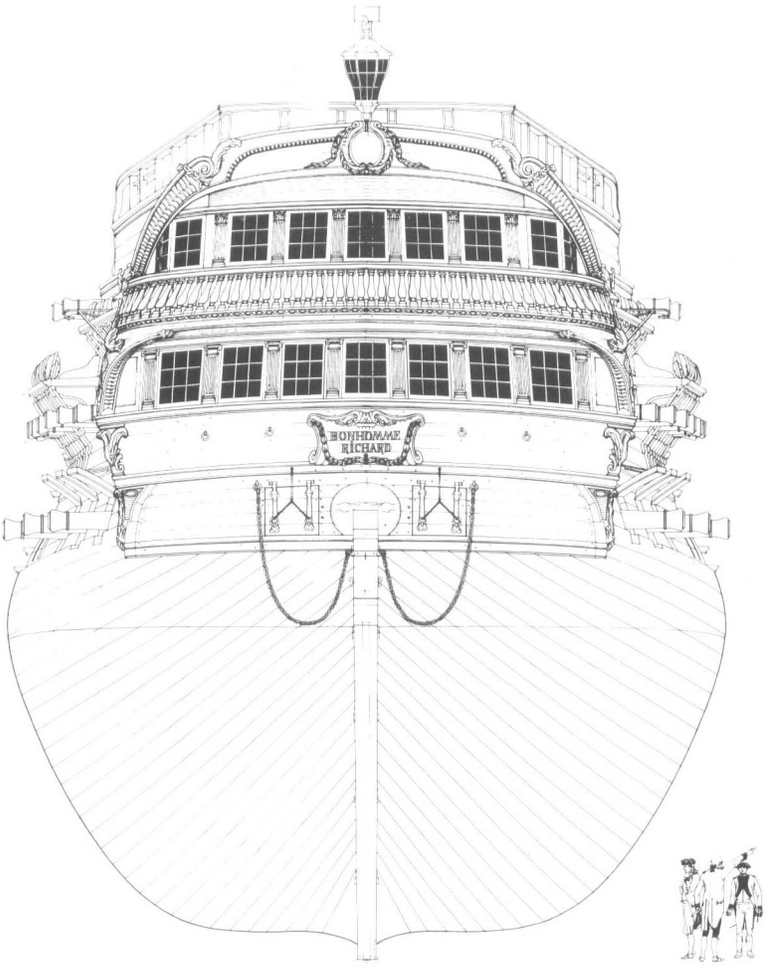
Jean Boudriot

BONHOMME RICHARD 1779

Translated by David H. Roberts



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THE BONHOMME RICHARD

Continental Navy of the United States

1779

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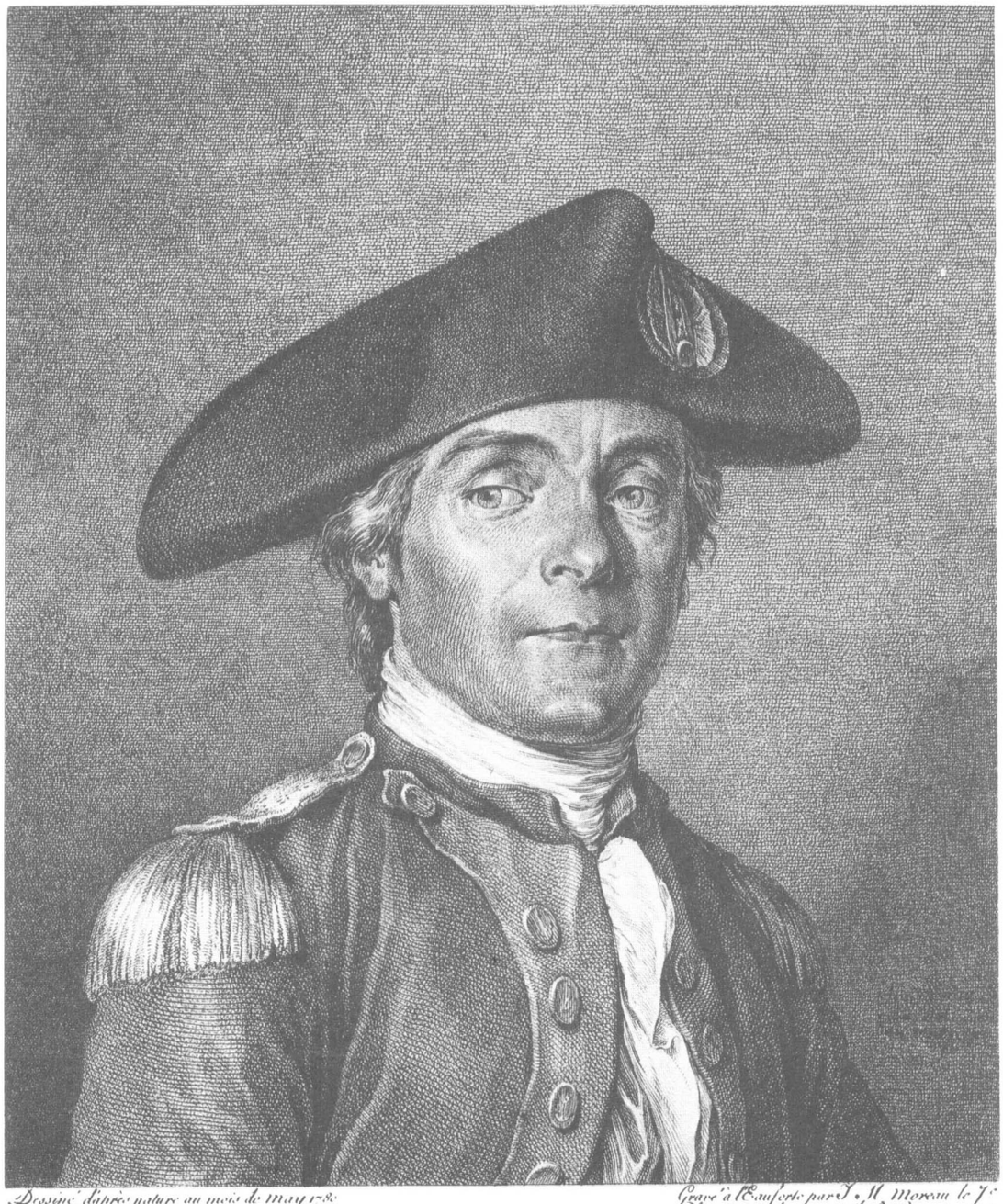


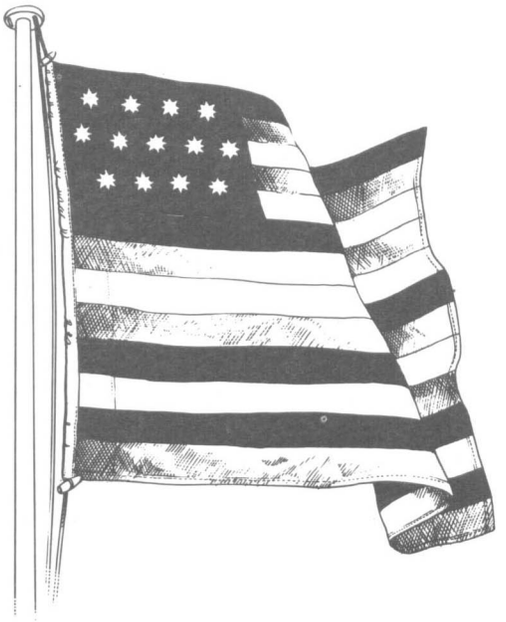
John Paul Jones, by Jean Michel Moreau the Younger. Drawn from life, May 1780. The caption, which is a quotation from Molière, reads: "Such men but rarely tread this earth, When Heaven sends them let us prove their worth." Official U.S. Navy Photograph. Reproduced by kind permission of the U.S. Naval Academy, Annapolis, Md.

THE BONHOMME RICHARD

Captain John Paul Jones

1779

Monograph and Plans
Scale: 1/48



Jean Boudriot
Paris 1987

TRANSLATOR'S NOTE

Those who have read my introductory notes in the The Seventy-Four Gun Ship *will be aware that in those volumes I have tried to stay as close as possible to the French original; the same is less true in the pages which follow. The English translation of Jean Boudriot's handwritten pages was undertaken almost simultaneously, and this enabled me to write the book with greater freedom than is usually the case for a translator; there are thus occasions when I have paraphrased or even expanded the text, drawing on material from other books by him, or directly from the sources quoted; at times this has led the author to make similar changes to the French text. Having been involved closely with the whole project from the beginning, albeit until now in an essentially "passive" role, I have enjoyed the pleasure of seeing the various drawings emerge one by one, and of sharing in the excitement of the re-discovery of the* Bonhomme Richard *after so long.*

A brief note is required on the dimensions given in the text of this monograph: all measurements are in French *feet and inches, with the metric equivalent in brackets after. The old French foot, for those unfamiliar with these measures, was made up of 12 inches of 2.71 cms, and was therefore about 10% longer than the English foot. French (and indeed English) inches were in turn divided into 12* lines, *(but wherever possible I have conformed to modern English usage by converting these into fractions of an inch). Each line could further be divided into 12* points *(equal therefore to slightly under 0.2 mm).*

I have severely restricted my explanations of contemporary maritime terminology, since this would merely be a repetition of the notes to be found in The Seventy-Four Gun Ship, *essential background reading for a full understanding of all Jean Boudriot's monographs.*

D.H.R.

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INTRODUCTION

Having already written one book on the subject of the French East India Company[1] *nothing was further from my mind than that I should find myself going over the same ground again, despite its undoubted interest; but circumstances have dictated otherwise.*

Students of maritime history will not be unaware that during the American War of Independence the government of France (in other words the King) offered the command of a ship to an officer of the young American Navy.

That officer was the renowned John Paul Jones, and his ship was to be the Bonhomme Richard*; their cruise round the coast of Britain, and more especially the battle with the English 44-gun ship* HMS Serapis, *were to count among the greatest achievements of the Continental Navy.*

The Bonhomme Richard *was in fact a former Indiaman of the French East India Company, named the* Duc de Duras. *For many years American historians have been curious about John Paul Jones's ship, and at different times several have got in touch with me, anxious to assemble as much information as possible about her; however, none of these attempts seemed likely to lead to a full reconstruction of the* Bonhomme Richard.

In 1985 however I was prevailed upon by a combination of circumstances to set aside my other work and to undertake the attempt myself, treating it not simply as a research project, but as the basis for a further volume in the series of monographs for shipmodellers which I have published over the last ten years, and indeed for a second book of more general historical interest[2].

At this point a word about such reconstructions of historic ships may not be out of place. It is important to realise that when talking about a specific ship no historian can affirm that ''this was so'', or ''this looked like this'', without direct archaeological evidence in the hand. Since the wreck of the Bonhomme Richard *lies today at the bottom of the North Sea, I am forced to express myself in terms of probabilities: that the general appearance of my reconstruction is accurate I have no doubt, but when we come to all the small details of stores, rigging and fittings I can only say that what I have illustrated conforms to contemporary practice, and is consistent with the somewhat meagre information provided by contemporary accounts of the ship. Perhaps one day the wreck itself will yield positive archaeological proofs, and confront hypothesis with fact: such a confrontation can only be of benefit to any historian, and one thing which my years of research has taught me is that reality is often very different from theory!*

Having expressed this caveat, I humbly submit the reconstruction in the pages which follow to the critical appreciation of you my most attentive readers, the model-makers: like the shipwrights of the 18th century, you will put my drawings to the test through the sweat of your brow and the skill of your hands. May you derive as much pleasure from that labour as I have experienced in piecing together the jigsaw of clues which provided the basis for my work on the Bonhomme Richard. *I wish you patience and skill, and above all enjoyment.*

J.B.

[1] *J. Boudriot: La Compagnie des Indes 1737 – 1768; Le Boullongne*. 2 vols, Paris 1983.

[2] J. Boudriot: *John Paul Jones and the Bonhomme Richard*, Paris and Annapolis, 1987. Published in English only.

Captain John Paul Jones Continental Navy of the United States

John Paul (the Jones was added later) was born at Arbigland in Galloway on July 6th 1747. His father was a gardener at the house of William Craik, but despite his humble birth John Paul was able to receive some education.

At the age of 13 he went to sea, and made his first voyage to America, where he was able to renew ties with one of his brothers who had settled in Virginia. By the age of twenty-one he commanded a merchant ship, and was able to make some money. In 1773 however an incident on board his ship degenerated into mutiny, and he was responsible for killing a man; the incident took place at Tobago, and John Paul decided that it would be discreet to make his way to America, rather than waiting for an Admiralty Court.

Two years later, John Paul Jones as he now called himself received a Lieutenant's commission in the fledgling navy of the rebellious colonists, and in 1777 he was promoted to the command of the sloop *Ranger*. His mission was to carry the war to Europe. He received a sympathetic welcome in Paris, and made the acquaintance of the American Commissioner, Benjamin Franklin, who was at that time living in Passy, in the town house of a wealthy and influential bourgeois called Donatien le Ray, who had made a large fortune in trade, mainly through his connections with the French East India Company.

Donatien le Ray had been ennobled following his acquisition of the Château de Chaumont, and he became the intermediary between the colonists in rebellion and the French crown, discreetly supplying arms and other matériel.

After a short stay in Paris[1], John Paul Jones returned to Paimboeuf and to the *Ranger* at the end of January 1778[2], and embarked on a profitable cruise off the Irish and Scottish coasts, returning in May 1778 to Brest in the company of one of his prizes, the sloop-of-war *H.M.S. Drake*.

In June, Benjamin Franklin invited Jones to come to Paris; he was to spend two months there, in the hope of securing the command of a larger ship, but this plan came to nothing. Nevertheless, both Franklin and Leray de Chaumont interceded on his behalf to secure a vessel from the French King; clearly it could not have been a Navy ship, and so in the end the solution adopted was for the crown to buy a vessel of some size and to lend it to Jones, with the intention of taking it into the Navy later.

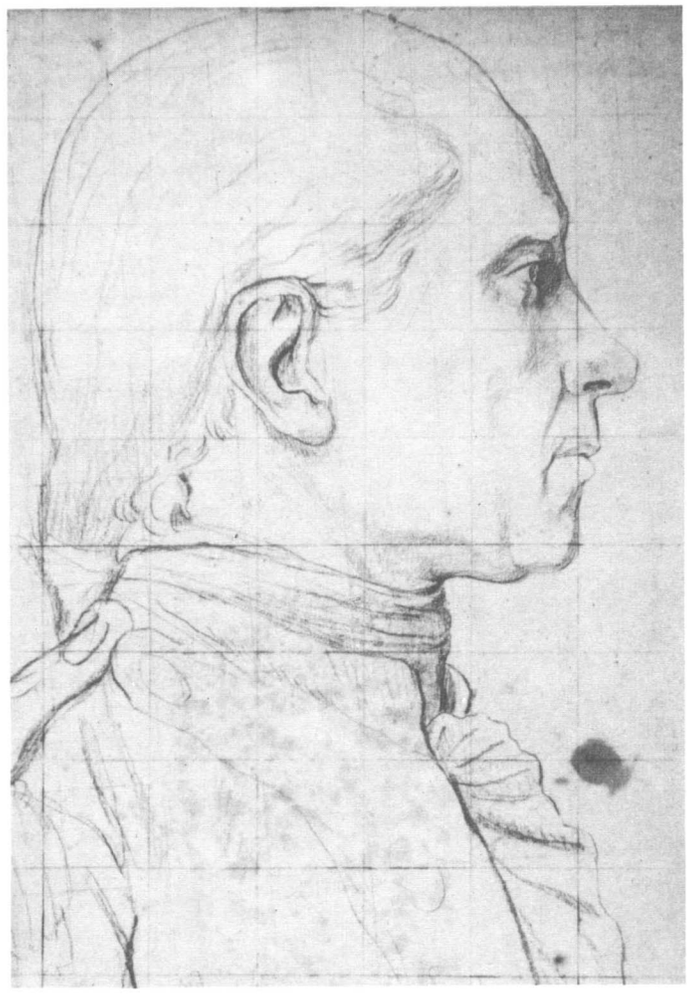
The negotiations were put in the hands of de Chaumont, and at the end of 1778 he was able to propose to Sartine, the Minister of the Navy, the purchase by the crown of the former East Indiaman, the *Duc de Duras*. After some manoeuvering, designed to increase the price, the vessel was finally bought at the end of January 1779; the vendor was a L'Orient merchant called Bérard, who was probably a "creature" of de Chaumont. The price of the vessel, despite its age, was no less than 221,000 *livres*, to which must be added the cost of converting her, amounting to another 7,250 *livres*. The cost was borne by the crown, and Leray de Chaumont was charged with supplying her with stores, in particular her guns[3]. To Jones fell the responsibility of finding a crew, permission however being witheld as to the recruitment of French seamen[4].

[1]Although brief, it was long enough for him to become the lover of Madame de Chaumont, a fact which was perhaps not immaterial in the not always cordial relations between Jones and the cuckolded husband!

[2]He was to have repeated problems with the crew.

[3]In fact, he failed to supply the guns required; see the section on the ship's guns, page 49.

[4]According to the documents drawn up and listing the entitlements to prize money, the crew included some 150 Frenchmen, for the most part volunteers collected together from as far afield as Nantes and Paris.



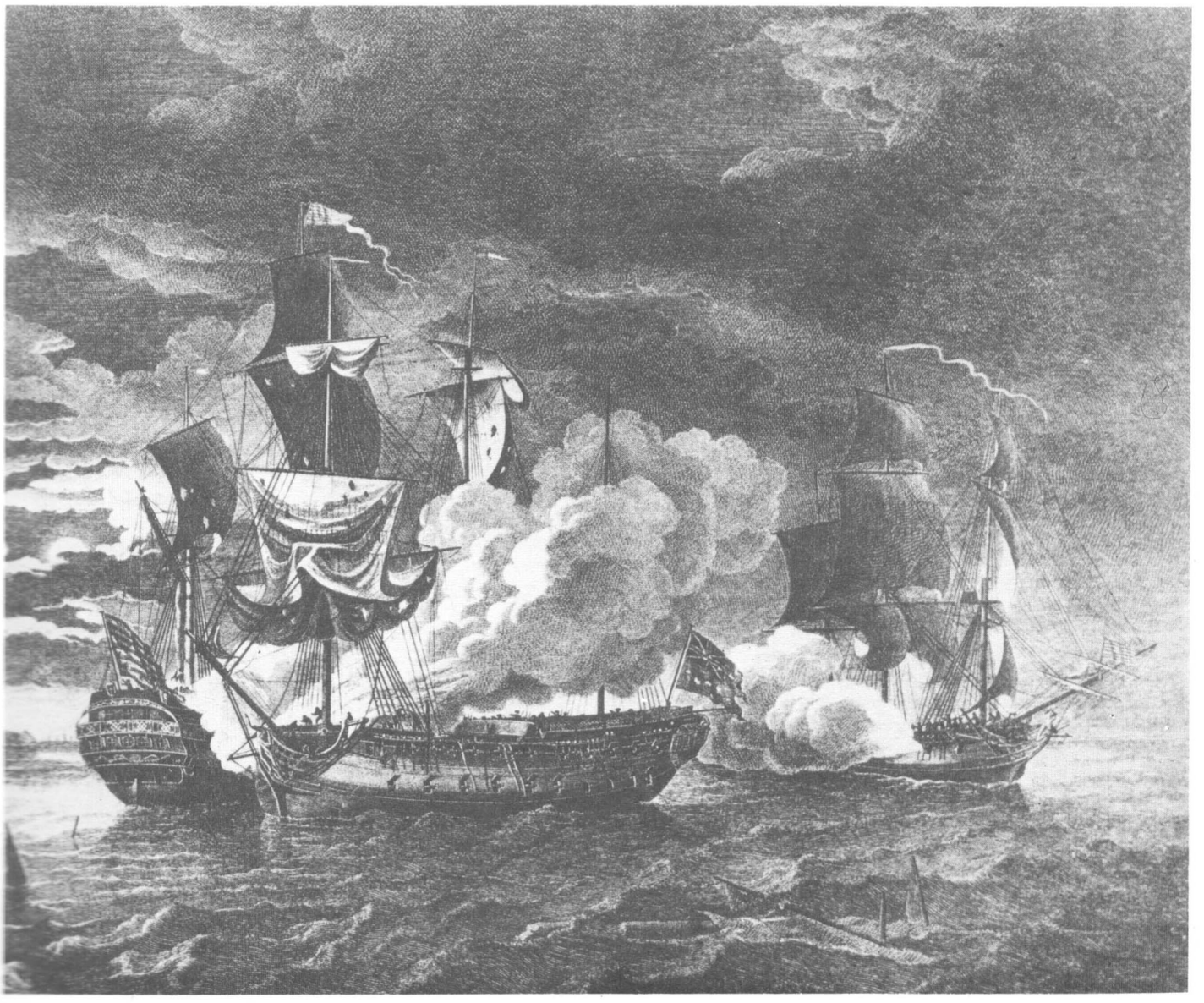
John Paul Jones, *by Dupré. This drawing is preserved at the Museum of Blérancourt, and reproduced here with their kind permission. It was almost certainly this drawing which served as the basis for the medal struck in 1787. Jones appears as a man of conventional good looks, of small stature but "well put together", brown hair, and lively grey-blue eyes. He was intelligent, and confident of his ability. He was a successful ladies' man, and a number of the fair sex, by no means of humble birth, were to compete for his favours. On the other hand, men liked him less; while they admired his courage, his ability as a commander was more questionable. Despite the assiduous protection of Benjamin Franklin, his enemies were numerous, and among them were many of his own countrymen. As is frequently the case with men of exceptional gifts, their talents only come to the fore in moments of exceptional danger, and perhaps in this sense Jones was a victim of the peace which followed the War of Independence.*

The men recruited were for the most part either Americans, Irish deserters, or landsmen enrolled from as far afield as Paris and Nantes. However, this makeshift crew was to fight extremely courageously. The Irish Régiment de Walsh-Sérrent in the service of the French crown provided a contingent of "marines" for the *Bonhomme Richard*. All in all, both supplies and men were to cause many problems, and one can only suppose that the French Navy regarded Jones as an unwelcome intruder, and put obstacles in his path.

To cut a long story short, the work of modifying the ship was completed in mid-May. She put to sea from the Ile de Groix on June 17th, but this was only a brief sortie in order to escort a convoy. She was back in Lorient by July 1st, to carry out repairs following a collision.

On August 14th Jones set sail again, this time in command of a small squadron of seven vessels: *Bonhomme Richard* (40), 380 men; *Alliance* (36), 215 men; *Pallas* (32), 253 men; *Vengeance* (12), 66 men; *Le Cerf* (18), 157 men; and two privateers, the *Monsieur* (38), 357 men, and the *Granville* (12), 100 men. The squadron was to cruise for prizes off the coasts of Ireland and Scotland, a repetition of Jones' earlier cruise in the *Ranger*.

This engraving is an English view of the battle which took place on September 23rd 1779. Compare this view of the Bonhomme Richard *with that on page 11; here she is shown with only one stern lantern, and with a gaff mizen. The* Serapis *seems to be very accurately represented, with the correct number of gunports (ten) on the lower and upper decks. She is shown however as having already lost her mainmast, so that the artist is somewhat "premature". This picture is in my opinion more reliable than the French picture on page 11, which shows for example three stern lanterns on the* Serapis. *However, the battle is shown as being very unequal, the four vessels in Jones squadron totalling 124 guns, against 64 for the two English ships.*



The squadron took a number of prizes, for the most part small merchantmen. During the night of August 23rd, off the coast of Ireland, the *Bonhomme Richard* found herself becalmed; the boats were lowered to tow her round, and the crew of the "Captain's boat" (the cutter) took advantage of the opportunity to drop the tow and desert. A second boat sent after them was unsuccessful, and her crew were made prisoner. On the following morning *Le Cerf* was sent in after them, but was equally unsuccessful, and failed to rejoin the squadron after losing touch in fog[5]. Meanwhile, the privateer *Monsieur* had also left the squadron on August 19th. Despite these setbacks however several prizes were taken, or burned, or driven ashore. The reduced squadron, consisting now only of the *Pallas*, the *Vengeance* and the *Alliance* in the company of the *Bonhomme Richard*, proceeded north round the coast of Scotland. An attempted attack on Leith was foiled by unfavourable winds, and it was on Thursday September 23rd 1779 that the squadron sighted a convoy of merchant shipping rounding Flamborough Head off the northeast coast of England. It was in the afternoon, and the convoy immediately turned back, the retreat being covered by the two armed escorts, who waited for Jones' squadron to come up. The escorts were the small armed ship *The Countess of Scarborough*, and the 44-gun ship *HMS Serapis*.

The wind was light, and it was as the sun was setting, at 6.30 p.m., that the *Bonhomme Richard* and the *Serapis* went into action; the *Serapis* was both faster and more manoeuverable than the ex-East Indiaman, and furthermore she was much more heavily armed[6]. After an hour of heavy fighting, Jones succeeded by a combination of skillful manoeuvering and good luck in ranging alongside the *Serapis*, the two vessels being head to stern, with the *Serapis*' jibboom caught in the *Bonhomme Richard*'s mizen-shrouds, and the two vessels seized together by a large number of grapplings. The cannonade continued at point-blank range, with hand-to-hand fighting. The six 18-pdrs of the *Bonhomme Richard* had been put out of action at the outset, when one or more of the guns burst, causing devastation in the gun-room. The superior firepower of the *Serapis* tore large holes along the waterline of her adversary, eventually silencing the upper deck battery as the men were forced up on deck.

Only the three port-side 8-pdrs on the quarterdeck remained serviceable. Jones had heavily armed and barricaded his tops, from which a continuous fire of swivels, muskets and grenades was poured down on the decks of the *Serapis*, forcing the guncrews down onto the lower deck, where the 18-pdrs continued to wreak havoc among the old timbers of the *Bonhomme Richard*.

The frigate *Alliance*, commanded by Captain Pierre Landais (a Frenchman, naturalised American), sailed round the two other ships, firing grape, and failing to draw any distinction between friend and foe in the smoke and the darkness. By 9.30 p.m. the *Bonhomme Richard* was on fire, half her crew dead or injured; water was flooding into the hold. Two wounded petty officers went up onto the quarterdeck; failing to find Jones, who was personally commanding one of the 8-pdrs, they presumed both him and the other officers dead, and began to hail the *Serapis*, shouting "Quarters, quarters, our ship is sinking!"

Hearing their cries, Jones hurled himself at the two men, knocking one unconscious with a blow from the butt of his pistol; in answer to the question from the *Serapis*, "Do you surrender?", it was Jones himself who replied: "No, I may sink, but I'm damned if I'll surrender". It was these words which many years later the 1st Lieutenant, Richard Dale, reported in the version which has now become famous, "I have not yet begun to fight".

Against all odds, the tide of battle was about to turn.
The Master-at-Arms had at his own initiative released more than a hundred English prisoners. They were set to working the pumps, holding their own for a while against the rush of water into the hold. Finally however it was the action of one of the men in the tops which was to change everything. Running out along the yard, he hurled a grenade down through the *Serapis*' main-hatch onto her lower deck. The grenade exploded, setting fire to a number of abandoned cartridges, and causing widespread destruction on the gundeck.

The quarterdeck 8-pdrs continued to batter at the *Serapis*' mainmast, and the *Alliance* was still in the offing, opening sporadic fire indiscriminately on the two vessels locked in combat.
The English crew, fewer in number anyway at the outset, were more than half dead or wounded. At 10.30 p.m., after four hours of terrible fighting, Captain Richard Pearson of the *Serapis* lowered his colours; but he had saved his convoy. The battle had taken place in calm weather within sight of the coast, where thousands of spectators had gathered, drawn by the sound of the guns. Captain Pearson[9] was led on board the *Bonhomme Richard*, where Jones offered him a glass of wine.

At midnight the *Serapis*' mainmast fell by the board, and it was not until the following morning that the fires on board both ships were brought under control. The *Bonhomme Richard* continued to make water, and the pumps were unable to hold their own; there were many holes below the waterline, and the upper works showed gaping damage; the masts and spars were seriously damaged, and the rudder had been shot away.
In view of the condition of his ship, Jones transferred his flag to his prize. During the night of Friday the rising wind and heavy sea forced him to transfer the wounded and any items of value from the *Bonhomme Richard*, and on Saturday morning, September 25th 1779, thirty-six hours after the end of the action, she sank slowly beneath the waves, while Jones watched from the *Serapis* "with inexpressible grief".

The *Serapis*, together with *The Countess of Scarborough* which had been captured by the *Pallas*, set sail towards the south-east, accompanied by the *Alliance* and the *Vengeance*. Despite the precarious state of the *Serapis*' spars, the squadron managed to make the safety of the neutral port of Amsterdam.
In April 1780 Jones returned to Paris, preceded by the considerable fame earned by his audacious and even foolhardy cruise off the coasts of Britain, and above all by his defeat and capture of the *Serapis*.

His fame had spread throughout Europe, and he was greeted as a hero. Louis XVI awarded him the Knight's Cross of the Order of Military Merit[10], and gave him a gold-hilted sword. During the summer Jones left Paris for Lorient to prepare for his return to the United States; his plans were however somewhat inconvenienced by the impromptu departure of the *Alliance*, under the command of Captain Landais. It was thus not until February 1781 that he was able to return himself, in a French ship.

On his arrival, he was obliged to defend himself against a number of personal attacks, for his detractors were not lacking; however, he defended his conduct successfully to Congress, and received permission to accept the Cross of Merit. He was appointed to the command of a new 74, the *America*, which was then building, but to his great disappointment, immediately after the launch, Congress decided to offer her to France, as a replacement for the *Magnifique*, lost off Boston. At the end of 1782, Jones put to sea as a guest aboard the *Triomphant*, the flagship of Admiral the Marquis de Vaudreuil, and was able to take part in the opening hostilities against Jamaica, to which however the signature of a peace treaty brought an end.

The Battle off Flamborough Head – September 23rd 1779

The Serapis *was armed with 20 18-pdrs on her gundeck and 20 9-pdrs on her upper deck. Her opponent was armed with 6 French 18-pdrs on the gundeck, with 28 12-pdrs on the upper deck, and with 6 8-pdrs on the quarterdeck. In theory therefore the weight of* Serapis*' broadside was 270 English pounds, or 1,223 kilos, while the* Bonhomme Richard *could fire only 248 French pounds, or 1,213 kilos. The series of sketches shown below, which come from Samuel Eliot Morison's book "John Paul Jones, A Sailor's Biography", show the different phases of the battle which started at 6.30 in the evening.*

1. Close-hauled and with the weather gauge, Bonhomme Richard *(shown in black) opens fire; Jones' 18-pdrs are immediately put out of action.*

2. Bonhomme Richard *tries to board* Serapis *(shown in white) on the starboard quarter.*

3. Serapis, *avoiding the manoeuvre, crosses* Bonhomme Richard*'s bows; losing speed at the critical moment, she is unable to prevent a collision in which* Bonhomme Richard*'s bows strike her quarter.*

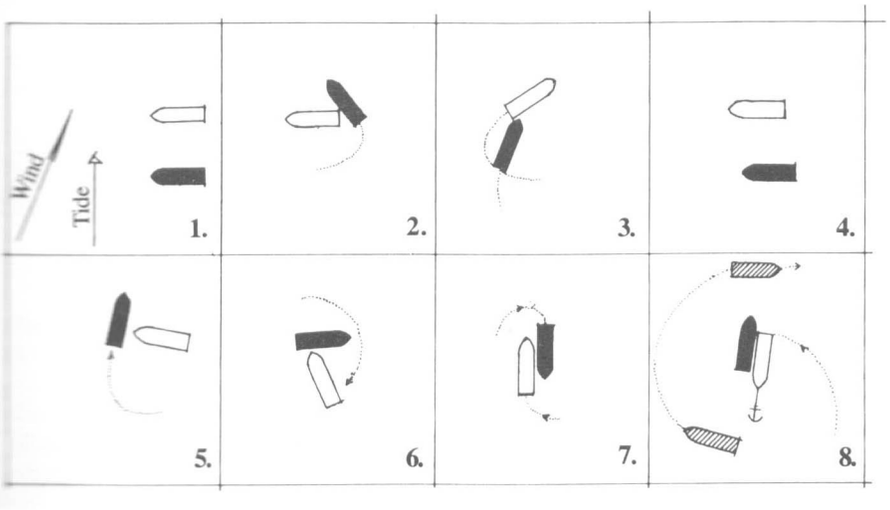
4. Pulling free, Serapis *reduces speed and places herself parallel with the* Bonhomme Richard, *as at the beginning of the action.*

5. Suddenly changing course, Bonhomme Richard *crosses ahead of* Serapis, *whose jibboom is caught in the American ship's mizen-shrouds.*

6. Bonhomme Richard *takes advantage of this position to swing round, coming alongside to starboard of her adversary.*

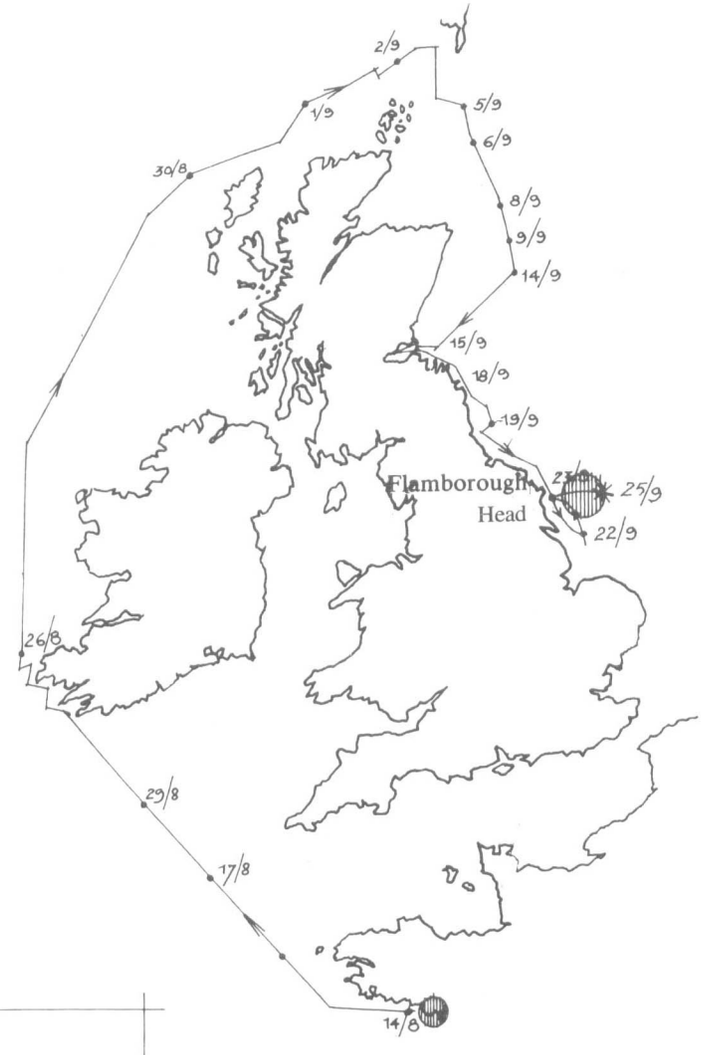
7. The vessels are finally grappled together, and night has fallen.

8. Serapis *lets go an anchor in an attempt to pull free, but swings round 180° in the tide, and the* Bonhomme Richard *follows her round. The battle continues with all its fury, and the small American frigate* Alliance *(shown in grey) sails round the two ships firing grape. At 10.30 p.m., after four hours, the battle ends. Captain Pearson surrenders his sword to John Paul Jones.*



It is somewhat surprising that Jones should not have attempted to board the English ship, in view of his superiority in numbers of crew. Was he perhaps unsure of the experience and above all of the determination of his men?

Furthermore, Captain Landais of the Alliance *was in a position to force Pearson to fight both his broadsides at once, instead of firing ineffectually from a distance, using grapeshot into the bargain. There must have been a considerable degree of antagonism between the two men to explain such curious conduct.*



On this outline map (which I owe once again to Morison's excellent book) I have marked the route taken by Jones' squadron round the shores of the British Isles. The cruise lasted only 40 days, from the departure from Lorient to the sinking of the Bonhomme Richard *off Flamborough Head. The route shows the audacious courage of John Paul Jones.*

At the end of 1783 Jones received the authority of Congress to return to France. He was to remain in Paris for three years, under the pretext of acting as prize agent for his crew and recovering the prize monies due to him. The real reason was however that he hoped to obtain a senior rank in the French Navy, an ambition which was doomed to failure as anyone will realise who is aware of the spirit of the "grand corps" of the French Navy. Despite all his efforts and the influence used on his behalf, he was unable to achieve more than the settlement of his prize monies. Returning to America in 1787, he was able to obtain from Congress the award of a gold medal, designed by Augustin Dupré, and struck at the Paris Mint[11].

Returning once again to Paris in December 1787, Jones undertook a journey to Denmark, once again ostensibly to secure compensation for the loss of some prizes[12]; there is little doubt however that this journey had other attractions, in that he was already en route for the Baltic: it was while he was in Copenhagen that he accepted an offer from Empress Catherine II of Russia of the rank of Rear Admiral in the Imperial Navy. Despite some minor successes against the Turks, his service in Russia was short, and marred by intrigues; he was invited to take leave of absence, and left Russia in August 1789. His journey took him to Warsaw, and then on a European tour which was to last for a year. He returned to Paris in 1790, and took up lodgings in the rue de Tournon. It was there that he died, on the evening of July 18th 1792, aged 45 years, worn out before his time by the rigours of his life.

He was buried at the Protestant cemetery outside the Porte-St-Martin, but in 1905, following extensive searches by General Porter, American Ambassador to France, his grave was re-located. His body was exhumed and taken to America, returned by France to the U.S. Navy representing the government of the United States. Amid great pomp, Jones was buried in a vault at the U.S.Naval Academy in Annapolis. His tomb is inscribed with the following words: "He gave our Navy its earliest traditions in heroism and victory".

I hope that this short biography has given the bare details of the life of a man who is rightly honoured in America, and has provided a context for his ship the *Bonhomme Richard* which he made so famous.

●

[5] See J. Boudriot: *Le Cerf*, ANCRE, Paris, 1982. Also available in English.

[6] The *Serapis* was a small two-decker of 44 guns. The design was considered obsolete in France, but she was a new ship, and although too slow to match the heavier frigates, and too lightly armed to face a 74, she should have been a powerful match for the dilapidated ex-East Indiaman.

[7] The antagonism between Jones and Landais was extreme, but the former was not an easy man to get on with, and the latter was certainly bordering on insanity.

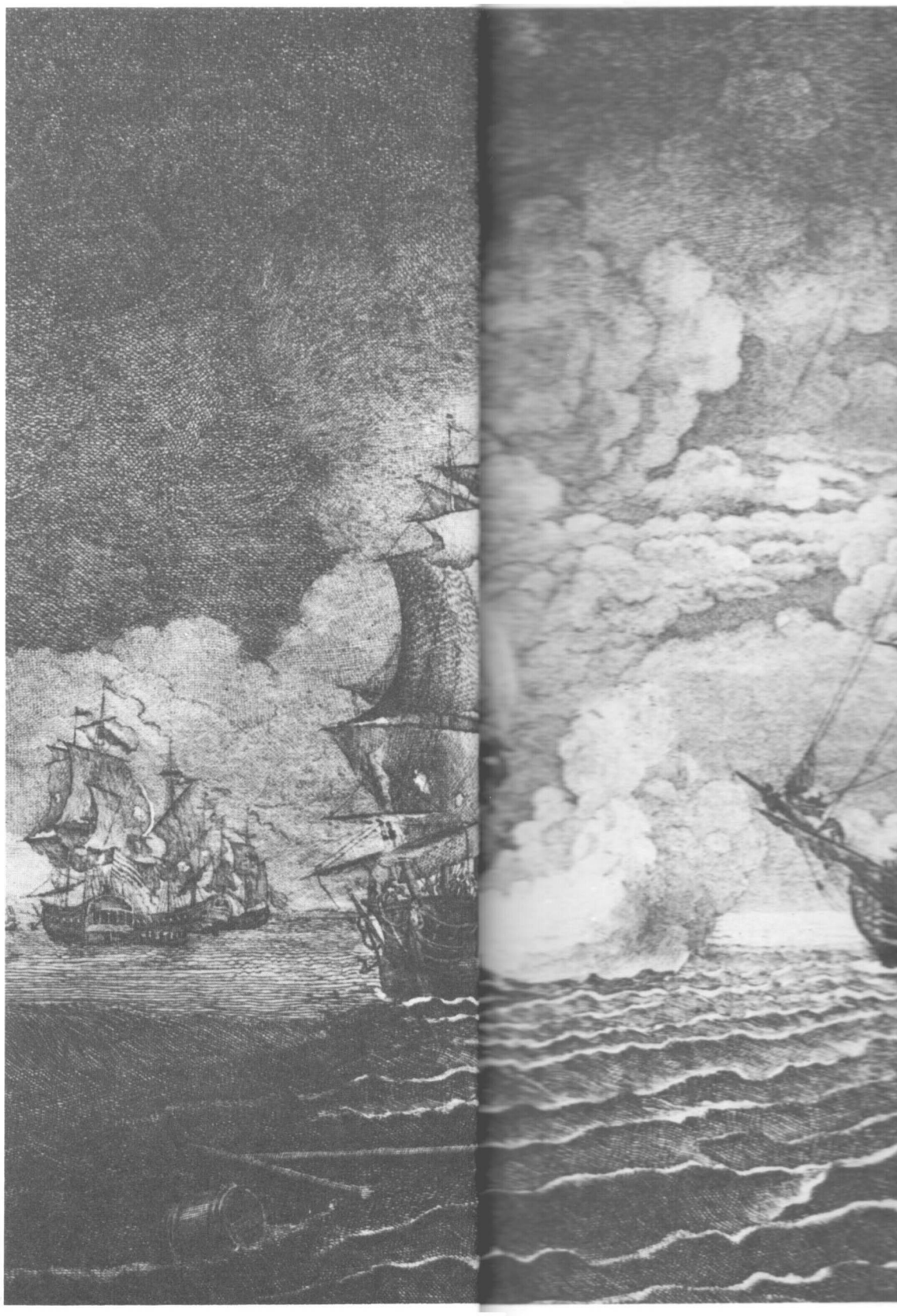
[8] Despite the damage caused by the *Serapis*' guns, the pumps remained in action. There were four in all.

[9] Captain Pearson was exchanged some months later as a prisoner of war. He had to face a Court Martial on his return for the loss of his ship, but he was honourably acquitted, and later knighted by George III for having saved his convoy. He remained in active service until 1789. In 1800 he was appointed Lieutenant Governor of Greenwich Hospital, where in 1805 he died at the age of 74. He is buried at Greenwich, and his sword and pistols are preserved at the National Maritime Museum.

[10] Being a Protestant, Jones could not be awarded the Cross of St Louis. While he was certainly greatly flattered by the honour, it should perhaps be said that it was commonly awarded to Protestant officers serving in the French Navy, and that all captains received the Cross of St Louis on their promotion.

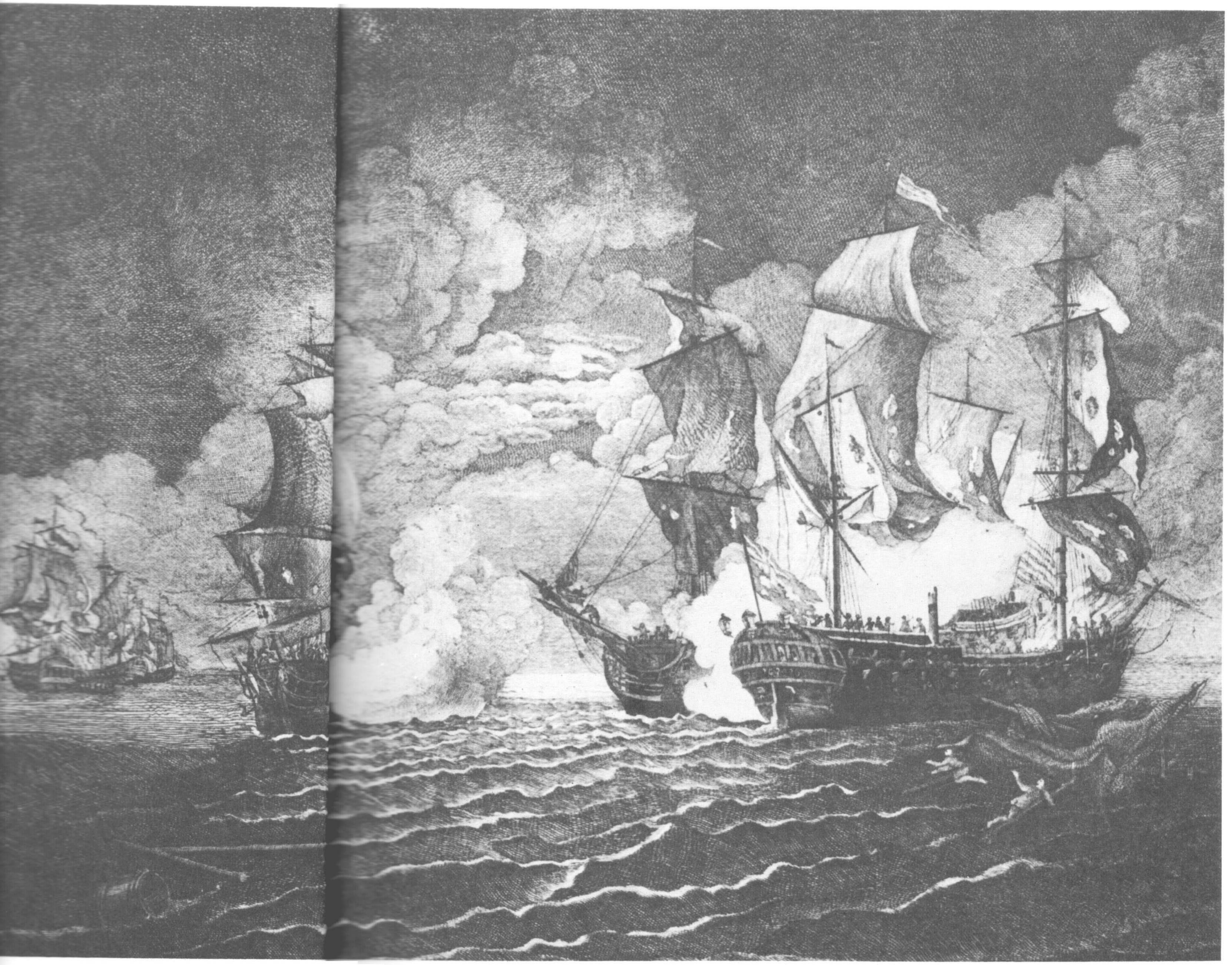
[11] These honours disguise a sad fact: with peace assured, Congress could dispense with the expense of a Navy!

[12] The prizes had been sent into a Norwegian port, and Norway at that time was ruled by Denmark. The prizes had however been immediately released to Britain, and Jones tried in vain to obtain compensation.



Battle between Bonhomme Richa
September 23rd 1779 (Engraving by a

The English ship can be seen in the fo
Richard *alongside on the port side. On t*
frigate Alliance, *sailing round the two s*



Battle between Bonhomme Richard and the Serapis, September 23rd 1779 (Engraving by an unknown French artist)

The English ship can be seen in the foreground, with Bonhomme Richard *alongside on the port side. On the left can be seen the small frigate* Alliance, *sailing round the two ships locked in combat, and firing grape. In the background to the left can be seen the action between the* Pallas *and* The Countess of Scarborough.

The artist has made the most of the dramatic effects of a night action, but has ensured that the smoke does not obscure his subject, as was certainly the case in reality.

THE RECONSTRUCTION OF THE BONHOMME RICHARD

The first task facing me, before looking at the *Bonhomme Richard*, was to undertake the reconstruction of the *Duc de Duras*. The *Duc de Duras* was launched in Lorient on November 28th 1765, and was built to the draughts of N. Groignard[1].

The facts at my disposal for this preliminary work were limited to a Table of Principal Dimensions, but I was able to cross-check these against the Dimensions of an identical ship, the *Duc de Penthièvre*, and those of two other ships of the same "class", the *Bertin* and the *Duc de Choiseul*. In addition, there is a draught in existence of the *Massiac*, a vessel of the same length. What was this class?

Between 1761 and 1765 a number of 900 ton[2] ships were built in Lorient[3] on the south coast of Brittany, all to draughts by Groignard. Groignard conceived the idea that ships of this size could serve the double role of merchant ships in peacetime, and warships in times of war. His concept was ratified by the Shipbuilding Council of the East India Company in April 1765, officially adopting these specific characteristics for ships of 900 tons burthen.

The Table of Dimensions of the *Duc de Duras*, with the supporting evidence provided by those of the other ships mentioned, enabled me to draw up a schematic sheer draught of the hull. These ships were theoretically armed with 26 18-pdrs[4] on the "gundeck" (although in practice only three ports were opened – see below), and 26 8-pdrs[5] on the upper deck. The arrangement of the gunports on the gundeck is determined by the positioning of the frames, and this was made possible by the fact that we have the dimensions of her *timber and room*.

The second station frame is positioned at the extreme forward end of the tread of the keel. The after side of the gunports of the gundeck is formed by the forward side of each of the station frames. There are three filling frames between each.

The upper deck ports are staggered in relation to those of the gundeck, and their position is thus imposed by the latter. The dimensions of the ports and their height of sill follows the standard practice of the period as laid down by the Regulations of 1762[6].

The number of beams on the gundeck is known from the Table of Dimensions, and they are laid out in accordance with contemporary practice (see for example the manuscript by P. Morineau, 1752-62, and Ch.N. Romme's *Art de la Marine* of 1787).

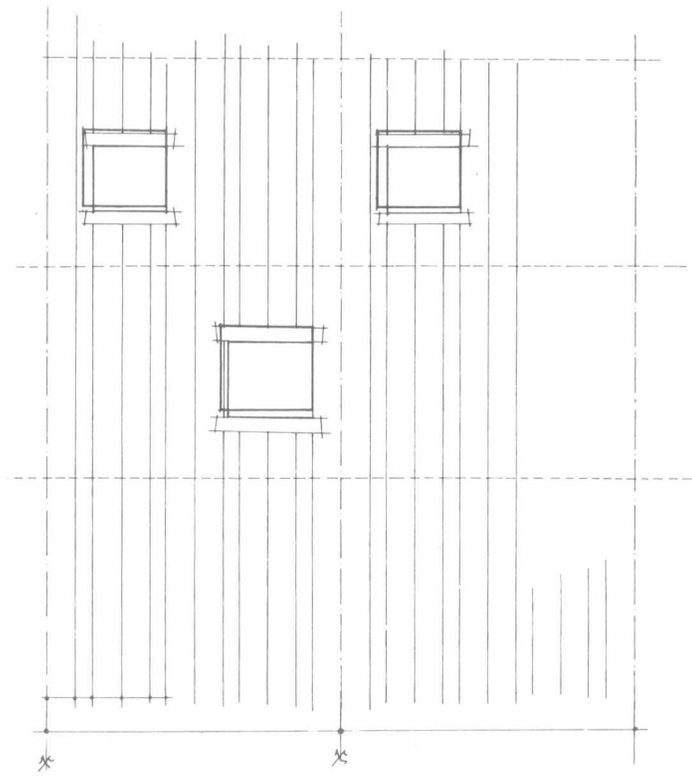
The draught of the *Massiac* gave me the positions of the masts, and at the same time confirmed the fact that only three gunports were opened on the gundeck, the remainder being planked over on the outside by the hull-planking.

The beams are positioned to take account of the pins of the bitts on the upper deck.

The ship has a "closed head", which was the normal practice for East India Company ships, and is furthermore confirmed by eye-witness accounts. The projection and structure of the head-timbers follows those of the *Massiac*. For the figure I have chosen a lion, which was a sort of universal emblem frequently adopted for Indiamen.

The poop finishes just abaft the mizen-mast, and is thus long enough to leave room for a great cabin at the stern and three smaller cabins forward of it on either side. The upper works are relatively low, since neither the forecastle nor the quarterdeck are armed.

The architecture of the stern is in accordance with contemporary practice, and I have followed the arrangements shown in the draughts of a second *Bertin*[7] of 1,200 tons, which was built in 1760.



This sketch of the frame timbers shows how the original gunports were cut in the Duc de Duras, *care being taken to cut as little as possible into the futtocks. Full advantage of the space between the frames was taken for their fore-and-aft enlargement, but raising the height of the sills and increasing the height of the ports required some adaptation of the timbers.*

The lines of the hull, and more particularly the underwater lines, were extrapolated from those of this larger ship, while respecting the dimensions given for the *Duc de Duras* (length, breadth, depth in hold, rake of stem and sternpost, and tumblehome). The draught of water aft is given on the Table of Dimensions, while the draught forward is taken from the report on the voyage of the *Duc de Penthièvre*.

When the ship was sold to the King in 1779, an inventory of stores was drawn up, which provided extremely useful information on her fittings, notably the anchors, boats and rigging; the proportions given are in fact in accordance with the Company's regulations of 1765 mentioned above.

These then briefly are the sources used which enabled me to make as plausible a reconstruction as possible of the *Duc de Duras*. Sold to the King in order that she might be lent to John Paul Jones, she was to undergo a series of modifications for her new role as a cruiser. Her name was changed to *Bonhomme Richard*, which was the French title of a book[8] by Benjamin Franklin first published in 1732; the choice of name was thus a compliment to Franklin, who had been instrumental in obtaining the ship for Jones.

By 1779 the *Duc de Duras* was already an old ship, and her sale to the King was a well-calculated transaction[9]. She had first passed into the hands of the crown on the dissolution of the Compagnie des Indes at the end of 1769. After completing two voyages to China, the *Duc de Duras* was chartered to transport troops to Ile de France. On her return in 1771, she was sold to two Lorient merchants. After a repair in 1772, she made a fourth voyage to China.

The work to convert the ship for her new role started in March 1779, and was to be completed in May, when her fitting-out was put in hand.

The first step was to modify the orlop and fit it out with the various arrangements necessary for a warship. In theory the gundeck could be armed with 13 guns on either side, but in fact only three ports had been opened, providing ventilation and light, and occasionally serving to embark cargo, the remaining ports being planked over on the outside. Because of the difficulties he experienced in obtaining sufficient 18-pdr guns, Jones opened up only four of the closed-off ports on either side. In the end, he was only able to obtain 6 guns for his "gundeck", and presumably in an effort to trim the vessel by the stern, he had a new gunport cut in the gunroom, and armed only the three aftermost ports on either side with 18-pdrs.

We learn from a letter written by Jones that the size of these guns required the original gunports to be enlarged, from which we can deduce that they were originally designed to be armed with 12-pdrs. Thus although there were ten ports on the gundeck, only six were armed, which must have represented a serious handicap; but with only four feet of height of gundeck sill, the use of the gundeck ports was probably in any case extremely restricted.

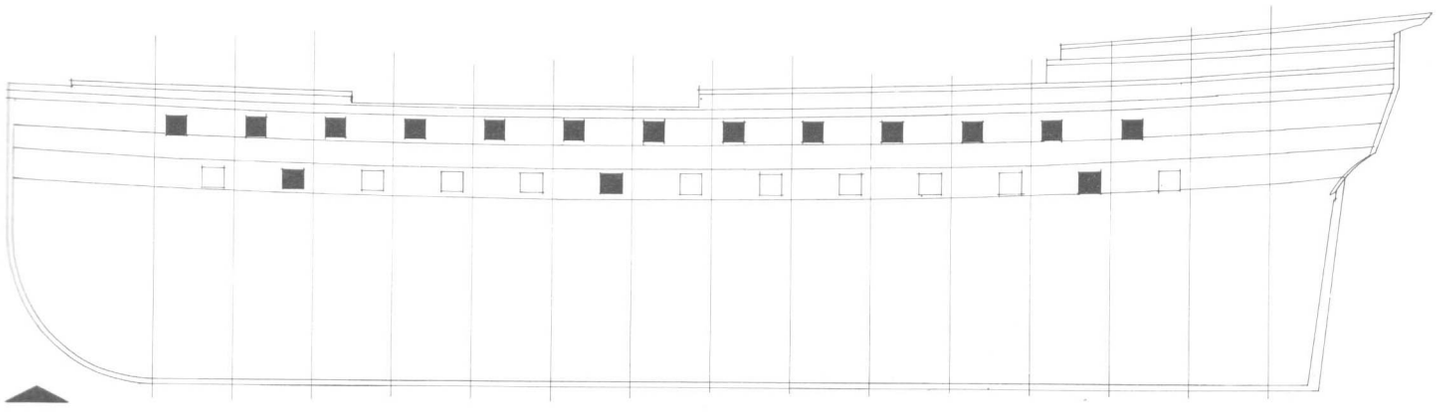
The upper deck ports, which had originally been designed for 8-pdrs, were enlarged to take 12-pdrs; an extra gunport was cut in the wardroom, and a bowchase port at the bows.

As a rule, East India Company ships carried no guns on the forecastle and quarterdeck, although open ports[10] were fitted, which might occasionally be armed with 4-pdrs. Jones decided on a much heavier armament of 8-pdrs, with one on the forecastle and five on the quarterdeck (on either side). The lengthening of the poop (see below) meant that one of these ports had to be opened in the great cabin. The bulwarks on the quarterdeck were raised to allow true ports to be cut, so that in all there were five gunports on either side on this deck, with however only the aftermost three armed. While theoretically the *Bonhomme Richard* might be described as a 64, in practice she mounted only 6 18-pdrs, 28 12-pdrs and 6 8-pdrs, or 40 guns in all[11].

As has already been mentioned, the poop was extended during the modifications. The probable reason was to enlarge the great cabin[12].

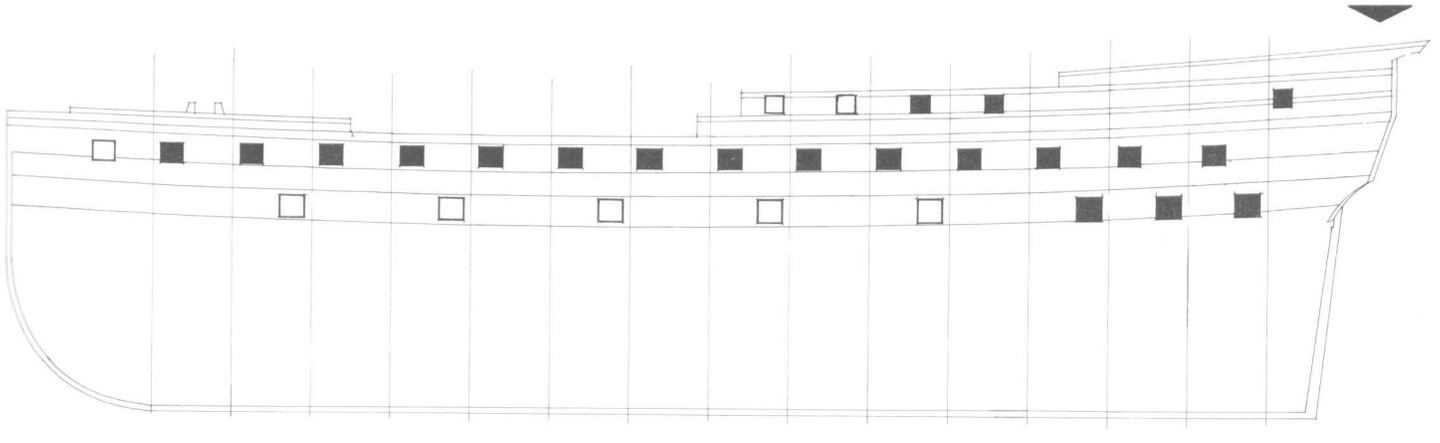
The poop breastwork and bulkhead, previously placed just aft of the mizen-mast, was moved to just forward of it, thereby covering over the after ladderway[13]. Previously the ladderway had been covered over by a *berthing* or hood.

The position of the riding bitts was changed from the upper deck to the gundeck. The original hawseholes were blocked up, and new ones opened on the gundeck. A new capstan was provided[14], and the head was rebuilt, this latter work being occasioned by a collision which occurred on her first cruise.



This first drawing shows the original arrangement of the gunports; there are thirteen ports on the lower deck, but ten are covered up by the hull planking on the outside; only those ports shown in black were opened. The thirteen upper deck ports are arranged chequer-board fashion.

This second drawing shows the arrangement of the ports after the modifications had been carried out. On the gundeck a new port was opened at the stern; the other original open ports were retained, and four of the berthed up ports were opened. On the upper deck, a bow-chase port was opened, and another port at the stern. On the quarterdeck five ports were opened. Only the ports shown in black were armed.



The upper part of the hull was reinforced with iron knees, supplementing the futtock-riders.
As for the rigging, the adoption of royal-sails meant that I had to show longer topgallant poles, and I have made the tops oversize[15].
The sail-plan is based on information provided by the ship's log.
And one final detail concerns the stern-lanterns: on the medal presented by Congress in 1787, the *Bonhomme Richard* is shown with three stern-lanterns. Is it possible that the engraver misinterpreted something he read?[16] This cannot be excluded, since at the time the use of three stern-lanterns was a privilege exclusively reserved for flag-officers commanding squadrons (Regulations of 1765 and 1776). To cut a long story short, I have trusted to contemporary usage and placed only one lantern at the stern.
I have brought together on one drawing (page 16) all the numerical information which we know about the *Duc de Duras*, her armament, and so on; then on the same drawing I have shown the changes made to what was to become the *Bonhomme Richard* in order to make her suitable for arming as a cruiser.
Following on from this drawing, I have added a commentary, and reproduced the principal archival sources, which I have annotated.
On page 21 there is a list of all the documents consulted during this difficult reconstruction, with their references or origins.
It must be understood that I cannot claim that my reconstruction portrays exactly John Paul Jones's *Bonhomme Richard*; on the other hand, I believe that what I have shown is at least the most plausible, on the basis of the current evidence. I am sure that my work can be criticised in some areas, and I welcome any criticism which offers an opportunity to bring to bear on this fascinating subject the knowledge and experience of other minds.

[1] N. Groignard: see the note on page 18.
[2] French tons of 2,000 French pounds or 978 kgs.
[3] Lorient (or L'Orient as it was then called) was the home port of the French East India Company.
[4] French pounds: 1 French pound weighs 489 grs, so that an 18-pdr fired a ball weighing 19.4 English pounds.
[5] Firing a ball weighing 8.6 English pounds.
[6] These Regulations formalised current practice, and naval shipwrights working for the East India Company would normally have followed them.
[7] This *Bertin* was launched on November 29th 1760, and was captured in 1761 on her first commission by *HMS Hero*. Her draughts are to be found at the National Maritime Museum in Greenwich, London.
[8] "Les Maximes du Bonhomme Richard". The English title was "Poor Richard's Almanack", and Jones frequently referred to the ship as Poor Richard.
[9] Particularly if one considers that the cost of building and fitting out the *Duc de Duras* in 1765 came to 246,367 livres, and the East India Company was in the habit of condemning its ships after five voyages. The price obtained by Bérard, at 221,375 livres, was undoubtedly a good "deal". Bérard had acquired the ship with an associate, the Sr Bernier, in 1771.
[10] With open ports the bulwarks came up only as far as the gunport sill, which left the gun and more importantly the guncrew completely exposed.
[11] On her first short cruise the Bonhomme Richard carried two 8-pdrs on the forecastle, and was described as a 42-gun "frigate". When she put to sea for the second time, these two guns had been removed. At the time that the conversion started, she was quite unrealistically described as a 64!
[12] Originally this cabin would have measured some 12 (French) feet fore-and-aft.
[13] An arrangement which would have been considered unusual, except on three-deckers.
[14] The original capstan would have had only one barrel, and that on the upper deck, since a second barrel on the lower deck, and above all its working, would have been impossible in a ship carrying cargo.
[15] Eye-witness accounts substantiate this fact, as do the number of men fighting in them during the battle with the *Serapis*, far in excess of those allowed by Regulations in the French Navy.
[16] I am referring to accounts which reported a lantern on each of the masts, thus three in all, but these were signal-lanterns hung in line abreast in the shrouds, not stern-lanterns.

This portrait of Benjamin Franklin (1706-1790) is from a treatise on physiognomy, published in the first years of the 19th century. Born in Boston, he was a member of the first Congress in 1775; he was sent to Versailles to negotiate a Franco-American alliance, which was confirmed in 1778.

These four documents are preserved in the Archives of the Port of Lorient. The first concerns the Duc de Duras*; it is supplemented and confirmed by a similar document concerning a sister-ship, the* Duc de Penthièvre. *A number of the entries have been deleted, and I advance the hypothesis that this might have been because a false deck of gratings joined the forecastle to the quarterdeck over the waist, in imitation of the* Ajax, *which was an English prize bought by the Company in 1763. The document relating to the* Duc de Penthièvre *shows no such anomalies, and nor do the documents concerning the* Bertin *and the* Duc de Choiseul, *which were identical to the* Duc de Duras, *except that they were 8 inches [21.7 cms] narrower in the beam.*

1222 5

Le Saint[illegible] 111e DÉSARMEMENT.

ESTIMATION ET PROPORTIONS.

LA Coque dudit Bâtiment, Conſtruction de Lorient

Agé de 20. mois ayant été lancé à l'eau le 28. 9bre 1765.

Du Port ——— de 900 tonneaux.

	Pieds.	Pouces.	Lignes.
Longueur de l'Étrave à l'Étambot,	145	—	
Longueur de Quille	126	—	
Largeur de dehors en dehors les Membres,	36	8	
Creux de la Calle de la Végre ſous Baux,	15.	—	
Deux Ponts conduits,			
Hauteur d'Entrepont ſous Baux,	5.	2	
Un Gaillard d'arriere,			
Hauteur du Gaillard d'arriere à l'entrée,	5	3	
Et d'arriere,	5	6	
Un Gaillard d'avant,			
Hauteur du Gaillard d'avant à l'entrée,			
Et d'avant,			
Une Dunette,			
Hauteur de la Dunette à l'entrée,	5	3	
Et d'arriere,	6		
Percé pour canons.			
Tirant d'eau à ſa charge,	17	6	
	3	8	
	26		

La Coque dudit Bâtiment eſtimée [illegible]

La Chaloupe, ... De Cambry

Son Canot, ... /

Le Vaiſſeau le Duc de Choiſeul [illegible] ARMEMENT.

Cet article a besoin d'être éclairci [illegible]

PROPORTIONS.

LA Coque dudit Bâtiment, Conſtruction de l'Orient

lancé à l'eau le 20e decembre 1763

Du Port ——— de 900 tonneaux.

	Pieds.	Pouces.	Ligne.
Longueur de l'Étrave à l'Étambot,	145		
Longueur de Quille,	126		
Largeur de dehors en dehors les Membres,	36	8	
Creux de la Calle de la Végre ſous Baux,	15		
2 Deux Ponts conduits,			
Hauteur d'Entrepont ſous Baux,	5	2	
Un Gaillard d'arriere,			
Hauteur du Gaillard d'arriere à l'entrée,	5	3	
Et d'arriere,	5	6	
Un Gaillard d'avant,			
Hauteur du Gaillard d'avant à l'entrée,	5	3	
Et d'avant,	5	3	
Une Dunette,			
Hauteur de la Dunette à l'entrée,	5	3	
Et d'arriere,	5	6	
Percé pour 26 canons. de 8.			
Tirant d'eau à ſa charge,	17	6	

A Lorient Ce 5 janvier 1769

Le Cambry

Le Vaiſſeau le Dervin

Proportions

La coque du dit Batiment Conſtruction de l'Orient, Lancé a l'eau

Le 9e 9bre 1762

Du Port de 900 Tonneaux

	Pieds	Pouces
Longueur de l'Etrave a l'Etambot	145	
Longueur de quille	126	
Largeur de dehors en dehors les membres	36	
Creux de la Calle de la Vegre Sous Baux	15	
Deux Ponts conduits		
Hauteur d'Entrepont Sous Baux	5	2
Un gaillard d'arriere		
Hauteur du gaillard d'arriere a l'entrée	5	3
Et d'arriere	5	4
Un gaillard d'avant		
Hauteur du gaillard d'avant a l'entrée	5	
Et d'avant	5	
Une dunette		
Hauteur de la dunette a l'entrée	5	2
Et d'arriere	5	6
Percé pour 56 Canons de 18 et de 8		
Tirant d'Eau a la Charge	17	6

Le Vaiſſeau Le Duc de Choiſeul

1222. II

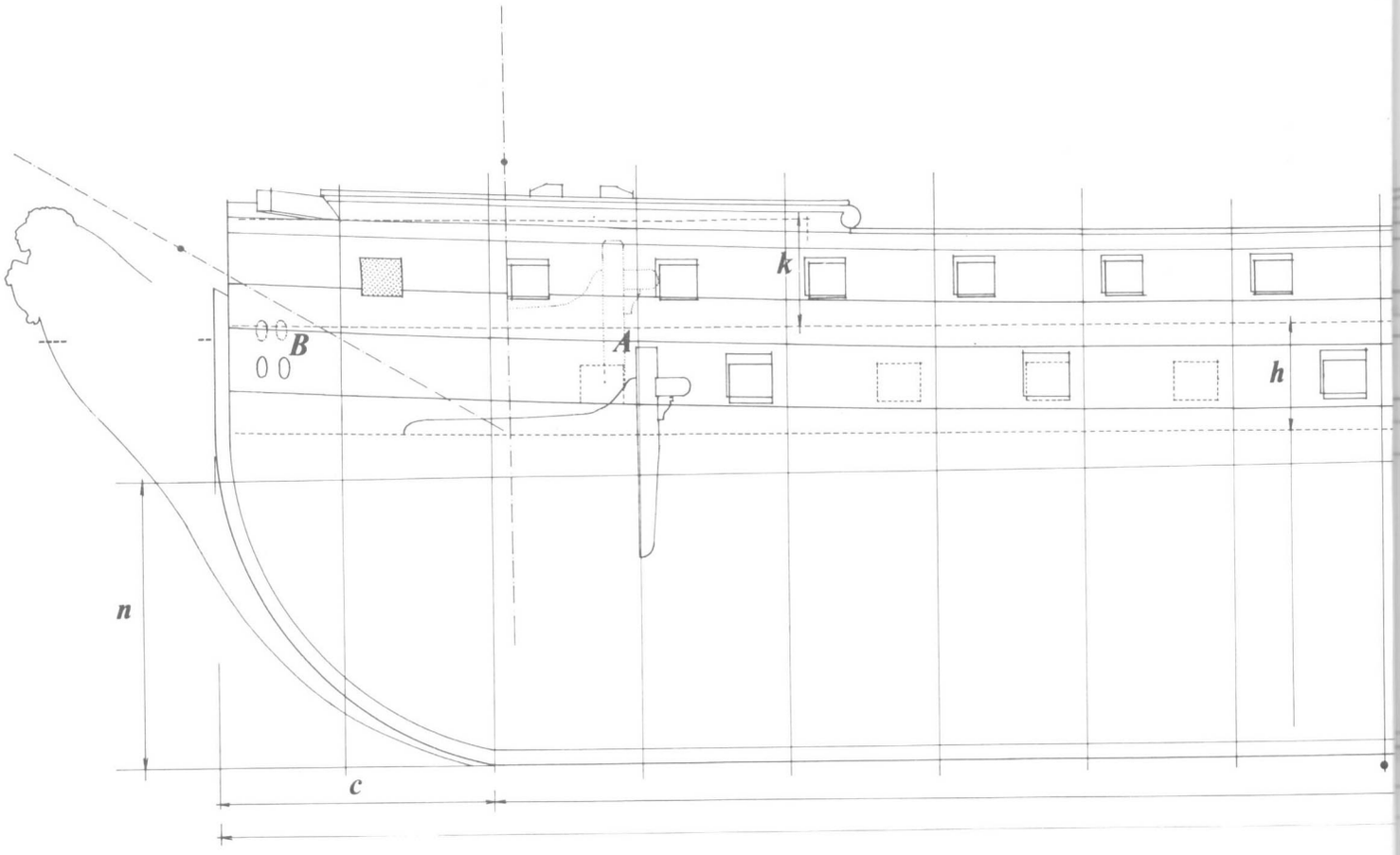
Proportions

La coque dudit Batiment Conſtruction de l'Orient, Lancé a l'Eau

Le 13e 8bre 1762

Du Port de 900 Tonneaux

	Pieds	Pouces
Longueur de l'Etrave a l'Etambot	145	
Longueur de quille	126	
Largeur de dehors en dehors les membres	36	
Creux de la Calle de la Vegre Sous Baux	15	
Deux Ponts conduits		
Hauteur d'Entrepont Sous Baux	5	2
Un gaillard d'arriere		
Hauteur du gaillard d'arriere a l'entrée	5	3
Et d'arriere	5	4
Un gaillard d'Avant		
Hauteur du gaillard d'Avant a l'entrée	5	
Et d'arriere	5	
Une dunette		
Hauteur de la dunette a l'entrée	5	2
Et d'arriere	5	6
Percé pour 56 Canons de 18 et 8		
Tirant d'Eau a la Charge	17	6



BASIC SOURCE DATA USED IN THE RECONSTRUCTION

This schematic drawing shows all the 17 dimensions given for the Duc de Duras, *checked against the known details of her sister-ships (see page 15).*

a.	*Length from stem to sternpost*[1]	*145'0"*	*46.99 m*
b.	*Length on the keel*	*126'0"*	*40.82 m*
c.	*Rake of the stem*	*16'0"*	*5.20 m*
d.	*Rake of the sternpost*	*3'0"*	*0.97 m*
e.	*Breadth to outside of frame*	*36'8"*	*11.91 m*
f.	*Depth in hold*	*15'0"*	*4.87 m*
g.	*Tumblehome at the midship frame*	*3'8"*	*1.19 m*
h.	*Height between decks*[2]	*5'2"*	*1.68 m*
i.	*Height beneath the quarterdeck at the bulkhead*	*5'3"*	*1.70 m*
j.	*Height beneath the quarterdeck at the stern*	*5'6"*	*1.79 m*
k.	*Height beneath the forecastle*	*5'3"*	*1.70 m*
l.	*Height beneath the poop at the bulkhead*	*5'3"*	*1.70 m*
m.	*Height beneath the poop at the stern*	*5'6"*	*1.79 m*
n.	*Draught forward*	*16'6"*	*5.36 m*
o.	*Draught aft*	*17'6"*	*5.69 m*
p.	*Thickness of frame sided*	*0'10"*	*0.27 m*
q.	*Space*[3]	*0'6"*	*0.16 m*

[1]Defined as the horizontal distance between a perpendicular line rising from the end of the keel and a plane passing through the extreme of the round-aft of the wing-transom.

[2]All these heights are "clearances", i.e. from the planking of the deck to the underside of the beams of the deckhead.

[3]The documents indicate a space of 5 to 6 inches, and it is this latter dimension which I have retained, which gives a distance between station frames of 8 feet 8 inches (2.817 m), starting from the extreme forward end of the keel.

In addition to the above dimensions there are three numerical values: – Burthen in tons: 900 – Number of beams on the gundeck: 30 – Number of gunports on the upper deck: 26.

Other known information (see page 21):

A. *Modification of the riding-bitts, moved from the upper deck to the gundeck.*

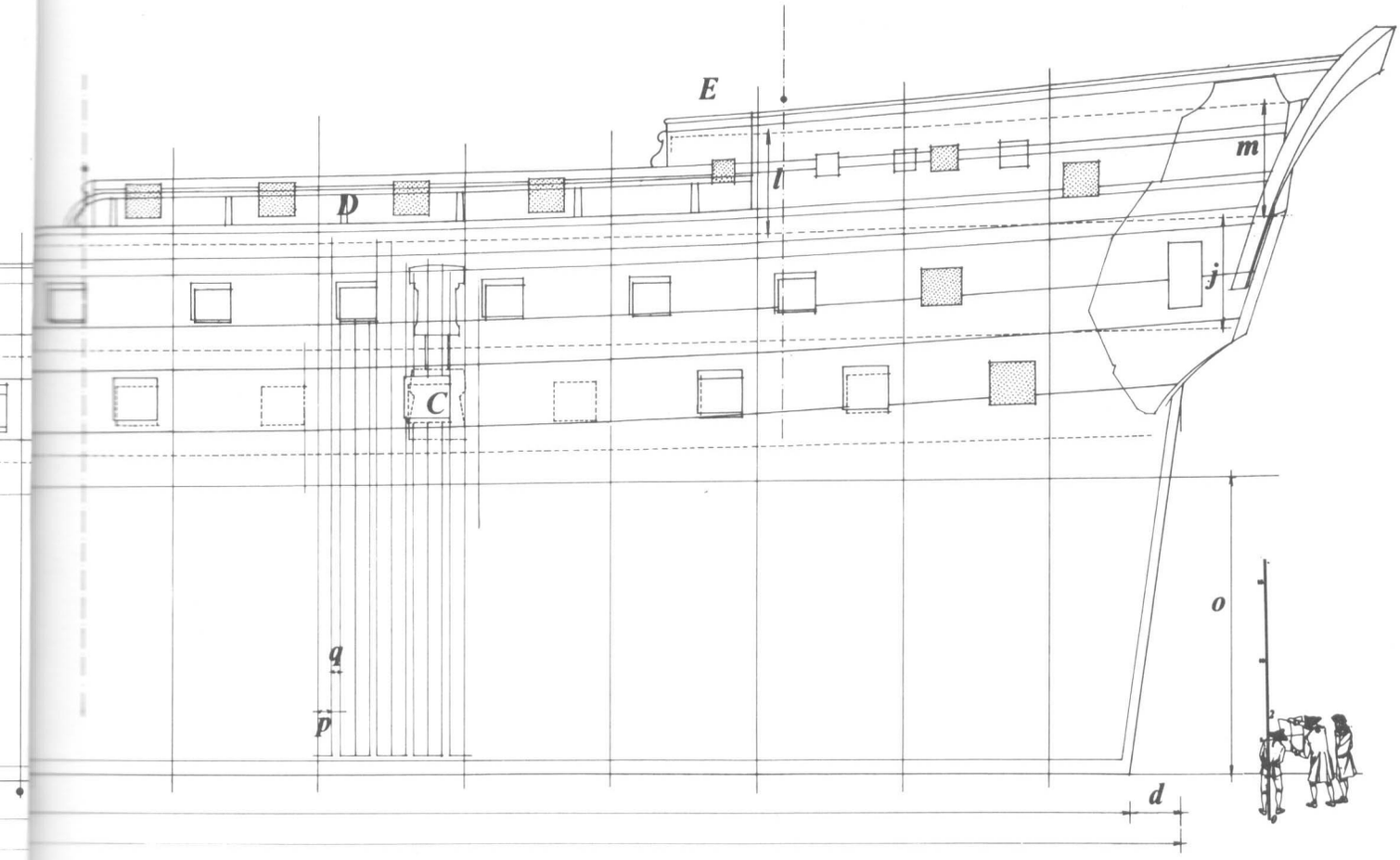
B. *Moving the hawse-holes.*

C. *A further capstan, or more accurately a barrel, added on the gundeck.*

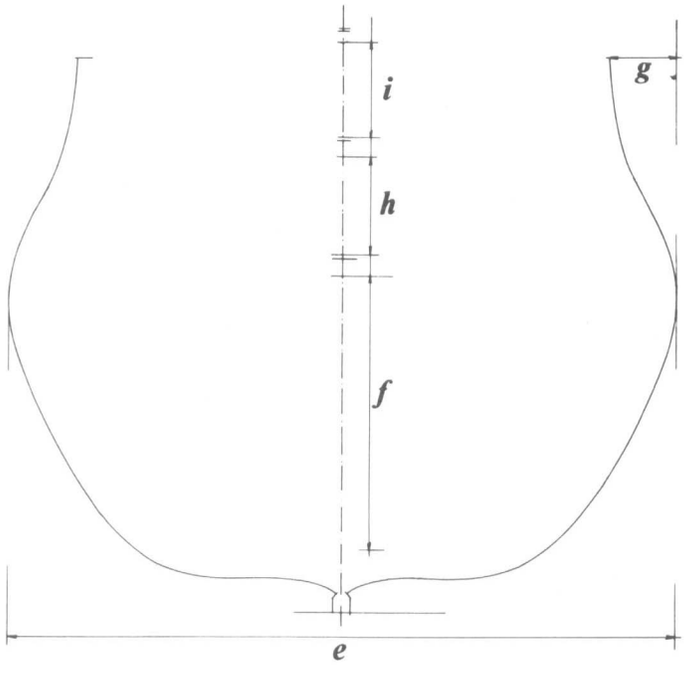
D. *Raising the bulwarks by 3 to 4 feet, and new gunports cut on the quarterdeck.*

E. *Poop rebuilt and extended.*

Elsewhere, we learn from correspondence, that: the gunports on the gundeck were berthed up by the outer hull-planking; and that there were 13 gunports on each side. The dimensions of these gunports are for 12-pdrs. Only 3 gunports were armed on the gundeck. From these original arrangements, Jones ordered 4 of the berthed-up ports to be opened on either side, and 1 more gunport on either side to be cut aft, making 10 in all. All these ports were enlarged to the dimensions needed for 18-pdrs.



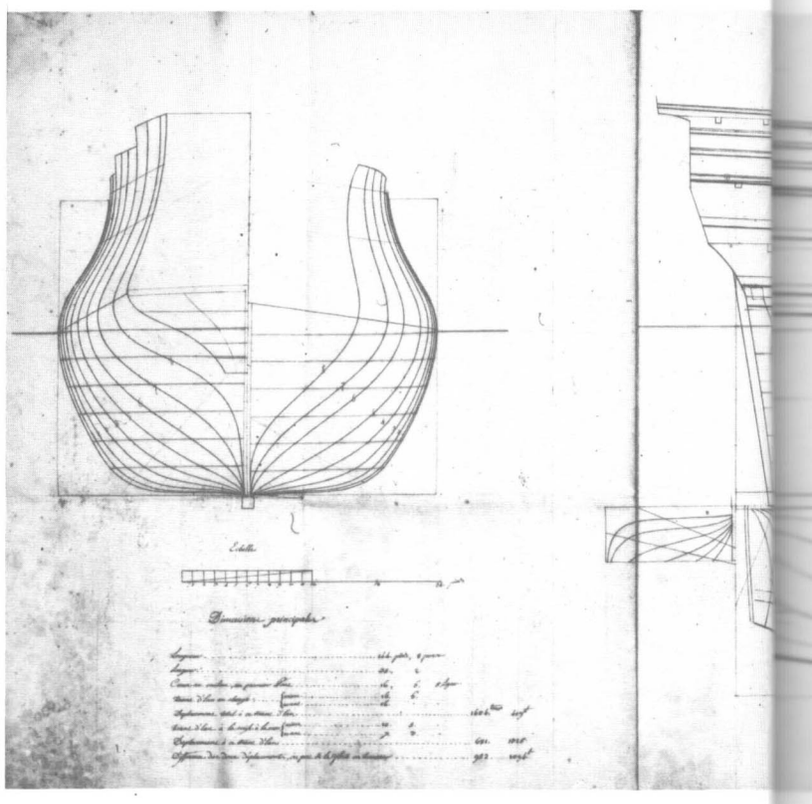
Dotted lines show the original gunports; I have supposed that the 2nd, 6th and 12th were those which were already open, and that Jones had the 4th, 8th, 10th and 13th ports opened, and a further new gunport cut in the gunroom, this being the aftermost port on the gundeck. My argument for this choice of ports is that the disposition of frame is such that they could be enlarged without altering their after edge (which would have meant weakening the station frames). On the upper deck the original gunports were sited immediately over the mid-point between the gundeck ports; originally designed to take 8-pdrs, they were enlarged for 12-pdrs. To the original 13 ports on either side were added one bowchase port (normally not armed), and an extra port at the stern, making 15 in all.
On the forecastle there is room for one gunport on either side.
5 gunports were cut in the raised bulwarks of the quarterdeck, the aftermost one in the great cabin, since the lengthening of the poop only left room for 4 guns forward of the poop bulkhead.
The ports and other openings cut or enlarged during the modifications are shown in grey on the drawing.
The axes of the masts and the steeve of the bowsprit are shown, taken from the draughts of the Massiac, *which was the same length as the* Bonhomme Richard*; the shape of the head is derived from the same source.*
I have thus brought together on one drawing the basic source information used in the reconstruction of the Bonhomme Richard.
The arrangement of the guns required considerable thought, and the solution adopted is the only one which reconciles the sources at my disposal with the positions imposed by the timbers of the hull and the internal arrangements.
I have expanded these pages considerably in a separate research document, in which I go into every detail of the reconstruction and the decisions and assumptions which I have made.



The midship frame is based on that of the 1,200 ton Bertin, *adjusted for the known dimensions of the* Duc de Duras. *Note at* **f** *the depth in hold, calculated from the ceiling to the underside of the deck-beams. To arrive at this dimension I had to allow for the thickness of the keelson, of the floor-timber at this point, and of the ceiling. Note also the relatively short floor, and the way it curves sharply inwards where it meets the keel.*

Draught of the *Massiac*

This vessel, which is named on the back of the draughts as the Massiac, *is of the same burden (900 tons) as the* Duc de Duras. *It is also, to within 4 inches [11 cms], of the same length. These draughts made it possible to determine the positions of the masts, and the shape of the head. Note that only three gunports are opened on the lower deck. Designed by Groignard, the* Massiac *was launched on December 30th 1758 at Lorient.*



Draught of the *Bertin*

The Bertin, *shown opposite, was also designed by Groignard, and was launched at Lorient on October 29th 1760. Larger than the* Duc de Duras, *it was of 1,200 tons burden. The lines of her hull enabled me to draw those of the* Duc de Duras, *after making due allowance for the differences in principal dimensions, and I was also able to use the draughts as a basis for calculating the sheer of the decks and the wales, the round up of the decks, the scantling of the deck-beams, the shape of the closed head and the structure of the stern. The decoration of the stern was derived however from another ship, the* Artois, *built in 1779.*

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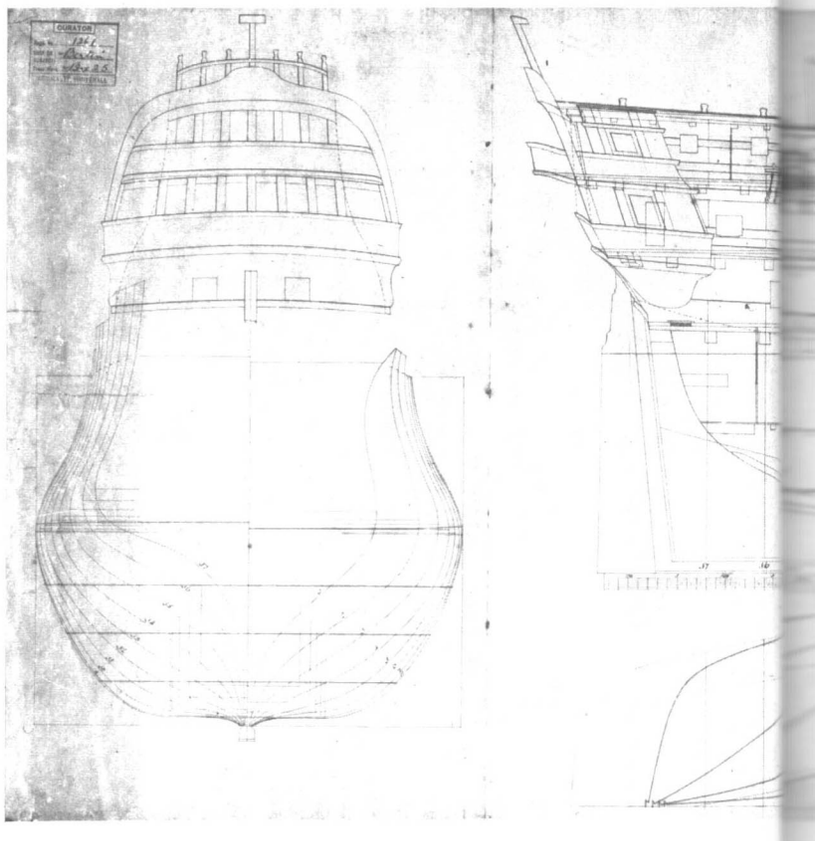
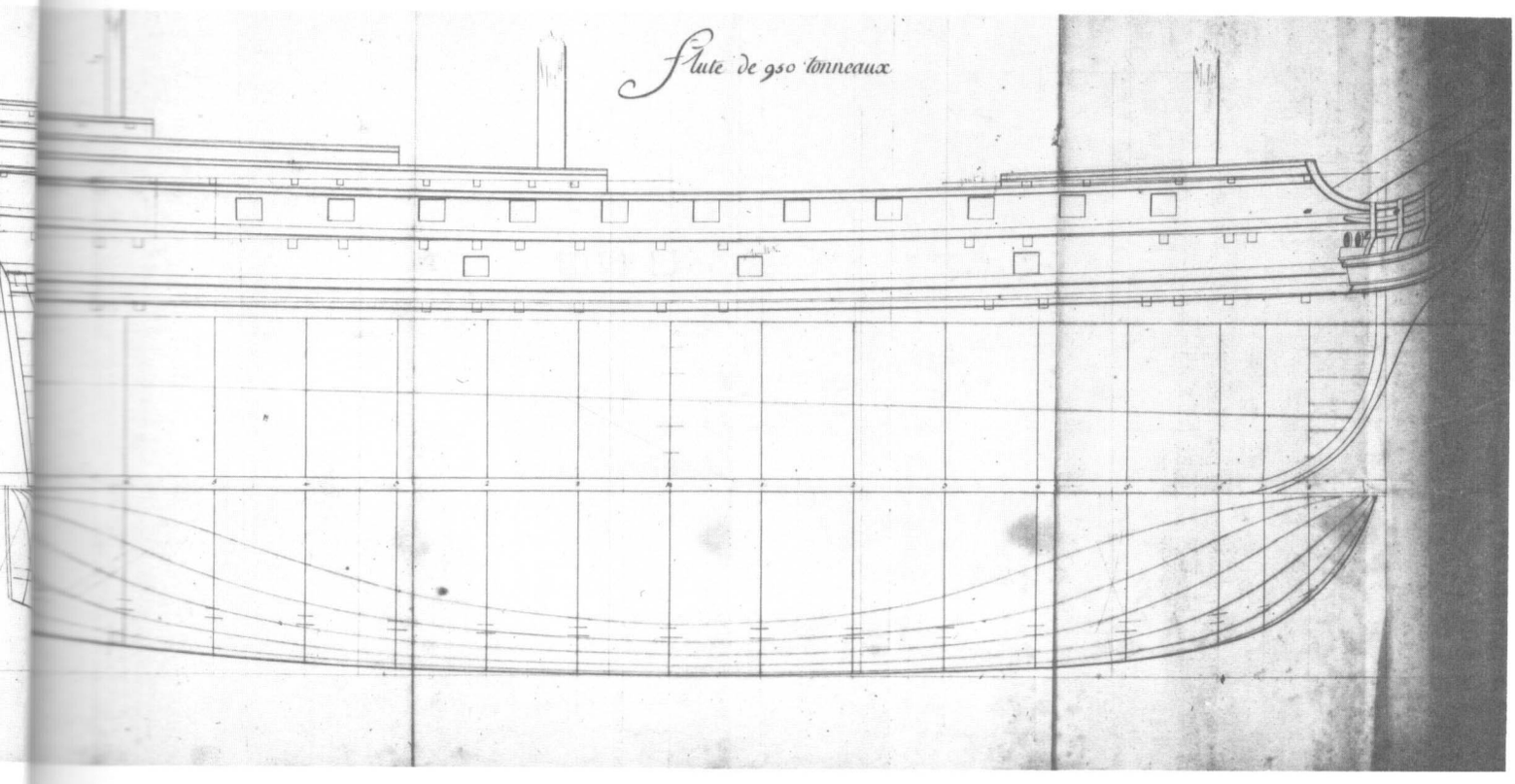
Antoine Groignard – Biographical Notes

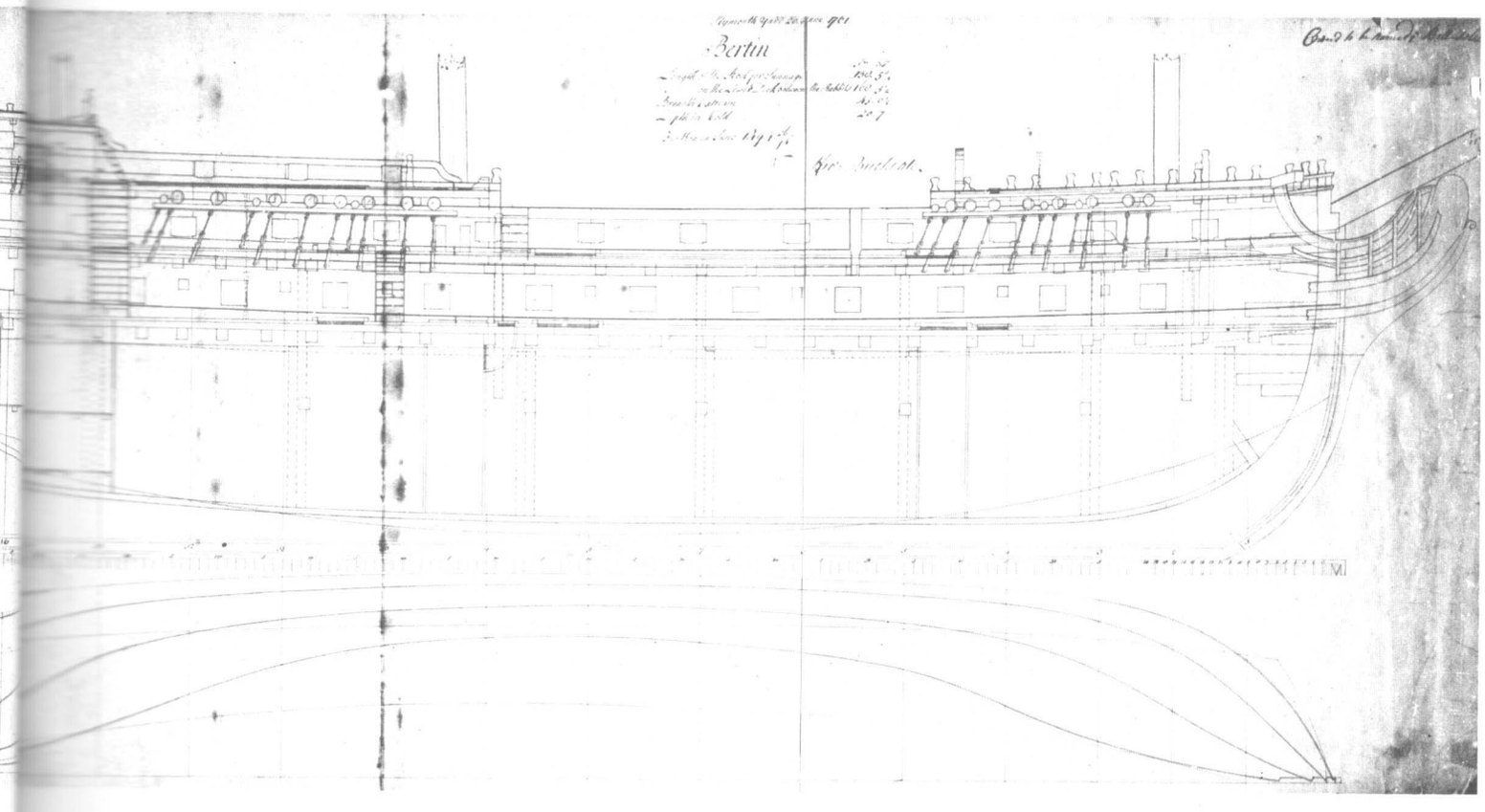
Born at Solliès-Pont near Toulon in 1727, died in Paris in 1798. After having "completed all his studies" at Toulon, he was sent to Paris in 1744 where he was one of the first students to attend the School newly created by Duhamel du Monceau (see *74-G.S.*, Vol I); he was taught in particular by de Camus and Bouguer. After three years during which he excelled himself at his studies he was awarded the rank of *sous-constructeur* in 1747. Posted to Brest, he supervised the building of a number of ships; in 1749 he was posted to Rochefort, where he continued to supervise shipbuilding and also completed two commissions at sea on board the *St Esprit* and the *Intrépide* "in order to understand the movements to which ships are subjected at sea". In 1754 Groignard was promoted to the rank of *constructeur*; his talents had already been recognised, for in 1751 he had been asked to prepare the draughts for a 64-gun ship, *l'Eveillé*, an extremely rare honour for a *sous-constructeur*. In 1754 he was the author of two memoranda on a new system of framing for ships, which brought him to the attention of the Minister de Machault. He was ordered to build two 64's at Brest in 1755 according to his new plans, but the project came to nothing, because in the same year he went to Lorient to assist in designing for the Compagnie des Indes a series of vessels which would be suitable for the double role of merchant ship and warship (see J. Boudriot: *La Compagnie des Indes*). He was destined to remain with the Company until its winding-up in 1770, during which time he was responsible for designing almost all of its ships. However, his considerable energy enabled him to combine his work for the Company with other work in the Royal Dockyards: thus he drew up the plans for the boats and invasion barges intended for the invasion of England in 1759-61. Promoted *ingénieur-constructeur en chef* in 1765, he was responsible for the design of a large number of ships, of which the best-known is perhaps the *Bretagne*, 1762-6, an extremely successful three-decker. Groignard designed his last ships in 1782, and was destined not to be part of the great transformation of the French Navy which took place under the initiative of the Chevalier de Borda. I should however also mention that he was responsible for the building of the dry-dock at Toulon between 1773 and 1778, a particularly remarkable piece of engineering, and sufficient proof of his ability to carry out works on land with equal success.

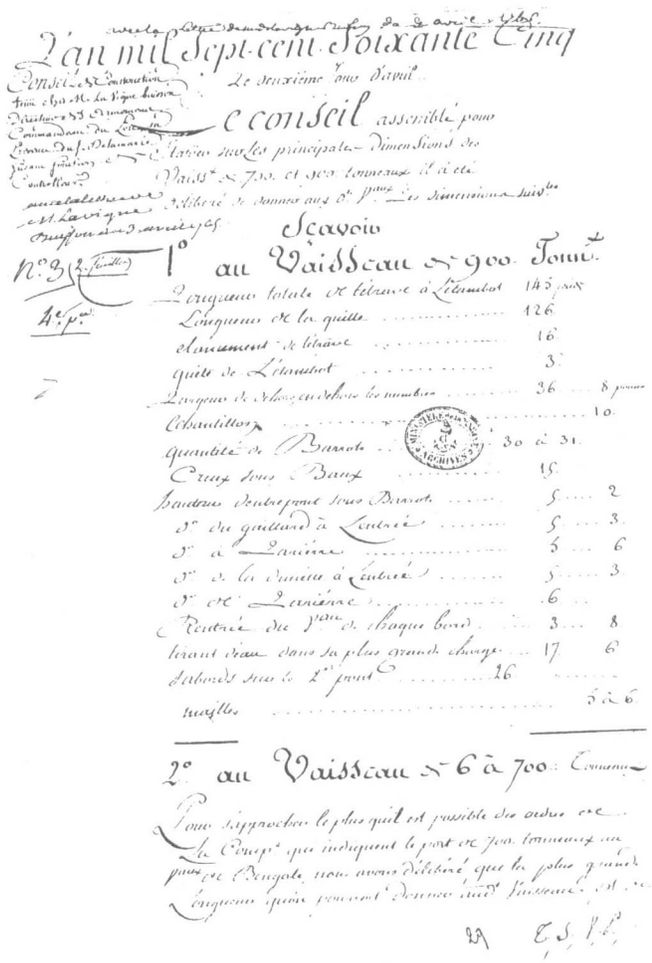
To conclude this short biography, I should add that Groignard designed nine 900-ton ships for the Company's China trade, all of them extremely similar if not identical to the *Bonhomme Richard* ex *Duc de Duras*.

I do not believe that Groignard supervised personally the conversion of the ship, responsibility for which was given to his subordinate Segondat-Duvernet; such works were altogether too modest to concern Groignard, who at this time held the highest position in the Navy, that of *ingénieur-général*, or Surveyor of the Navy.




Flute de 950 tonneaux


Bertin



L'an mil Sept-cent Soixante Cinq

Le Soixième Jour d'Avril

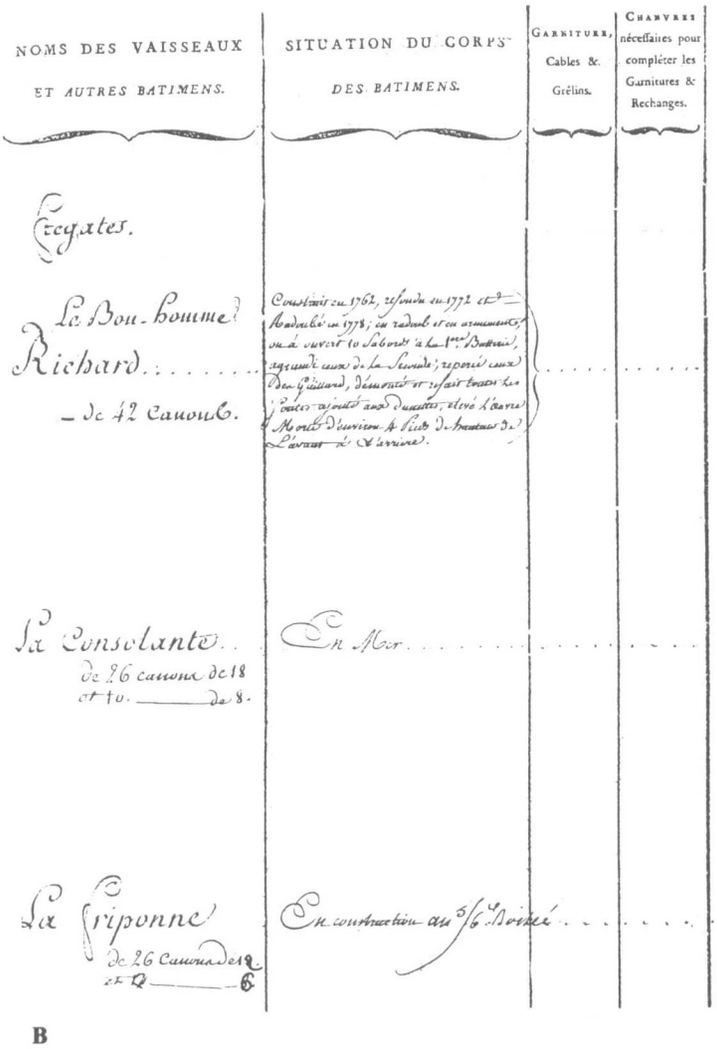
Le conseil assemblé pour

Scavoir

1° au Vaisseau de 900. Tonn.

2° au Vaisseau de 6 à 700. Tonn.

A



NOMS DES VAISSEAUX ET AUTRES BATIMENS.

SITUATION DU CORPS DES BATIMENS.

GARNITURE, Cables &. Grélins.

CHANVRES nécessaires pour compléter les Garnitures & Rechanges.

Fregates.

Le Bon-homme Richard. — de 42 canons.

Construit en 1762, refondu en 1772 et doublé en 1778; en radoub et en armement, on a ouvert le Sabord de la 1re Batterie, agrandi ceux de la Seconde; reporté ceux des Gaillard, démonté et refait toutes les Portes ajoutés and Quarters, élevé l'Avant, Monté d'environ 4 Pieds d'hauteur sur l'Avant et l'Arrière.

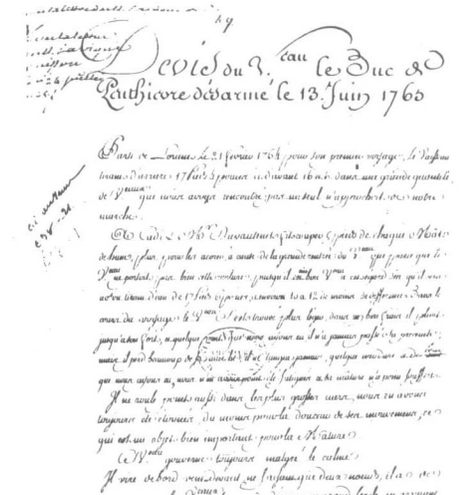
La Consolante. — de 26 canons de 18 et 10. — de 8.

En Mer

La Friponne — de 26 Canons de 12 et 6

En construction aux 5/6 Bordé

B



Journal du Voyage fait par ordre du Roi autour du Monde par la Frégate du Roi la Boudeuse et la Flûte l'Etoile commandées par M. de Bougainville Capitaine de Vaisseau, depuis le 15 Novembre 1766 jusqu'au 16 Avril 1769.

Journal du Voyage fait par ordre du Roi autour du Monde par la Frégate du Roi la Boudeuse et la Flûte l'Etoile commandées par M. de Bougainville Capitaine de Vaisseau, depuis le 15 Novembre 1766 jusqu'au 16 Avril 1769.

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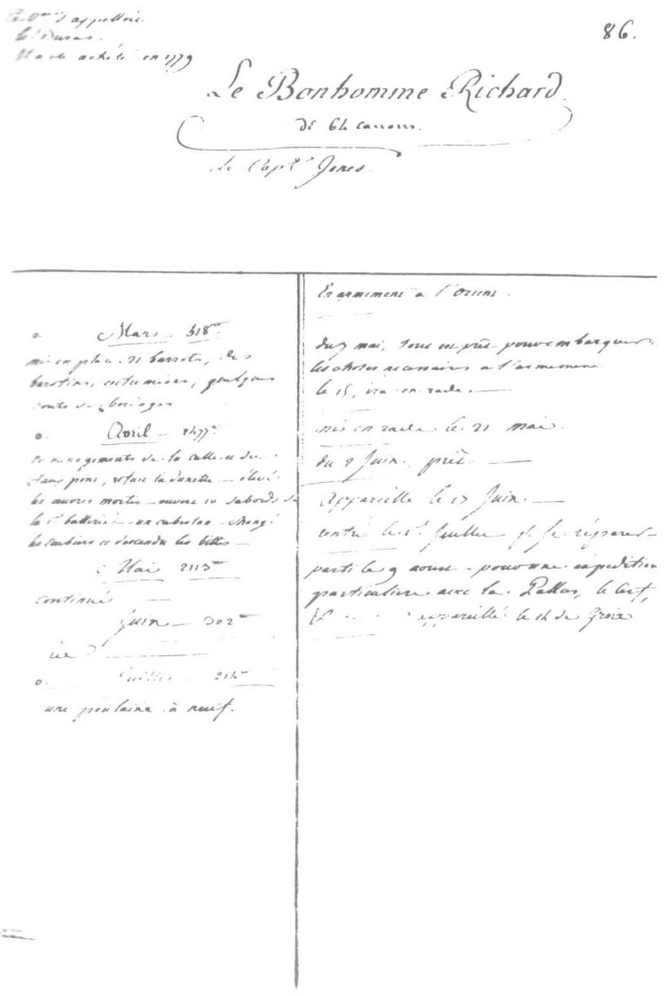
D



C

Sources

Archives Nationales (Fonds Marine): $B^{1}89$. Inventories of the *Duc de Duras* and the *Bonhomme Richard*, and various items of correspondence for the years 1778-9. $B^{3}665$-666. Correspondence from the port commandant and the commissioner resident. $B^{5}10$-11-12. State of ships, port movements, ships in commission and commissioning.

Archives Nationales (Fonds Colonies): $C^{2}272$. Various documents concerning the ships of the Compagnie des Indes.

Archives du Port de Lorient: Sub-Series 1P 222-223-224-225. Ships commissioned, 1760 – 1767. 1P 236-237-238-239. Ships de-commissioned, 1760 – 1767. In addition to these bundles or boxes, bundle 27 1P 265, which concerns expenditure on the *Duc de Duras*.

Service Historique de la Marine: Series D^{1}, box 65, draughts of the *Massiac*.

National Maritime Museum, Greenwich: Ship Plans Collection, 1261. Draughts of the *Bertin*.

*In addition extensive use was made of other source material from American and other archives, of which the most important was the log of the *Bonhomme Richard* covering the period May to September 1779. I should also mention the excellent book by Samuel Eliot Morison "John Paul Jones, A Sailor's Biography" (Faber & Faber, London, 1959), which includes an extensive bibliography.

A. *This document confirms the dimensions of the* Duc de Duras *as being those which were later adopted for the East India Company's 900-ton class.*

B. *This document, which lists the state of readiness of the ships at Lorient, provides information concerning the changes made to the ship when fitting her out for Jones' use. Although only a few lines long, the information given proved to be crucial in determining the positioning of the gunports.*

C. *This document completes the previous one, providing information notably on the shifting of the riding-bitts and the hawseholes, and on the making of a second barrel for the capstan. Note that the* Bonhomme Richard *is described as a 64-gun ship, whereas in document B the correct figure of 42 guns is given (the number being reduced later to 40).*

D. *In the absence of any "decommissioning" report for the* Duc de Duras, *here is one relating to her sister-ship the* Duc de Penthièvre. *This document indicates the draught fore and aft, and provides information regarding her handling qualities: in general it is favourable, although she is said to gripe badly. Some valuable information is given concerning her ballast.*

THE PLANS

To complete the model of the *Bonhomme Richard* will demand real skill on the part of the model-maker, and complete familiarity with my original book *The Seventy-Four Gun Ship*. While this monograph includes a large number of plans, all of which are accompanied by explanations, it is not possible for every one of the monographs (and this is my tenth), to provide all of the extremely detailed explanations which appear in the first three volumes of *The Seventy-Four Gun Ship*. Rather, the monographs should be considered as appendices to that basic text, providing as it were the practical examples which go to complete it, so that if one takes the publications as a whole, anything which is unexplained in the monographs can be found in the original work.

The scale adopted for this monograph is 1/48 (1/4″ = 1 ft), and this has meant that in some cases a number of drawings have been placed on the same large sheet. However, the plans of the rigging (apart from those covering the masts and spars and their fittings) have had to be drawn at 1/64 (3/16″) scale, since otherwise they would be beyond the limits of even the largest sheets. Thus model-makers who want a fully rigged model should multiply the dimensions on these plans by 1.33.

For the benefit of those who would prefer to build their model to a smaller scale, the basic plans have been put together on to a single sheet (No 26), at 3/16″ scale. The explanatory comments which follow for the first two sheets apply equally to this one.

Sheet 1. SCHEMATIC SHEER PLAN

This drawing and those showing the vertical and horizontal sections of the hull (the body plan and the half-breadth) provide all the basic information for the ship's lines, and **should therefore be considered as being the most important ones.**

The stations are numbered with Roman numerals according to conventional French practice in the 18th century, starting at the midship frame (M) and moving forward and aft.

The profiles of four buttock lines (marked **a – b – c – d**) are shown at the bow and the stern. These sections are drawn to outside of frame, thus taking no account of the thickness of the hull-planking. Again at the bow and stern can be seen a number of lines indicating the horizontal sections, which are spaced 18 inches [488 mm] apart, zero corresponding to the bottom of the rabbet of the keel.

The lines of deck are shown dotted, and the most meticulous care must be taken with the line of the gundeck, since it serves as a datum line for the other decks, for the wales and for the gunports. The 30 gundeck beams are numbered, and the axes of the masts and their steps are shown by ticked lines.

The axis **u** of the foremast is perpendicular to the load waterline, which in view of the small difference in draught fore and aft (1 foot – 325 mm) corresponds to an angle of 1° with the keel.

The axes of the mainmast **w** and of the mizen **z** are perpendicular to the keel. The axes of the pumps are marked **x**, and those of the capstans **v** and **y**. The step of the bowsprit is at **t**.

Also shown on the sheer plan are: the load waterline; the two lower wales, the upper one being cut into by the two aftermost gunports on the gundeck; the upper pair of wales; the waist-rail and the fore- and main-channels beneath; the forecastle rail; the quarterdeck drift-rail and the mizen-channels on the same line; the quarterdeck plankshear cut into by the scuttles of the officers' cabins; the poop breastrail.

The outline of the quarter-galleries and stern is marked, as is that of the wing-transom and the helm-port transom. Between stations III and V of the afterbody I have drawn in the frame-timbers in order to explain the arrangement of the gunports: there are three filling-frames between every two station frames, and only the two outer filling-frames are cut into by the ports, all the other timbers running up unbroken to the plankshear. All the gunports have been shown, together with the scuttles of the cabins and the doorway to the quarter-gallery. The hawseholes and the doorways to the head will be found however on other drawings.

Sheet 1. HALF-BREADTH PLAN

The upper part of this drawing shows the horizontal sections below the line of maximum breadth. At the bow can be seen the way the angle of the rabbet alters through the sweep of the stem. At the stern the fashion piece is marked, as are the wing-transom, the counter, the helm-port, the stern and the taffarel fife-rail, and the stern-chase port.

The lower part of the drawing shows the horizontal sections above the line of maximum breadth. Note the relatively pronounced tumblehome, which explains the somewhat peculiar shape of the buttock lines **c.d**. The closed head of the vessel is clearly shown on this drawing. In view of the number of horizontal sections shown, it is relatively simple to obtain any other desired section, although some care is required.

Sheet 2. BODY PLAN

The left-hand drawing shows the fore-body, and on both drawings the port side shows the outline of the frames and the lines of deck, which must be minutely respected. The lines of the upper and lower sills of the gunports are parallel to the lines of deck. **(The line of deck is defined by the intersection of a plane passing through the upper side of the beams and another passing through the inside of the frame timber.)**

On the starboard side the wales and rails are shown, as are all the strakes of the planking covering the timbers. At the midship frame there are 30 strakes. The thickness of the three upper strakes below the lower wale is 7 inches [190 mm], and this thickness diminishes by 1/4″ [7 mm] at each strake until it reaches 3 3/4″ [102 mm], which is then maintained for the last fifteen strakes of the bottom. The average width of the strakes at the midship frame is of the order of a foot [325 mm]. The edge of each plank is perpendicular to the frame, except for the upper of the lower pair of wales: its edge is horizontal. As can be seen, only 27 strakes finish at the stem.

The thickness of the planks between the two pairs of wales varies between 3 and 4 inches [81 – 108 mm]. The upper pair of wales and the filling strakes between are 4 1/2 inches [122 mm] thick. Finally, the hull planking above the wales is 2 inches [54 mm] thick.

On the starboard side the hawseholes and the hole for the bowsprit can be seen.

The right-hand drawing shows the afterbody. The same comments as above apply to the planking of the hull. Note however two extra strakes in the lower part of the quarter, which can be seen more clearly on the drawing on Sheet 12. Thus 22 strakes finish in the rabbet of the sternpost, 8 on the wing-transom, and two others against the end of the wing-transom and the side counter timber. Particular attention should be given to the upper of these two strakes, which makes the transfer between the buttocks and the much less pronounced curve of the ship's side.

This drawing also shows the section of the stern, which it should be remembered is not vertical but curved. On the port side can be seen the stern-chase port, the helm-port, and the wing-transom, which has no rabbet.

I would emphasise that the strakes of the wales vary in length between 30 and 60 feet [9.75 – 19.50 m], while the hull-planks vary between 18 and 60 feet [5.85 – 19.50 m].

As a rule the thinner planks tend to be shorter, and the planks at the stern which are cut from the solid are rarely of any great length, because of the difficulty in shaping them.

The horizontal sections are spaced 18″ [488 mm] apart, and section zero corresponds to the bottom of the rabbet of the keel.

Sheet 3. **FRAMING PLAN; TIMBERS**

Note on the framing plan the six cant-frames. The horizontal sections at the bow are relatively "pinched" so that the bevels are considerable. This must be corrected by canting the frames so that their position is nearly perpendicular to the waterlines, rather than to the keel.

The remaining frames are conventionally arranged, *with the floors facing towards the midship frame.*

The station-frames are spaced 8 feet 8 inches [2.82 m] apart, and this is accounted for by two frame-timbers measuring 10 inches [271 mm] and a space of 6 inches [163 mm], and three filling-frames in between. While in theory the first station-frame is positioned at the extreme forward end of the tread of the keel, the use of cant-frames in effect makes the position of station VI of the fore-body somewhat notional, but for all that the position of the other frames is determined therefrom.

The arrangement of the gunports must take into account as far as possible the positioning of the frames. The after edge of the gundeck ports is thus formed by the forward face of the station-frames, and this allows three timbers between the ports, which were originally arranged 6′2″ [2.00 m] apart, and were 30″ [813 mm] wide.

Seven of the original gunports (on either side) were enlarged, being increased in width to 32″ [867 mm] by removing a 2″ [54 mm] filling-piece from their forward edge. The lower sills had to be raised by 3″ [81 mm], and the height of the port increased from 2′3″ [732 mm] to 2′6″ [813 mm], so that the upper sill was now 6″ [163 mm] higher.

These modifications to some of the gunports, which were carried out to allow 18-pdrs to be mounted in place of the 12-pdrs for which they were originally designed, explains the irregularity of the gundeck ports. Furthermore, an extra port was cut at the stern*.

As usual, the upper deck ports are placed chequer-board fashion over the gundeck ports, and as a result they cut through one of the frames. All the ports, which were originally designed for 8-pdrs, were enlarged to take 12-pdrs. A bow-chase port was opened at the forward end of the upper deck, and an additional port at the after end. The upper deck thus has fifteen ports, armed with 14 12-pdrs on either side. (The gundeck was only lightly armed, with three 18-pdrs on either side at the aftermost ports.)

There are five 8-pdr ports on the quarterdeck (the last being situated in the great cabin). Apart from these, there are the scuttles of the officers' cabins, and the doorway leading to the quarter-gallery.

The timbering of the stern should be examined in conjunction with Sheet 11.

Also marked on the framing plan are the lines of deck.

On the lower part of the sheet are a number of timbers.

The timbers parallel to the ship's longitudinal axis are: the keel, rising wood, keelson, head, stem, apron, stemson, sternson knee, deadwood knee, inner-post and sternpost.

The head has the peculiarity of having no lacings (see *74-G.S.*, Vol II, p. 8), the gammoning knee being formed of a number of filling-timbers.

The keel is made up of five timbers, the forward one forming the gripe. There is no false keel. The stem is composed of two timbers.

The rising wood has the usual shouldered scores to receive the floors, while an ordinary shallow score receives the half-floors. From station V of the afterbody a combination of mortices and scores receive the crotches.

The stemson is in two parts and runs up as far as the gundeck hook.

The after piece overlaps the keelson, which in turn is scored down over the each floor. The sternson knee is fashioned like the stemson, but has steps cut in it.

The inner-post has shouldered scores cut in it to receive the transoms, and is tennanted into the keel. The sternpost is high enough to allow sufficient room for the tiller between the helm-port transom and the upper deck transom.

The breadth of the keel is 14 inches [379 mm], its height is 16 inches [434 mm]; the stem and apron are of the same breadth. The rising wood is the same breadth as the keel and is 7 inches [190 mm] thick, increasing fore and aft in order to raise the heels of the crotches and rising floor-timbers as far as possible.

The keelson is made up of two timbers laid side-by-side and with their butts giving shift. They are 11 inches [298 mm] thick, and are scored down 2″ [54 mm] over the floors. The breadth of each timber is 9″ [244 mm], reducing to 7″ [190 mm] fore and aft, which is the same as the stemson and sternson knee.

The riders are shown; they are placed directly over the top of frames and over the ceiling, and the arrangement of their butts is shifted in relation to those of the frame timbers over which they are laid: thus where the frame has a full floor, the rider has a half-floor. There are 7 riders in all reinforcing the hull, and they are marked **A** to **G**; the first forms the after face of the step of the foremast. The upper futtock-riders finish on the gundeck. The floor-riders are scored down over the keelson. They are drawn as if one were looking forward to the bow.

The hooks and half-hooks of the foremast step (**I** and **H**), and those of the mainmast step (**J**, **K** and **L**) are shown, as are the scores for the mast-step carlings. These timbers are made up of a number of pieces because of their shape.

*This gunport could scarcely have been cut further aft, just as the bow-chase port on the upper deck could scarcely be further forward.

Sheets 4, 5, 6, 7. **FRAME TIMBERS**

The port-side frame timbers are shown, as if viewed from behind. I admit that it might have been easier for model-makers if I had shown the complete frames, but I trust I may be forgiven for not wishing to increase considerably the already large number of sheets.
Care should be taken to note the axis of each frame. For the six cant-frames at the bow, the axis corresponds to the joint-line. A total of 61 frames are shown, and on the station-frames the lines of deck, the run of the planking etc. are all marked.
On each frame I have marked the butts of the floors, futtocks and toptimbers, etc. These positions are however somewhat notional, since in practice their positions would be determined by the availability of compass-timber at the dockyard. For all that, for aesthetic reasons, it is desirable that there should be an even run of butts of these timbers when constructing a model. By the same token, convention demands that the frames should not vary in thickness fore-and-aft, even though in practice the space was significantly wider in the upper works, and also varied irregularly depending on the timber available for the toptimbers.
The spaces should be filled with chocks where the preventer-bolts of the chains will be fastened.
Frame VIII of the afterbody (No 61) is scored to receive the fashion piece (see Sheet 19), but this is not apparent from this drawing.
The station-frames, in addition to being sequentially numbered, are also marked with Roman numerals.
When making up the frames, it is a sensible precaution to leave the toptimbers over-length and trim them later.

Sheet 8. **HAWSE-PIECES AND BEAMS**

Two views of the hawse-pieces, one from the right side and one a plan view, give a clear view of their arrangement, and incidentally also of the station-frames. The principle of the closed head demands that the hawse-pieces run up to the height of the forecastle; there are thus openings cut for the bowsprit, as well as for the doorways leading out onto the beakhead. There are nine hawse-pieces in all, numbered **a** to **i**, and their heels rest on two deadwood timbers. There are small spaces cut between the hawse-pieces 2 inches [54 mm] wide; they are found between horizontal sections 5 and 16. They are staggered, and each space is 18″ long, corresponding to exactly the distance between each horizontal section.
Each hawse-piece has marked on it horizontal sections 5 – 10 – 15 – 20, and is shown as if one were looking at its after side. For the plan views, the two sides are assumed to be parallel, in order to simplify their construction. An oblique plane corresponding to their forward face is also shown, so that they can be cut to their final wedge-shape afterwards. The horizontal sections are also shown on the plan view of the bow (on the left), and on each hawse-piece.
Finally I have shown on this same Sheet the midship-beams of the various decks: **A.** Gundeck – **B.** Upper deck – **C.** Forecastle and Quarterdeck – **D.** Poop.
The sections of the beams* are as follows: Gundeck 11 1/2″ [312 mm] square – Upper deck 10 1/2″ [285 mm] square – Forecastle and Quarterdeck thick 8″ [217 mm] broad 7″ [190 mm] – Poop thick 5 1/4″ [142 mm] broad 7″ [190 mm].
The midship or master beams serve as patterns for the other beams and for the ledges simply by shortening them as required. The upper surface of the beams must coincide exactly with the lines of deck.
The thickness of the deck-planking is as follows: 3 inches 8 lines [99 mm] – 2 inches 8 lines [72 mm] – 1 inch 10 lines [50 mm] – 1 inch 2 lines [32 mm]. These thicknesses in turn determine the dimensions of the nails, which are indicated on page 53.
The "spacers" between the beams are square in section and equal to the thickness of the planks; the ledges are the same thickness.
The left-hand side of the elevation of the bow shows the hull-planking. Note that all the strakes do not finish in the rabbet of the stem. The extra thickness of the strakes between the two belts of wales, and of the strake beneath the waist-rail, is clearly visible; this is obtained either by using thicker plank, or by applying two layers. Note the cheeks of the head and the cant fayed to the planking of the bow to take the gratings of the beakhead. Note also the way the face-piece diminishes in thickness as it rises.

*It is conventional to show the beams as being of a single piece, which in reality would demand exceptional lengths of timber, and more frequently in practice they would be made in several pieces (see *74-G.S.*, Vol I, p. 109). However, most contemporary models have beams made in a single piece.

Sheet 9. **THE CEILING**

These drawings are only intended as a guide, since it is up to the model-maker himself to work out a fair run for the planking of the ceiling. The first strake placed next to the keelson is the limber-strake, and can be removed in order to inspect the limber-passages. There then follow eight ordinary strakes, and three strakes of thick-stuff at the rung-heads; the thick-stuff is 4 1/2″ [122 mm] thick, while the ordinary planking is 3 1/3″ [90 mm] thick. Above the thick-stuff there are two more strakes of the same thickness, an air-strake, two ordinary strakes and a second air-strake, two more ordinary strakes and a third air-strake, and finally four strakes, of which the last is the clamp which is 6″ [163 mm] thick. The strakes below the clamp diminish progressively in thickness by 1/4″ [6.8 mm] at each strake. The air-strakes run from station V of the fore-body to station IV of the afterbody. The planking of the ceiling finishes aft at the sternson knee, but forward several strakes finish short of the stemson, since the hold fines away forward, and the end of the planks cannot be allowed to finish in a point.
The clamp turns inwards at an acute angle towards the stern, as do the stringers below it; this is illustrated in the transverse half-sections which show the arrangement of the ceiling at each station-frame. The sections of the deck-clamp are shaded; the upper face is horizontal, but the lower face, like those of all the other planks, is perpendicular to the frame-timbers. The clamp is made up of four timbers scarphed together with plain scarphs.
Note the dovetail scores for the ends of the beams, the positions of the riders, the hooks and half-hooks of the mast-steps, and the positions of the three hooks at the bow and the two sleepers at the stern. It is important to make moulds for these sleepers directly from the ceiling of the model. The planks of the ceiling vary in length from 30 to 60 feet [9.75 – 19.5 m], and in principle the butts should be shifted by four or five strakes. The starboard half of the upper drawing has been used to show the exterior planking seen from below. Note the considerable curve of the planks finishing on the wing-transom.

Sheet 10. **THE HEAD**

On the left-hand drawing can be seen the planking and the openings (except for the gunports), and the cheeks of the head are in place. The other side of the drawing shows the bow in its completed form. The drawings to the right of the sheet are the various "components" which go to make up the head.

A. Part of the knee of the head is drawn in, and we are looking at it as if it were cut longitudinally, so as to show the the head-beams joining the main-rails and supporting the gratings. The cross-pieces must not impede the passage of the gammoning. At the forward end a small hook fills the angle formed by the rails.

B. The head seen from the side; **a** and **b** are the cheeks of the head, which have a double curvature which is not evident in a plan view. The exact lines will thus have to be taken directly from the model. The main-rails are shown by the letter **c**, the middle-rail by **d**, and the lower-rail by **e**. **a** and **b** are once again the cheeks of the head. The trail-boards are shown in place between them, as are the wash-cants between the lower cheek and the bolsters of the hawseholes. **f-g-h-i** are the head-timbers resting on the upper cheek, and bolsters are placed between the heels of these timbers. The bolster of the hawseholes runs back and the half-head timber **f** rests on top of it. Note the holes in the gammoning knee to take the gammoning, and those for the bobstay.

C. This view of the head shows the respective positions of the head-timbers and transverse pieces compared with the oblique lines of the rails of the head. Their purpose is to support the head laterally. All these timbers are drawn in plan on the right-hand side of the Sheet.

D. View of the head from above; the lower part of the drawing shows the cross-pieces **j** and **k**, which are reinforced where they meet the upper-rail by small lodging-knees **o**. Filling-pieces between the cross-pieces protect the gammoning from chafe, and take the carlings of the grating. A small hook **r** reinforces the point where the upper-rails meet, at the forward end of the head. The cross-pieces **j** and **k** are shown full-size with their scores to take the carlings supporting the battens of the grating. A cant **l** is nailed to the planking of the bow to support the carlings and battens of the grating. This is shown in the upper part of the drawing, as is the seat of ease **m**.

E. This drawing shows from above the various timbers making up the head, with the grating not yet in place.

Also on this Sheet can be seen the catheads (**F**), which are bolted to the beams of the forecastle, and the bumpkin (**G**).

The head is in fact less complex than it at first appears, since most of the timbers curve only in one plane. Only the knees of the head and the wash-cants present any real difficulty.

Finally I should draw your attention to the scores cut in the false-rail fayed to the top of the upper-rail. These are intended to allow the run of the hawsers passed out through the doorways to the beakhead to be altered.

Sheet 11. **THE STERN**

In my view this is by far the most complicated part of the model to make.

A. The timbering of the stern. **a-b-c-d** are the four filling-transoms. **e** is the deck-transom, supporting the ends of the deck-planks of the gundeck; **f** is the wing-transom. These six transoms are drawn in full to assist in their shaping. Great care must be taken with the wing-transom, **which has no rabbet**; the heels of the stern counter-timbers are strengthened by dovetails half-way up it.

The helm-port transom **h** forms the upper sill of the stern-chase ports; just above it is the transom of the upper deck **i**, and at **j** and **k** are those of the quarterdeck and the poop. Finally, the transom-knees are shown at **l**; they are bolted to the beams of the poop and support the structure of the cove of the gallery and the taffarel. They are clad on their under-sides with planking, and form the slightly concave arch of the cove over the stern-gallery, while above that their after faces receive the planking to which the carved-work of the taffarel is fastened. At **m** is a further knee which serves to support the ensign-staff.

The stern counter-timbers form a solid mass amidships, through which is cut the helm-port. On either side of this are the stern-chase ports, the outboard sides of which are formed by further counter-timbers; further timbers are fitted between the ports and the toptimbers of the after fashion-piece. These stern counter-timbers are joined to the timbers forming the munions of the lights of the wardroom and the great cabin. The shape of these timbers arches somewhat at the level of the poop in order to make the stern-gallery more spacious.

The fashion-piece **g** is shown in plan; the filling-transoms, deck-transom and wing-transom all finish on the fashion-piece. However, because of its double curvature it is not possible to show the side counter-timbers in plan.

B. This drawing shows the way the planking "clads" the timbering shown in the drawing on the right. Note the way the deck-planking of the quarterdeck continues aft and rounds up somewhat to form the walk of the stern-gallery. This section of planking will be covered over underneath by further planks running athwartships. Note also: the planking nailed to the underside of the transom-knees; the way the planking of the stern extends out beyond the side counter-timbers, nailed to the lower part of the arch of the cove, as does the planking of the taffarel itself.

To the right of these drawings I have tried to show the taffarel-knees as clearly as possible. You will see how the outer ones are scored to assemble with the toptimbers of the frames.

The fitting of the ensign-staff requires the support of a further knee **m**; this has a small mortice cut in it to receive the heel of the ensign-staff, and a second mortice for the heel of a supporting-timber which rests against the taffarel fife-rail, and has a small cap at its head through which the ensign-staff passes. Where this supporting-timber rests against the taffarel fife-rail there is a small filling-piece bolted to the rail; this has a semi-circular notch cut in it and a hinged collar which locks the staff in position. The same filling-piece has a second notch cut in it for the supporting-timber.

C. This schematic drawing shows the make-up of the various decorative elements of the stern: the tuck-rail – lower counter-rail – upper counter-rail – quarterdeck transom – footspace rail – arrangement of the balusters – breastrail of the gallery – lower sill-rail of the lights of the great cabin (obscured) – upper sill-rail of the same lights. Thus a series of horizontal rails separate the various parts of the stern. Finally, note the arch of the cove, the taffarel transom, and the taffarel fife-rail supported by the taffarel-knees.

D. A similar schematic drawing shows the various elements which go to make up the quarter-galleries. The various rails of the stern curve round to decorate these (for their structural timbers, see *74-G.S.*, Vol II, p. 45). At the bottom they end in the drop of the lower finishing, while the top is called the upper finishing. Note the way the gallery curves forward, an arrangement which considerably reduces the breadth of the upper stool of the gallery, which becomes extremely narrow.

The plan view includes a number of lines which are by no means easy to follow. First of all I should say that the breastrail of the stern-gallery leans outwards, and is supported by 56 balusters; these are flat – since they are all different it would be impossible to turn them on a lathe – and have an imitation moulding. In addition to these balusters are those which decorate the quarter-galleries. The size of the quarter-galleries can be judged from the various essentially horizontal sections which correspond to the lower stool, the basement of the lights, the upper sill of the lights of the wardroom, the breastrail of the gallery. The upper stool of the gallery corresponds to the level of the great cabin which gives onto it: note three lines representing the deck, the lower sill of the cabin lights, and the deckhead.

Examine closely the drawings on this Sheet, but they are more intended to give a spacial appreciation of the forms than to provide any very real practical guidance. Like the shipwrights of the time, you will have to work out and adjust the timbers "on the job".

E. Shows the finished stern. All the carved-work must be treated with a very light touch, avoiding too bold a relief. The various elements were executed on panels of light timber which were then fayed to the planking. Note the hance in the taffarel, where the acanthus leaf decoration of the lower part merges in a scroll with the upper part. This scroll marks the transition to a lighter form of decoration, and in the centre is a cartouche decorated with the thirteen stars representing the thirteen states of the Union.

At the risk of repeating myself, I would emphasise that the stern and in particular the gallery are the hardest parts of the model to finish, and I must confess to a certain impatience to see how the more skillful model-makers will succeed in "rounding off" their models!

F. The toptimbers from station VIII of the afterbody to the stern, seen from the side.

G. The inner-post and helm-port transom seen from aft and overhead.

H. Several horizontal sections of the quarter-galleries

a. Lower stool above the lower finishing
b. Upper stool at the level of the gallery
c. Section at the level of the footspace rail
d. Upper finishing at the level of the upper face of the beams of the poop.

Sheet 12. **OUTBOARD PROFILE**

This drawing shows the "clothing" of the schematic elevation. According to convention, the gunports which are armed are shaded in grey. This explains why the port-lids of five of the gundeck ports are lowered. The bow-chase port on the upper deck, the only one to have a full port-lid, is closed: this is because, as already explained, it was armed only when necessary. On the quarterdeck the fact that the first two gunports are left white shows that they were not armed. The gunport in the great cabin is fitted with a port-light, and the same arrangement could be adopted for the gunport in the wardroom.

All the various fittings are drawn separately on Sheets 16 and 17, so you should refer also to the text accompanying these.

This overall view shows how relatively slight the sheer is, the height of the upper works aft, and the limited rake of the sternpost. These comments do not however detract from an appearance which is undeniably elegant.

Sheet 12. **PLAN OF THE GUNDECK**

The lower part of the drawing shows the structure of the deck, as if the ship had been sliced apart along a plane coinciding with the upper edge of the waterway. There is nothing out of the ordinary about the construction, and once again I can only recommend that you turn to *The Seventy-Four Gun Ship*, Volume I. I would however draw your attention to the breasthook at the level of the beams, to the wrought-iron knees, the upper futtock-riders, and to the deck-transom. The hull is not planked and you will see that from station VI forward the frames are canted in order to reduce the need for what would otherwise be excessive bevels.

The upper part of the drawing shows the fittings and apartments. Starting at the stem, note the hawse-hook bolted under the hawseholes; the low manger-boards supported by standards. Then the stanchions of the shuttering around the steps of the bowsprit, and its partners; the foremast and its wedges; the scuttle leading to the Bo'sun's stores, situated between the bitt-standards. Next the hatchway to the cable-tier and the forward ladderway for the crew; the sheep-pen running aft as far as the main-hatch. Just aft of this is the bread-oven, the mainmast and its wedges, and the four pumps. The after ladderway for the crew is next, which like the forward ladderway is double. The after-hatchway leading to the victuals is immediately forward of the lower barrel of the main-capstan.

Forward of the mizen-mast, the step of which rests on the gundeck, is the main ladderway reserved for the officers. The bulkhead of the gun-room is formed of panels which can be struck down, and is fitted with shelves or racks for the cartridge-boxes. There is a doorway on the port side. Backing up against the bulkhead are two arms chests, one on either side. Inside the gun-room itself is the scuttle leading to the magazine, and the smaller one leading to the lady's hole where the Gunner keeps his spares. The Gunner sleeps in the starboard cabin, and the Purser in the port one. Canvas screens erected forward of these two cabins provide space on the starboard side for the Surgeon, and on the port side, if there is no chaplain on board, for another warrant officer. The midshipmen and volunteers sleep in the gun-room, and the ship's petty officers take their meals there, at a large table with benches.

Note the open gunports for the 18-pdrs; only the three aftermost ports were armed, the other five (on either side) being left empty. Five other ports were left berthed up on the outside by the hull-planking; they were designed for 12-pdrs, and should have been opened up and enlarged, but Jones was unable to obtain in time the 28 18-pdrs with which he originally intended to arm her.

To conclude this description, note the futtock-riders; the flat iron straps of the upper deck knees; finally the pillars, those in the way of the capstan being hinged to the deckhead so that they can be swung up out of the way.

Sheet 13. **PROFILE OF INBOARD WORKS**

The profusion of detail shown on this drawing makes it easier to provide a numbered key rather than a commentary. We start in the hold and work upwards progressively, and at each level moving aft from the bow.

A. Hold

1. Coal-room (for charcoal)
2. Forward cartridge-rooms
3. Cable-tier
4. Main hold (for water)
5. Shot-locker
6. Pump well
7. After hold (usually for wine)
8. Captain's storeroom
9. Magazine and powder-rooms

B. Orlop

1. Bo'sun's spares
2. Grain locker (for poultry)
3. Bo'sun's storeroom
4. Carpenter's storeroom
5. Sail-locker
6. Surgeon's storeroom
7. Spare anchor
8. Scuttle leading to the starboard carpenter's walk
9. Scuttle providing access to the shot-locker
10. Dried vegetables
11. Officers' provisions
12. Bread-rooms
13. Light-room of the magazine
14. Lady's hole (Gunner's spares)

C. Gundeck

1. Manger
2. Forward step of the bowsprit
3. After step of the bowsprit
4. Galley
5. Scuttle leading down to the forepeak (Bo'sun's stores)
6. Cable Hatch
7. Forward ladder
8. Sheep-pen
9. Main-hatch
10. Bread-oven
11. After ladder (for crew)
12. Lower barrel of main capstan
13. After ladderway (for officers)
14. Mizen-mast step
15. Gun-room
16. After-hatch
17. Hatchway to the magazine
18. Scuttle to lady's hole
19. Gunner's cabin

D. Upper Deck

1. Doorway to the head
2. Bow-chase port
3. Step of the fore jeer capstan
4. Riding bitts
5. Gangway ladders
6. Ship's boats
7. Spare spars
8. Kevel
9. Fixed-block
10. Main topsail-sheet bitts
11. Pumps
12. Jeer-bitts
13. After ladder (for crew)
14. Kevel
15. Upper barrel of main capstan
16. After ladderway (for officers)
17. Tiller ropes running up to wheel
18. Wardroom
19. Sideboard
20. Doorway to the quarter-gallery

E. Forecastle and Quarterdeck

1. Beakhead bulkhead stanchions and pin-rails
2. Fore topsail-sheet bitts
3. Foremast bitts
4. Fore jeer capstan
5. Hood of the galley fires
6. Belfry and forecastle breastwork
7. Watch-bell and quarterdeck breastwork
8. Mainmast bitts
9. Kevels
10. Bench for watch-keeping officers
11. After ladderway (for officers)
12. Steerage
13. Passageway leading to great cabin and arms-rack
14. Great cabin
15. Chest of drawers
16. Stern-gallery
17. Mizen bitts
18. Large poultry-coops
19. Fixed-block

Sheet 13. **PLAN OF THE UPPER DECK**

As with the plan of the lower deck, the timbering is shown on the lower half of the drawing, the ship having been "sliced through" along a plane corresponding to the upper edge of the chine of the waterway. Note that the waterways are single. The tumblehome of the ship's side is evidenced by the frames which are visible below, together with the the gundeck ports. I would also draw your attention to the deck-hook, the iron knees of the gundeck, the quadrant and the tiller (see *74-G.S.*, Vol. II). Note the lodging-knees of the helm-port transom and the deck-transom.

The upper half of the drawing shows the ship fitted out, the plane passing this time just below the upper sill of the gunports, once again just like the drawing of the gundeck.

Starting at the bow, note: the doorway leading out onto the beakhead; the partners of the bowsprit; the pins of the fore topsail-sheet bitts; the foremast. Forward of the galley fires can be seen the spindle and the step of the fore jeer capstan. The stanchions of the belfry of the ship's bell are hard up against the casing of the fires. Abaft the galley, the forward ladderway, and then four gratings which precede the main-hatch. The spare spars (topmasts, topsail-yards[1]) are stowed on small chocks on either side of these gratings. These spars take up a lot of room, and clutter the deck from the galley to the after ladderway[2].

The mainmast is surrounded by the four pumps, and on the forward side are the main topsail-sheet bitts, aft the jeer-bitts.

Still moving aft, the after ladderway for the crew, the after-hatch, two gratings, the upper barrel of the main capstan, and two more gratings. Forward of the mizen-mast is the main ladderway for the officers, the pannelled casing for the tiller-ropes leading down from the wheel, and the wardroom bulkhead.

This bulkhead can be struck down, and there is a door on the port side. A third arms chest backs against the forward side of the bulkhead to starboard.
The wardroom is reserved for the officers, who take their meals there; its furnishings consist of a sideboard, a table and benches, and lockers forming seats are fitted beneath the stern-lights of this vast room. The lockers can be removed if required, in order to rig guns in the event of a stern-chase. The central locker disguises the rudder-head, and this hood can be quickly removed in order to fit the spare tiller. A doorway leads off on either side into the quarter-galleries. Screens of wood and canvas divide up the space into six cabins.
The upper deck armament is made up of 28 12-pdrs, and a further bow-chase port has been opened up hard against the bow: this is armed only in case of need, by moving the adjacent broadside gun. In view of Jones' desire to trim the ship by the stern, I believe that he would have armed the six aftermost ports with the six older, somewhat longer guns, these being heavier; it is one of these therefore which is in the wardroom.
Note the triangular shot-parks of the French pattern; the knees of the beams of the forecastle and quarterdeck, and the smaller ones of the gangways; and the access ladders leading up to the gangways.

[1]The spare spars consist of a main-topmast, a fore-topmast, a main topsail-yard, a fore topsail-yard (the yards are sometimes stowed in the channels (see *74-G.S.*, Vol. II). There are also two fishes, and on the orlop or in the hold, two trestletrees and two mast-caps.
[2]The longboat is stowed on top of the spare spars, and a dotted line shows the space it occupies.

Sheet 14. **PLAN OF THE FORECASTLE, QUARTERDECK & POOP.**

As with the two preceding deck-plans, the lower part of the drawing shows the timbering, at a plane corresponding to the upper edge of the chine of the waterway of the forecastle. Note the pronounced sweep of the waterway, caused by the considerable tumblehome of the toptimbers at the bow. The position of the catheads is shown, and note the small scuttles for the spar-shores, when the ship is hauled down on a careen (see *74-G.S.*, Vol. III). The knees of the forecastle and gangway beams are of timber.
The upper part of the drawing shows the arrangement and fitting-out. The beakhead is partly hidden by the tumblehome of the ship's sides. Forward of the foremast can be seen the fore topsail-sheet bitts, while abaft are the foremast-bitts. Moving aft, we come to the fore-jeer capstan and the galley scuttle. The ship's bell is built into the breastwork, leaving room on either side of the belfry for a chicken-coop. There is only one gun-emplacement on either side on the forecastle.
The gangways lead aft to the quarterdeck, and in the space between them are the ship's boats: the cutter nested in the barge and the barge in the longboat, with only the thwarts of the cutter being left in place. Beside the boats can be seen the spare spars, and just the ends of the upper deck guns. Removable ladders at the four corners provide access for the crew from the upper deck up to the gangways. The channels of the three masts have been shown, complete with their small knees, deadeyes, etc. Note also the chesstrees, the muzzles of the 12- and 18-pdrs, and the gundeck port-lids. The cleats of the entering-ladder can also be seen.
The quarterdeck ends just forward of the mainmast, and its breastwork incorporates the belfry of the smaller watch-bell. There are two poultry-coops backing onto the breastwork. The scuttles for the pump-spears and the mainmast-bitts can be seen around the mainmast, followed by six gratings.
The exposed part of the quarterdeck has four gunports on either side, of which only two are armed, with 8-pdrs. The main ladderway just forward of the mizen-mast comes out on the starboard side, and backing against the balustrade surrounding it is the watch-bench. On either side of the mast is a binnacle and a water-jar, and abaft the mast the double-wheel. Three cabins give onto the steerage on either side. The Captain's sleeping-cabin is the aftermost cabin on the starboard side. Full details of how these cabins are furnished are given in *The Seventy-Four Gun Ship*, Vol. II. The same applies to the great cabin, access to which is provided by a passageway running between the after cabins. There is a further gunport armed with an 8-pdr in the great cabin, which is in effect a vast drawing-room, reserved in principle for the sole use of the Captain. Doors lead out onto the stern-gallery, which continues round the quarters; this explains the fact that the upper stool of the quarter-galleries is narrower, leaving room however for a small washroom to be fitted.
The plan of the poop shows the most important timbers, notably the taffarel knees, which are bolted to the beams and provide a framework for the "roof" over the gallery.
Access to the poop is by means of two ladders situated at either side of the breastwork; backing onto this are two poultry-coops. Forward of the mizen-mast are the mizen topsail-sheet bitts. Much of the poop is taken up with two large poultry-coops or "poop-cages". Note the planking over the arch of the cove; the stern-lantern; the overhead view of the quarter-galleries, which shows clearly how they merge into the stern-gallery.

Sheet 14. **VIEWS OF THE BOW AND THE STERN.**

The closed head is surmounted by a number of timberheads with sheaves and a pin-rail; these serve the many items of rigging which run aft from the bowsprit. The downward curve of the bumpkins is designed to spread the clue of the foresail better. The head-timbers must be so positioned in relation to the hawseholes that they do not impede the passage of the cables. Note the wash-cant beneath the lower cheek of the head, and the bolsters between the cheeks. The design of the stern already shows signs of the horseshoe-shape which will be adopted in the 1780s. The quarter-galleries are on two levels, and the large knees supporting the stern-gallery have been abandoned, save for the two outer ones, which have been retained more for aesthetic reasons than because their support is really needed, particularly at this point where the gallery projects least.
The stern is probably the hardest part for the model-maker, not least the balusters of the gallery, each one being set at a different angle, the angle increasing from the centre outwards.
The way in which the bow and stern of the ship are finished contributes greatly to the elegance of her appearance, and the the model-maker should be particularly careful in these areas.

Sheet 15. **TRANSVERSE SECTIONS.**

1. This section is taken at station III forward, and shows the forecastle breastwork, the belfry and the ship's bell. On either side is a breastrail supported by stanchions. The upper deck 12-pdrs are run out. Note the step up from the gangways to the level of the forecastle. The beams of the upper and lower decks are fastened to the ship's sides by means of wrought iron knees (see the detailed drawings on p. 52). The orlop is illustrated, as is the carpenter's walk. The iron pigs of the shifting-ballast may be stowed under the flat of the cable-tier as required.

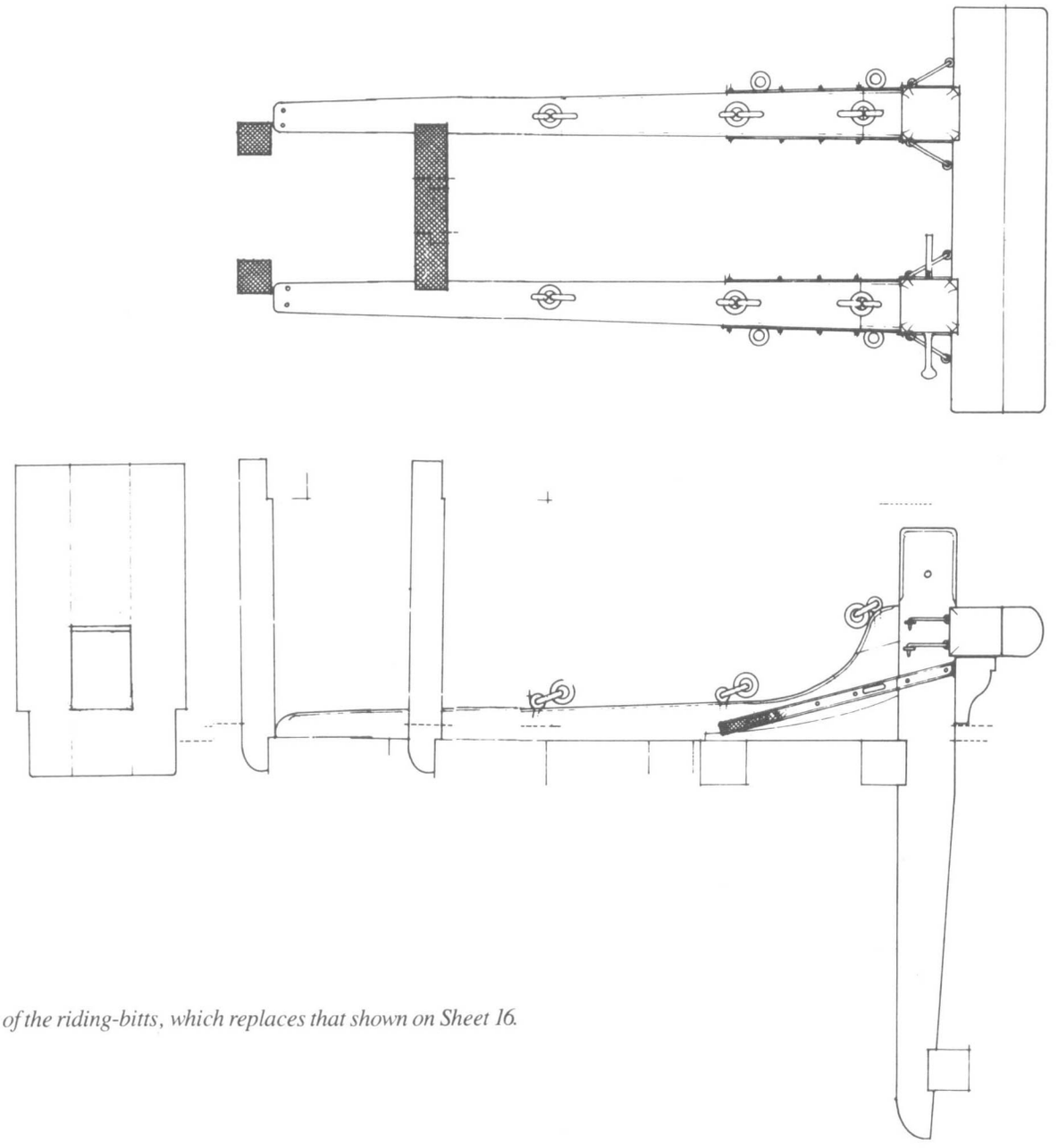
2. This section is made at the midship-frame, and shows the mainmast and its wedges where it passes down through the gundeck. The inventory confirms the fact that the four pumps were "Royal" pumps, as on the King's ships. The design of the quarterdeck breastwork is similar to that of the forecastle, save that the belfry of the watch-bell is somewhat lighter.

3. This section is made at station V of the afterbody, and shows the poop breastwork and the balustrade of the officers' ladder. The three tiers of armament are shown according to convention.

Sheet 16. **FITTINGS A.**

This and the the following sheet show most of the items needed to fit out the ship.

1. Fore jeer capstan
2. Main capstan
3. Double wheel
4. Old model 18-pdr
5. Old model 12-pdr
6. New model 12-pdr
7. New model 8-pdr
8. Fore-channels
9. Main-channels
10. Mizen-channels
11. Stern-lantern
12. Galley fires
13. Rudder
14. Rudder-irons in close-up
15. Two types of kevel
16. Chestrees
17. Single binnacle
18. Jeer-bitts with bronze sheaves
19. Riding-bitts (see modified drawing)



Drawing of the riding-bitts, which replaces that shown on Sheet 16.

20. Fore- and mainmast bitts[1]
21. Large poultry-coop for the poop[2]
22. Watch bench
23. Arms chest (3 in all)
24. Two-tier poultry-coop
25. Single-tier poultry-coop
26. Small single-tier poultry-coop
27. Stanchions: single for entering-ropes, with swivelling crane for breastrails
28. Officers' ladder and detail of baluster[3]
29. Main topsail-sheet bitts
30. Fore topsail-sheet bitts
31. Mizen topsail-sheet bitts

None of these items require any special comment for those who have seen them before in my other books. The section on pages 52-53 on the ironwork should however be read carefully.

[1]Too many models are spoiled by out-of-scale belaying-pins. These are turned from wood, and measure 1 foot [325 mm] in length; their diameter does not exceed 1 1/2 inches [40 mm].

[2]From the inventory we know that 8 poultry-coops were embarked, but without specifying which type; a "saving" can be made by omitting one of the large ones for the poop.

[3]While the balusters supporting the rail which surrounds the head of the staircase on three sides are round (i.e. turned on a lathe), those supporting the handrails of the staircase itself are flattened in profile, so that they are widest on their visible face.

Sheet 17. **FITTINGS B.**

The inventories taken of the ship give the weight of the anchors, from which it was possible to calculate their sizes, and also the diameter of their respective cables and cablets.

1. Sheet anchor and spare[1]
2. Best bower anchor and small bower[1]
3. Large stream anchor
4. Kedge anchor
5. Cutter[2]
6. Barge
7. Longboat[3]

The anchors conform to normal practice at the Royal Dockyard at Brest: the six anchors weigh (respectively) 4,055 pounds – 4,000 – 3,525 – 3,600 – 1,070 – 705 [1983, 1956, 1724, 1760, 523, 345 kgs].

[1]The difference in size between the sheet anchor and the spare, and between the best bower and the small bower is insignificant, so that I have shown only one of each.

[2]The boats illustrated are those listed for the *Bonhomme Richard*: we know that the longboat was refurbished, and the barge and cutter were both new. The "Captain's boat" (in principle the cutter) was lost off the coast of Ireland when her crew deserted in her.

[3]The thwarts of all but the cutter are removed when the boats are stowed, nested one inside the other.

Sheet 18. **MASTS AND MAST FITTINGS A.**

1. Mainmast
2. Foremast
3. Bowsprit[1]
4. Mizen-mast
5. Fore-topmast[2]
6. Main-topmast
7. Mizen-topmast
8. Fore topgallant-mast
9. Main topgallant-mast
10. Mizen topgallant-mast
11. Ensign-staff
12. Jibboom
13. Bibbs of the foremast
14. Bibbs of the mainmast
15. Bibbs of the mizen-mast
16. Jackstaff-knee and bees
17. Gammoning-fish
18. Rubbing-paunch of the foremast
19. Rubbing-paunch of the mainmast
20. Rubbing-paunch of the mizen-mast

[1]The drawing is upside-down, and the flat part at the end of the bowsprit is the upper side.

[2]The heelings of the topmasts are of the so-called "French" type (*74-G.S.*, Vol. III).

Sheet 19. **OTHER SPARS AND FITTINGS B.**

1. Mainyard
2. Foreyard
3. Crossjack yard
4. Main topsail-yard
5. Fore topsail-yard
6. Spritsail yard
7. Lower fore studdingsail-boom
8. Lower main studdingsail swinging-boom
9. Fore topgallant-yard
10. Main topgallant-yard
11. Sprit topsail-yard
12. Mizen topsail-yard
13. Mizen topgallant-yard
14. Mizen-gaff

16.* Fore-topgallant studdingsail-boom
17. Main-topgallant studdingsail-boom
18. Fore-topmast studdingsail-boom
19. Main-topmast studdingsail-boom

22.* Fore-topgallant studdingsail-yard
23. Main-topgallant studdingsail-yard
24. Main-topmast studdingsail-yard
25. Fore-topmast studdingsail-yard
26. Lower main studdingsail-yard
27. Lower fore studdingsail-yard

*Numbers 15,20 & 21 not allocated.

Sheet 20. **TOPS AND MAST-CAPS.**

The dimensions of the tops are determined by the length of the topmasts. The Compagnie des Indes used smaller topmasts than the Navy, adopting factors of 1.5 rather than 1.6 and 1.33 rather than 1.5. This in turn gave tops which were 18′3″ [5.93 m] and 16′2″ [5.26 m] wide, rather than 19′7″ and 18′4″ [6.37 & 5.96 m]. Since Jones fitted larger tops, in the end I settled for dimensions of 20′0″ [6.50 m] and 18′7″ [6.04 m]. For the mizen-top, the original proportions were retained.

1. Maintop
2. Foretop
3. Mizen-top
4. Main topgallant trestletrees
5. Fore topgallant trestletrees
7. Mainmast cap
8. Foremast cap
9. Mizen-mast cap
10. Main-topmast cap
11. Fore-topmast cap
12. Mizen-topmast cap
13. Bowsprit cap

The caps are of the so-called "French" type.

Sheet 21. **THE MAINMAST.**

This drawing, like those on the next two sheets, is commented on in detail in the section beginning on page 34. I should however explain that the left-hand half of the sails shows their after side, the right-hand half their forward side. The studdingsails have only been shown on the port side. The *Bonhomme Richard* is rigged according to the rules which are explained in considerable detail in Volume III of *The Seventy-Four Gun Ship*, which describes the standard practices for rigging of the time (and many variants).

Sheet 22. **THE FOREMAST.**

I have also shown on this Sheet the spritsail and the sprit-topsail. Making a fully-rigged model complete with all its sails presents very real difficulties, if scales are to be respected, particularly with regard to the canvas. For example, the weight per m^2 of the *Bonhomme Richard*'s courses is 700 grammes, and this drops to about 400 grammes for the topgallants. I have real doubts as to whether any materials can be found which weigh 48 times less.

Sheet 23. **THE MIZEN-MAST.**

While on the other two masts Jones rigged royals and topgallant-studdingsails, on the mizen he employed neither royals nor any studdingsails at all. We know this from a careful examination of the ship's log. Did he I wonder find that the *Bonhomme Richard* tended to gripe, the tendency perhaps being aggravated by the height of the upper works at the stern?

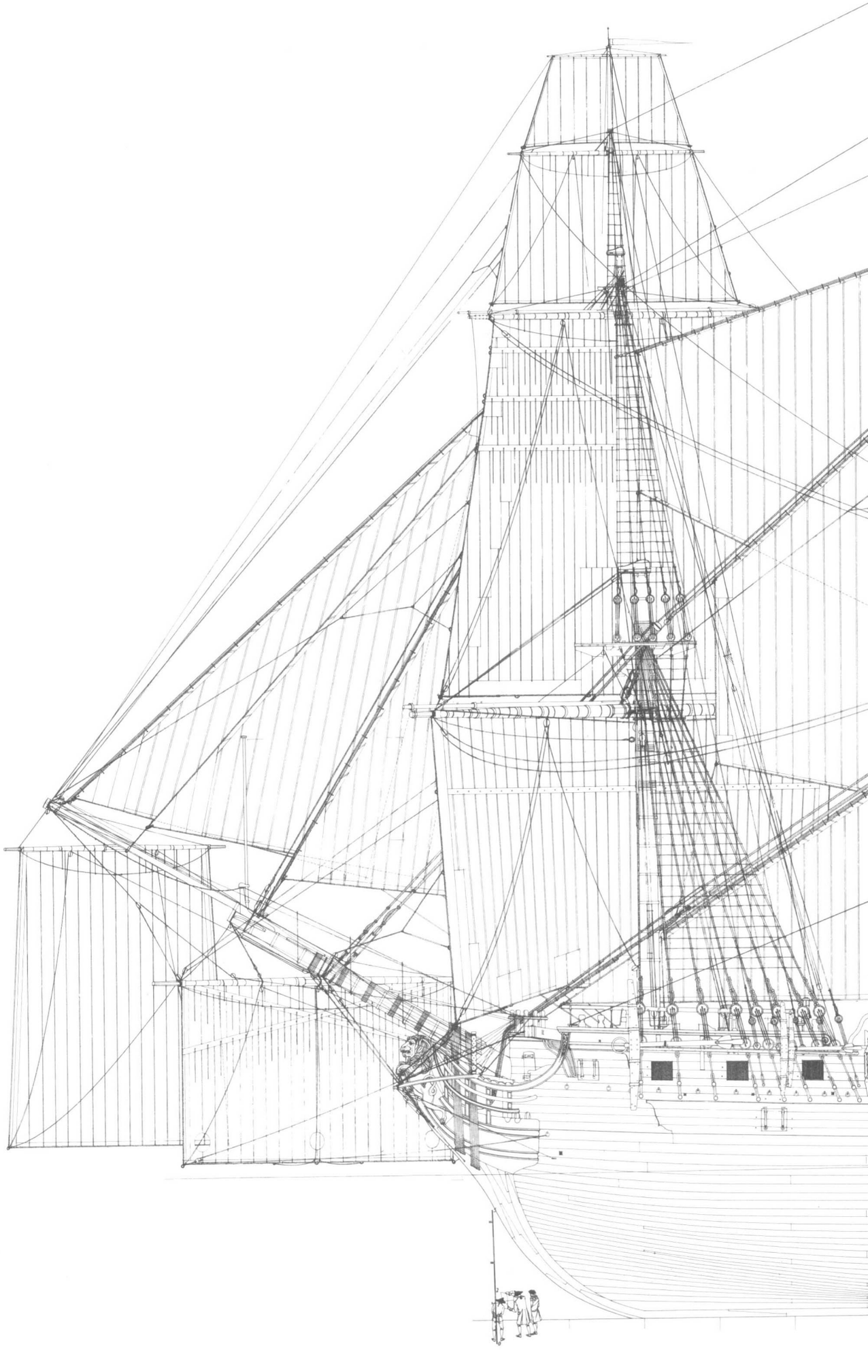
Sheet 24. **FORE-AND-AFT SAILS.**

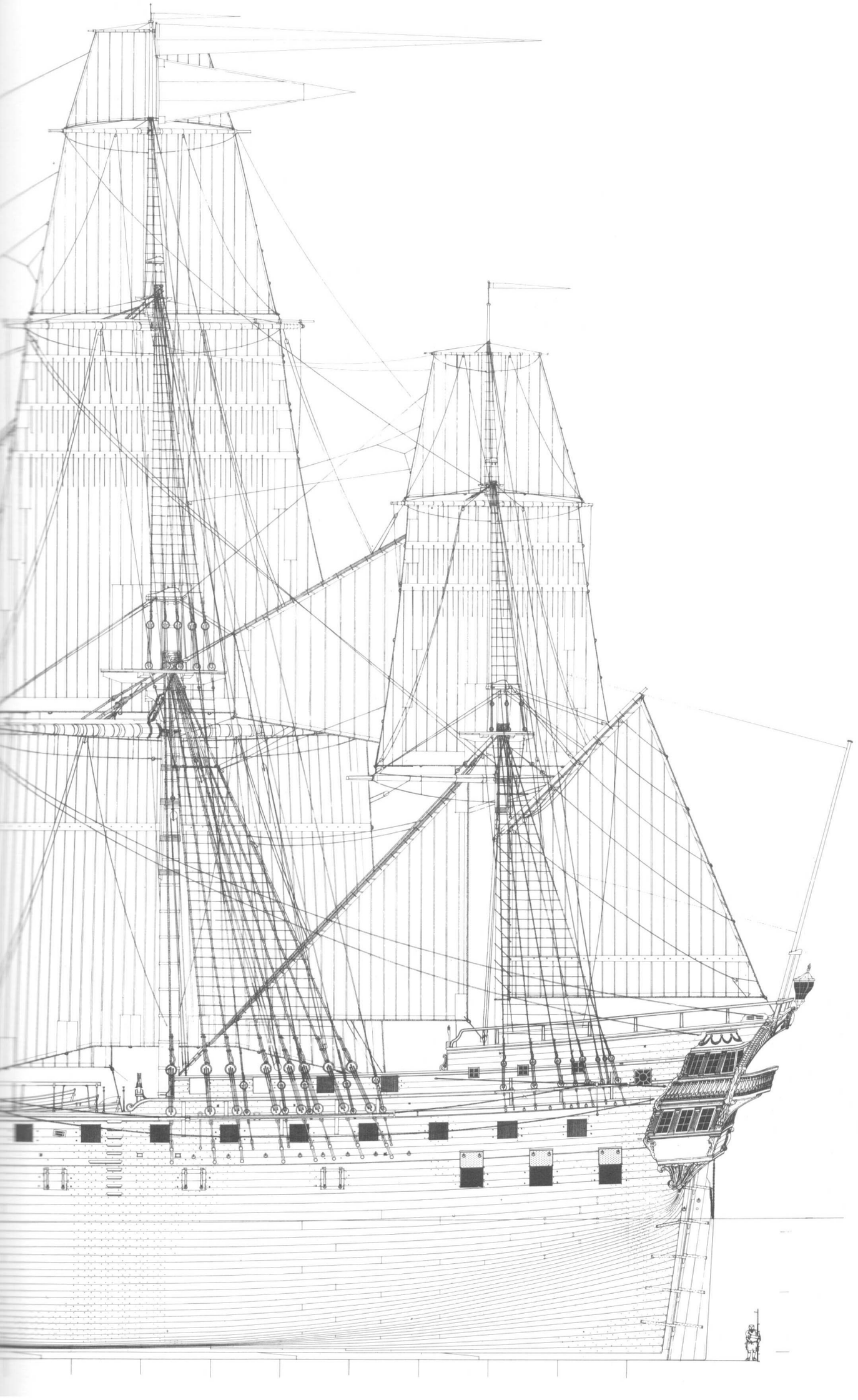
It will be seen that there are only a limited number of staysails, among them a main-staysail, with its tack hauled down forward of the foremast. For the other staysails rigged on the main lower mast, I have adopted French conventions by showing collars round the foremast.

The use of royal-sails justifies the portrayal of royal-mast staysails, in addition to the usual topgallant-staysails.

Sheet 25. **THE BONHOMME RICHARD UNDER SAIL.**

This is an entirely artificial view, showing all the sails except the studdingsails. The ship is represented with her square sails braced over at an angle of 40° with the keel, while the fore-and-aft sails are of course parallel to it.





RIGGING GUIDE

The following rules should assist in rigging your model of the *Bonhomme Richard*. However, it is important to fully understand the art of rigging as it is explained in Volume III of *The Seventy-Four Gun Ship*, where there are many explanations and drawings covering both the general principles and the details of rigging in the 18th century.
The sizes of all the standing and running rigging were given in the inventory of the ship referred to above, or else are derived from another ship of the same breadth (it will be remembered that it is this dimension which determines the sizes of all items of rigging). For each item I give below its circumference in French inches and fractions of an inch, and then its diameter in millimetres. The length of the blocks is merely given in French inches, without the metric equivalent; however, there is a table on page 48 which will provide all the information you require.

RIGGING TO THE MASTS

Shrouds and pendants of the lower masts.

1. Fore shrouds, 8 on either side. 8″. ø 69 mm.
2. Main shrouds, 8 on either side. 8 1/4″. ø 71 mm.
3. Mizen shrouds, 5 on either side. 5 1/4″. ø 45 mm.
4. Fore winding-tackle pendant. 8″. ø 69 mm.
5. Fore-tackle pendant. 8″. ø 69 mm.
6. Main winding-tackle pendant. 8 1/4″. ø 71 mm.
7. Main-tackle pendant. 8 1/4″. ø 71 mm.
8. Mizen-tackle pendant. 5 1/4″. ø 45 mm.

The foremost shroud of each mast is served overall with spun-yarn. The rigging is placed overhead in the following order, after first nailing bolsters of fir to the trestletrees:
First overhead on the foremast are the pendants of the fore winding-tackles and fore-tackles, port-side pendants first, followed by the starboard pendants; next are the foremost pair of shrouds on the port side, followed by each pair in turn, alternating port and starboard. There are thus 10 eyes over the masthead.
For the mainmast, the order is reversed: starboard pendants first, followed by the other rigging, alternating starboard and port.
For the mizen-mast, the eye of the first shroud overhead has a short leg for the mizen-tackle pendant, the longer leg forming the shroud being the foremost shroud on the starboard side; that is followed by the port-side shroud and tackle-pendant; next come two more starboard shrouds, then two port shrouds. There are thus four eyes in all over the mizen masthead.
Both shrouds and pendants are cable-laid.
The main and foremast deadeyes measure 14″ [379 mm] in diameter[1], while the mizen deadeyes are 10″ [270 mm]. The dimensions of the chains are given in the section on the ship's ironwork.

The pendants turn in an iron thimble, and their length is such that in the case of the fore-, main- and mizen-tackles the upper blocks hang just below the catharpins; the pendants for the winding-tackles are about a third longer. The eyes of the shrouds and pendants where they pass over the masthead are served with spun-yarn, and sometimes this serving is extended down as far as the catharpins.

The deadeye-laniards are half the circumference of their respective shrouds, less 1/4″.

Lower mast stays.

9. Forestay. 12″. ø 103 mm.
10. Fore preventer-stay. 8″. ø 69 mm.
11. Mainstay. 12 1/2″. ø 107 mm.
12. Main preventer-stay. 8″. ø 69 mm.
13. Mizen-stay. 6 3/4″. ø 58 mm.
14. Forestay collar. 5 1/2″. ø 45 mm.
15. Fore preventer-stay collar. 4″. ø 34 mm.
16. Mainstay collar. 12″. ø 103 mm.
17. Main preventer-stay collar. 8″. ø 69 mm.
18. Mizen-stay collar. 6″. ø 52 mm.

The stays are placed over the masthead on top of the eyes of the shrouds, by means of an eye which also embraces the trestletrees. The eyer is formed by passing the lower end of the stay through a small eye at the upper end; a swelling called a mouse is formed on the stay at a distance from the bight of the eye equal to the length of the masthead; the length of the mouse is equal to the circumference of the stay. The eye is served overall, and this serving may extend down 5 or 6 feet below the mouse.
At its lower end the stay turns in a heart, the length of which is equal to 3.8 times the diameter of the stay, the width 2.9 times; the thickness is half the length. The diameter of the laniard is equal to 1/4 that of the stay, and its standing end is made fast to the heart.
The collar of the mainstay turns in a heart which is stropped between the two equal legs of the collar, seized together beneath the heart; the legs then pass either side of the foremast, and cross over below the hook of the gammoning-knee; from there they are turned back up inside the collar and secured by seizings. The collar of the main preventer-stay is rigged in the same manner. Scored bolsters of fir are nailed on either side of the foremast to take the collar, which is inevitably chafed by the mast. In addition, the collars are usually served overall with spun-yarn.
The collars of the forestay and fore preventer-stay are much shorter, and pass round the bowsprit approximately one third in from its end. They are stropped round hearts which are double-scored, and this explains why they are proportionately thinner. They are prevented from slipping down by stop-cleats nailed to the bowsprit. The preventer-stay hearts are the same size as the hearts of the stays, but are double-scored.
The collar of the mizen-stay is stropped round a heart, and its legs pass round the mainmast, where they are securely fastened by a lashing about four feet [1.30 m] above the quarterdeck.

Gammoning, bobstays, etc.

19. Gammoning. 3 1/2″. ø 30 mm.
20. Bobstay. 6″. ø 52 mm.
21. Horses. 2 1/2″. ø 21 mm.
22. Bumpkin-shrouds. 2 1/4″. ø 19 mm.

The two gammonings are formed of eight turns, the first turn being made fast with a slip-knot to the bowsprit; from there it is taken through the gammoning-hole and back round the bowsprit forward of the standing end; the next turn passes through the gammoning-

[1]It may be simpler to rig fore and main shrouds of the same diameter, and the deadeyes are in any case the same size. In principle the deadeyes should be somewhat larger for both masts, since the usual rule is twice the diameter of the shrouds, but I have respected the figures given in the inventory.

hole aft of the first, and so on, so that each turn crosses over the previous turn (see *74-G.S.*, Vol. III).
The bobstay is formed by a strop which is served overall with spun-yarn and passed through the face-piece of the stem; the two ends are then spliced together to form a bight, into which a heart is turned by a throat-seizing. A second strop passes round the bowsprit and turns in a second heart in the same way, and is prevented from slipping down the bowsprit by stop-cleats; its two ends are turned back on themselves with two eye-splices, and the eyes thus formed are lashed together over the top of the bowsprit. There is a second hole in the gripe just above the waterline, designed to take a shifting bobstay, which is rigged in the same way.
The bumpkin-shrouds consist first of all of a strop hooked into an eyebolt in the fore-quarter and turning in a single block; a second single block is lashed to the outboard end of the bumpkin. The second shroud reeves through the fore part of the knee of the head and turns in at either end a 7″ single block; as with the first shroud, a tackle is set up using a second block at the end of the bumpkin.
The horses consist of a line which is middled and made fast to the head of the jackstaff standard; its two legs are then bowsed taut by means of two tackles made fast to the forecastle bulkhead. The horses serve at times to rig a netting for the fore-topmast staysail. Two stretchers take the two short sides of the netting. The horses are secured by legs or stirrups which pass under the bowsprit, having eyes spliced in each end through which the horses reeve.

Ratlings, catharpins, futtock-shrouds.

23. Futtock-staves. ø as for shrouds.
24. Futtock-shrouds. 2 3/4″. ø 23 mm.
25. Mizen futtock-shrouds. 2 1/4″. ø 19 mm.

The ratlings are formed from lengths of ratline hitched to the shrouds every 13 or 14 inches [35 – 38 cms] below the catharpins. Each ratling is made fast at either end by means of a small eye seized with a length of marline, and is clove-hitched to the intermediate shrouds. The foremost shroud is not rattled.
To rig the catharpins the first step is to clap on the futtock-staves, which are lengths of rope of the same diameter as the shrouds; these are seized with lengths of line to the inside of the shrouds, crossing all but the foremost shroud, just below the bibbs. The catharpins are are composed of a number of short legs, each with an eye spliced in both ends, which are seized to the shrouds on either side. Once the futtock-staves are in place tackles are rigged to them, allowing the shrouds to be swiftered together; as soon as the catharpins are in place, the tackles are unrigged.
The futtock-shrouds serve to tighten the topmast-shrouds, and ratlings hitched to them allow access to the tops. Deadeyes are arranged along the rim of the tops (ø 10″ – 270 mm and 6″ – 160 mm); the lower ones are turned into an iron strap or futtock-plate with a ring at its lower end; it passes through a hole cut in the rim. The futtock-shrouds are middled and a thimble is seized in the bight, and a hook passes through the thimble and is hooked into the ring in the futtock-plate; the two legs of the futtock-shrouds are made fast to each shroud with a half turn and two seizings.

Tackles, winding-tackles and stay-tackles.

26. Fore and main winding-tackles. Fall 4″. ø 34 mm.
27. Fore- and main-tackles. Fall 3 1/4″. ø 28 mm.
28. Mizen-tackles. Fall 2 1/4″. ø 19 mm.

The winding-tackles are composed of two heavy blocks, the lower one double and the upper one threefold. The strap of the upper block turns in a thimble, so that it can be lashed to the thimble of the tackle pendant. The lower block is a hook-block. The standing end of the falls is made fast to the strap of the lower block, reeves through the sheaves of the two blocks and then runs down to a lead-block in the waterway. When the winding-tackles are not in use they are hooked onto the foremost shrouds; frequently they are unrigged in order to lighten the rigging, in which case the pendants are seized to one of the shrouds.
The other lower mast tackles are similar, save that they are less powerful, and are composed of a long-tackle block (13″ & 19″) overhead and a single block below (11″ & 7″).
I mention the stay-tackles to remind you of their existence, but in fact they are rigged only when required, and so I have not shown them. For further information see *The 74-G.S.*, Vol. III. Their fall has a diameter of 28 mm.

Upper jeer-blocks and slings of the lower yards.
Jeer-blocks of the fore- and mainyards: falls 4″, ø 34 mm.
These are threefold blocks (15″), and their strap is seized to the masthead.
The slings are the same size as the shrouds; they are middled and a thimble is turned into the bight with a throat-seizing. An eye is spliced into each end so that the two eyes can be lashed together round the masthead over the shrouds; sometimes they pass over the forward end of the fore crosstrees.

Rigging to the topmasts.

29. Main-topmast shrouds. 4 1/2″. ø 39 mm.
30. Fore-topmast shrouds. 4″. ø 34 mm.
31. Main-topmast backstays. 5 1/2″. ø 48 mm.
32. Fore-topmast backstays. 5 1/4″. ø 45 mm.
33. Mizen-topmast shrouds. 2 3/4″. ø 23 mm.
34. Mizen-topmast backstays. 3″. ø 26 mm.
35. Main-topmast stay. 6 1/2″. ø 56 mm.
36. Main-topmast preventer-stay. 5″. ø 43 mm.
37. Fore-topmast stay. 6 1/4″. ø 54 mm.
38. Fore-topmast preventer-stay. 5″. ø 43 mm.
39. Mizen-topmast stay. 3 1/2″. ø 30 mm.

The shrouds are cut to length in pairs and middled; an eye is formed in the bight by means of a throat-seizing, and the eye is passed over the masthead; the legs are made fast to the rim of the tops by means of deadeyes, the bindings of which form the futtock-plates. The foremost shroud is served overall, the others down as far as the topmast catharpins (topgallant trestletrees).
The topmast shrouds are placed overhead after the tie-block pendants (see rigging to the yards) and the brace pendants, which hang down on either side of the mast forward of the foremost shrouds and which are composed of a length of rope which is middled with an eye formed in the bight. The first pair of shrouds is on the starboard side for the main-topmast, and on the port side for the other topmasts; both legs of each pair hang down the same side. Since there is an odd number of shrouds, the last pair is put overhead so that one leg is to starboard and the other to port; it is middled and an eye formed at the bight like the pendants. The backstays are put overhead after the shrouds, and there are three on each side for the fore- and main-topmasts. In the case of the fore-topmast backstays, the deadeyes are 10″ in diameter and are rigged between the 4th and 5th lower mast shroud deadeyes, between the 5th and 6th, and at the after end of the channels. For the main-topmast backstays, the deadeyes are the same size and are rigged between the 4th and 5th lower mast shroud deadeyes, between the 6th and 7th, and also at the after end of the main-channels. In the case of the mizen-topmast backstays, of which there are only two, the deadeyes measure 6″ and are rigged between the 3rd and 4th and

the 4th and 5th lower mast shroud deadeyes.
The topmast stays are put on overhead after the backstays, and they pass either side of the trestletrees in a large loop similar to the collars of the lower mast stays. The other end of the main-topmast stay leads forward to the foretop where it reeves through a powerful single block (13″), runs down the after side of the foremast to the deck where it reeves through a thimble in an eyebolt, and is doubled back on itself and the bight seized with two or three seizings.
The preventer-stay runs below the stay and parallel to it as far as the foretop, reeves through a 10″ single block the strap of which is made fast round the foremast-head, and is then doubled back on itself and the bight secured by seizings.
The fore-topmast stay leads down to the forward end of the bowsprit, where it turns in a single block; this block forms the upper part of a tackle with a 13″ long-tackle block, the strap of which is made fast round the bowsprit between the bees, and the falls are 2 1/2″ in circumference (ø 21 mm).
The fore-topmast preventer-stay is rigged in the same manner, and at its lower end it turns in a single block; the lower block of the tackle is identical, and its strap is seized to a thimble in an eyebolt in the jackstaff standard.
The mizen-topmast stay is rigged over the masthead like the other topmast stays, leads forward to the maintop where it reeves through an 11″ block made fast to the rigging at the masthead, passes down the after side of the mast to the deck where it is set up like the main-topmast stay.

Rigging to the topgallants.

40. Fore-topgallant shrouds. 2″. ø 17 mm.
41. Main-topgallant shrouds. 2 1/4″. ø 19 mm.
42. Mizen-topgallant shrouds. 1 1/2″. ø 14 mm.
43. Fore-topgallant backstays. 3″. ø 26 mm.
44. Main-topgallant backstays. 3″. ø 26 mm.
45. Mizen-topgallant backstays. 2″. ø 17 mm.
46. Fore-topgallant stay. 3″. ø 26 mm.
47. Fore-royal stay. 2″. ø 17 mm.
48. Main-topgallant stay. 3 1/4″. ø 28 mm.
49. Main-royal stay. 2″. ø 17 mm.
50. Mizen-topgallant stay. 1 3/4″. ø 15 mm.

The shrouds are placed overhead first, and there are three on either side; each shroud passes down through holes fashioned in the ends and in the middle of the iron straps joining the topgallant trestletrees, and are secured to the futtock-staves, sometimes passing through a thimble on the way.
On either side there are also two backstays, which provide further support to the fore and main topgallant-masts. Their deadeyes measure 6″.
The mizen topgallant-mast has only one backstay on either side, and their deadeyes measure 5″.
The backstays are put on overhead above the shrouds.
The fore-topgallant stay forms an eye at its upper end which is placed over the head-rigging, and then leads down to the forward end of the jibboom where it reeves through a single block lashed below the truck; it leads aft down the bowsprit, and is made fast close to the fore-topmast stay. The royal stay reeves through the central sheave of a 10″ threefold block which is also lashed to the jibboom below the truck, and then leads aft to be made fast next to the topgallant stay.
The main-topgallant stay leads forward to the fore-topgallant masthead, reeves through a 10″ single block lashed to the head-rigging, and leads down the after side of the mast, either to the deck, or else only as far as the top; reeving through a thimble it is doubled back on itself, and the bight is seized close.
The royal stay leads forward to the head-rigging of the fore topgallant-mast where it reeves through a thimble, and is then made fast in the foretop.
The mizen-topgallant stay leads forward to the mainmast cap, reeves through a 6″ block, and is made fast in the maintop.

Rigging to the Jibboom.

51. Crupper
52. Guys. 2″. ø 17 mm.
53. Horses. 2 1/2″. ø 21 mm.
Two guy-pendants are made fast round the jibboom below the truck, with 7″ single blocks spliced in their ends. The falls are clapped over the spritsail yardarm at their standing end, reeve through the pendant-block, then through an identical block one quarter of the way aft down the jibboom, and are belayed round a pin in the forecastle breastwork. (Alternatively, the guy falls may reeve through one of the rack-blocks.)
The horses have eyes spliced at either end, the forward end being seized below the truck of the jibboom and the after end to the jackstaff standard. Knots are tied at regular intervals.

RIGGING TO THE YARDS

Lower Yards.

Slings.

54. Foreyard slings. 4″. ø 34 mm.
55. Mainyard slings. 4″. ø 34 mm.
56. Crossjack yard slings. 2 3/4″. ø 23 mm.
The yards are slung roughly at the level of the catharpins. The slings themselves are formed by two single strops placed one beside the other in the groove of a heavy thimble and seized together by a flat seizing, so that the two strops pass round the yard at its middle (the "slings"); they are then seized together on the forward side. They are served overall.

Jeers.

57. Fore jeers. 4″. ø 34 mm.
58. Main jeers. 4″. ø 34 mm.
59. Crossjack yard jeers. 2 3/4″. ø 23 mm.
The lower jeer-blocks (known as bollock-blocks) are the same size as the upper jeer-blocks. Their strop is formed, like the slings, of two straps of unequal length; they are passed round the scores in the shell of the block and seized together by a throat-seizing at the tail; the two legs then pass round the yard and are seized together by a lashing on the forward side of the yard. Like the slings, they are served overall with spun-yarn.

Lifts.

60. Fore lifts. 3″. ø 26 mm.
61. Main lifts. 3 1/4″. ø 28 mm.
62. Crossjack-yard lifts. 2″. ø 17 mm.
The lifts are double, and are made fast at their standing end at the mast-cap of the lower mast; from there they run down on either side, reeve through a shoe-block at the yardarm (13″, 14″, 9″ respectively), pass back up to the mast-cap again, reeve through a single block (10″, 11″, and 7″) lashed to an eyebolt in the mast-cap, and then pass down the foremost shroud and are belayed at the bulwarks within-board. The inventory of the *Duc de Duras* makes

no mention of shoe-blocks, from which we should perhaps conclude that the lifts are rigged in the following manner: the place of the shoe-blocks is taken by single blocks which are made fast to the yardarm or to the strap of the topsail-sheet blocks; these blocks measure 10″, 11″ and 7″ respectively.
In the case of the crossjack-yard, these running lifts are supplemented by standing lifts like those of the spritsail-yard.

Braces.

63. Fore-braces. 3 1/4″. ø 28 mm.
64. Main-braces. 3 1/2″. ø 30 mm.
65. Crossjack-yard braces. 2″. ø 17 mm.
Each fore-brace is made fast at its standing end to the mainstay below the eye, and leads to a 10″ single block turned in to a pendant passed round the yardarm; reeving through the sheave of the block, it then leads aft to reeve through a double block (10″) lashed at the bibbs of the mainmast, passes down the mast, reeves through a 10″ lead-block, and leads up again to a mast-cleat where it is belayed.
Each main-brace is made fast at its standing end to an eyebolt driven into the ship's side near the upper finishing of the quarter-galleries, reeves through a 10″ single block at the yardarm, returns aft to reeve through one of the sheaves of the fixed-block nailed to the plankshеer of the poop near the stern, and is belayed round a cleat nearby.
The braces of the crossjack-yard lead forward; they are made fast at their standing end to the aftermost main-shroud at the height of the catharpins, reeve through 6″ quarter-blocks lashed about 15 feet outboard of the slings of the yard, then lead forward to two identical blocks lashed near the standing end, run down the shroud to reeve through lead-blocks, and are belayed to pins within-board. Note that the braces of the crossjack-yard are crossed over so that the starboard brace leads forward on the port side and vice versa.

Trusses.

66. Fore-truss. 6″. ø 52 mm.
67. Main-truss. 6″. ø 52 mm.
68. Truss-tackle. 1 3/4″. ø 17 mm.
There are two trusses for each of the lower yards, except for the crossjack-yard which has none[1]. They consist of a length of rope turning in a thimble at one end. They are made fast round the yard on either side of the slings by means of a round turn, the free end being made fast by means of a seizing, leaving the end turning in the thimble hanging. These ends are then each passed through the thimble of the other abaft the mast, and brought together by a lashing to which is made fast a 6″ block forming the upper part of the truss-tackle, the lower part of which is hooked to an eyebolt on deck.

[1]Sometimes the crossjack-yard has a single truss.

Horses, stirrups.

69. Foreyard horses. 3″. ø 26 mm.
69. Mainyard horses. 3″. ø 26 mm.
69. Crossjack-yard horses. 2 1/2″. ø 21 mm.
The horses of each yard consist of two lines which are fastened by means of an eye over the end of the yardarm; their other ends are then seized together so that they hang 18 inches below the yard. They are held in place at this distance from the yard by stirrups made fast at regular intervals to the yard, each stirrup having a thimble turned in to its lower end, through which the horse reeves; the upper ends of the stirrups are woven into a plait which is passed twice round the yard and nailed in place. The horses are bowsed taut by means of small deadeyes (ø 6″).

Topsail sheet-blocks.

70. Fore-topsail sheet-block (quarter-block).
71. Main-topsail sheet-block (quarter-block).
72. Mizen-topsail sheet-block (quarter-block).
One of the sheaves (the larger of the two) of the shoe-blocks serving the lifts at the yardarms takes the topsail-sheets, and allows the clews to be hauled down. The quarter-blocks are situated as the name suggests half way out along the yard and serve to lead the sheets down towards the deck. There are two on each of the lower yards (12″ – 13″ – 7″ respectively), and they are strapped with two legs ending in eyes which allow them to be seized round the yard near the yard-slings. The clue-line, buntline and leech-line blocks are covered in the section on the sails.
The rigging is fitted over the end of the yard in the following order: a. horse – b. strap of the shoe-block – c. brace-block pendant – d. lift.

Topsail-yards.

Ties and halliards.

73. Fore topsail-yard tie. 4 1/4″. ø 37 mm.
74. Main topsail-yard tie. 4 1/2″. ø 39 mm.
75. Mizen topsail-yard tie. 3″. ø 26 mm.
The ties are served overall with spun-yarn. Each tie reeves through a single block (14″ – 19″) at the middle of the yard, and then the ends reeve through two other blocks (length 14″ and 9″) suspended from the topmast head by means of a single strop with an eye in the middle; this is placed over the bolster of the topgallant trestletrees. The tie hangs down on either side to about the height of the top, with the yard on the mast-cap. At each end of the tie (which is thus effectively a pendant) there is a fly-block (double: 9″ – 8″ – 6″ respectively). The halliards are formed of a rope (ø 23 – 21 – 15 mm respectively) which constitutes the fall of a tackle made fast at its standing end to a single block the same length as the tie-blocks, and this lower block is iron-bound with a swivel which is secured towards the after end of the channels. The running part reeves through a lead-block identical to the lower block and made fast in the spirketting, and is belayed to a cleat.
Each topsail-yard tie has a topsail-halliard traveller just above the fly-block, and this is made fast to one of the topmast backstays (see *74-G.S.*, Vol. III, p. 158).
The mizen topsail-yard only has a single tie, which is made fast at its standing end to the head of the mizen-topmast; it passes down the starboard side, round the yard, reeves through a pendant-block hanging down on the port side, and then passes down again to be made fast to the tackle or halliard, also on the port side (2 6″ blocks).
The horses are of the same thickness as those of the lower yards, and each one has an eye at either end, one of which forms a running knot which is slipped over the end of the yard; the eyes at the free ends then reeve through the thimbles of the stirrups, and are seized together by a lashing where they meet at the slings.

Braces.

76. Fore topsail-yard braces. 2 1/2″. ø 21 mm.
77. Main topsail-yard braces. 2 3/4″. ø 23 mm.
78. Mizen topsail-yard braces. 1 1/4″. ø 11 mm.
The fore topsail-yard braces are made fast at their standing end to the eye of the mainstay, lead down to the 8″ single block at the yardarm, and thence back again to a similar block lashed to the yard

near the standing end. Each brace reeves through the second sheave of the double blocks which serve the fore-braces, runs down the lower mast to the deck, and is belayed next to the fore-braces at the foremast-bitts.
The main topsail-yard braces are made fast at their standing end to the eye of the mizen-stay; from there each brace reeves through the 9″ single block at the yardarm and then passes under the bibbs by way of a similar block made fast to a pendant. Next, they pass down to the deck inside the foremost mizen shroud, reeve through a lead-block seized to an eyebolt in the waterway, and are belayed to a pin in the pin-rail.
The mizen topsail-yard braces pass forwards like those of the crossjack-yard; they are made fast at their standing end to the aftermost main-shroud at the catharpins, reeve through a 6″ single block at the yardarm, and then return forward to reeve through a 6″ double block lashed below the standing end. From there they pass down to a lead-block and are belayed round a pin in the quarterdeck pin-rail. The mizen topsail-yard braces cross over like those of the crossjack-yard.

Lifts.

79. Fore topsail-yard lifts. 2 1/2″. ø 21 mm.
80. Main topsail-yard lifts. 2 3/4″. ø 23 mm.
81. Mizen topsail-yard lifts. 1 3/4″. ø 15 mm.
The lifts serve as sheets for the topgallants, and have a toggle in their ends which is secured to the clue; from there they reeve through a single block (8″ – 9″ – 6″ respectively) at the yardarm, and return to below the topgallant trestletrees, where they reeve through a second identical block, the strap of which is made fast round the masthead; lastly, they run down to the level of the top where they are made fast to the lower shrouds at the the lower masthead, by means of a seizing.

Parrels.

82. Fore topsail-yard parrel.
83. Main topsail-yard parrel.
84. Mizen topsail-yard parrel.
The topsail-yard parrels consist of three rows of trucks separated by ribs. The parrel-ropes on which the trucks and ribs are strung finish at either end in an eye, and a small mouse serving to prevent the trucks from slipping off. The ropes should be three to four times the length of the parrel, and be so arranged that the eye of one finishes opposite the eye of the other.
The parrel is placed round the after side of the mast, and the loose end of each rope passes forward over the yard and through the eye of the other; it then passes round the yard a second time, in the opposite direction, and back behind the mast round the parrel; the rope then passes forward again over the yard, outside the turn of the other parrel rope, and back again round the parrel; the turns are then seized together close to the yard.
The mizen topsail-yard parrel would normally consist of two rows of trucks, but the inventory of the *Duc de Duras* specifies a single row as for the topgallant-yard parrels. The fore and main topsail-yard parrels each have eight 3″ [81 mm] trucks, while the mizen parrel consists of six 2″ [54 mm] trucks.

Rigging to the topgallant-yards.

Halliards.

85. Fore topgallant-yard halliard. 2 1/4″. ø 19 mm.
86. Main topgallant-yard halliard. 2 1/2″. ø 21 mm.
87. Mizen topgallant-yard halliard. 1 1/4″. ø 11 mm.
The halliards consist of a single rope which is made fast directly to the centre of the yard, reeves through a swallow cut in the topgallant masthead; passing down the after side of the mast, it turns in a single block (7″ – 8″ – 5″ respectively), through which a runner is rove, each end being made fast on either side to a cleat or belaying pin.
A strop which is served with spunyarn passes round the slings of the yard and is seized together above it, turning in a thimble in the eye thus formed; the halliard ends in a thimble and a hook, which passes through the thimble of the strop.
The horses are the same as those of the topsail-yards. 2 1/2″. ø 21 mm.

Braces.

88. Fore topgallant-yard braces. 1 3/4″. ø 15 mm.
89. Main topgallant-yard braces. 1 3/4″. ø 15 mm.
90. Mizen topgallant-yard braces. 1 1/2″. ø 14 mm.
The braces are rigged singly, and they are made fast to the end of the yard by means of an eye formed at their end. The fore topgallant-yard braces reeve through a 6″ block made fast below the mouse of the main topmast stay[1]; the running part returns forward, reeves through another identical block fastened behind the trestletrees of the foretop, and then passes down to another block made fast almost directly below on the mainstay; it is belayed at the foremast bitts.
The main topgallant-yard braces pass back on either side to the mizen topgallant trestletrees, reeve through a single block, and then pass down through the lubber's hole along the foremost mizen shrouds to the deck, where they are belayed round a pin in the rail.
The mizen topgallant-yard braces cross over and reeve through 6″ single blocks lashed high up on the aftermost main-topmast shrouds, and then run down to the quarterdeck where they are belayed at pins.

[1]I apologise for the error on Sheet 22 which shows the braces running down to the mouse of the mainstay.

Lifts.

91. Fore topgallant-yard lifts. 1 3/4″. ø 15 mm.
92. Main topgallant-yard lifts. 1 3/4″. ø 15 mm.
93. Mizen topgallant-yard lifts. 1 1/2″. ø 14 mm.
The lifts are rigged singly, and consist of ropes which fit over the yardarm by means of an eye formed in one end, then reeve through a thimble or a 6″ block lashed to the topgallant masthead, before passing down the mast to be belayed in the top.

Parrels.
According to the inventory of the *Duc de Duras*, the topgallant-yard parrels were made up of a single row of five 2″ trucks, instead of two rows, which would have been more usual.

Rigging to the royal yards.

94. Fore royal halliard. 1 3/4″. ø 15 mm.
95. Main royal halliard. 1 3/4″. ø 15 mm.
96. Fore royal braces. 1″. ø 9 mm.
97. Main royal braces. 1″. ø 9 mm.
98. Fore royal lifts. 1″. ø 9 mm.
99. Main royal lifts. 1″. ø 9 mm.

The halliards are rigged singly: they are made fast at the slings of the yards, reeve through sheave-holes cut in the the topgallant mastheads, and then pass down to the deck, where they are belayed next to the standing part of the topgallant-yard halliard runners.
The fore royal braces run down to the outboard end of the jibboom, reeve through a thimble lashed there, and then return aft to be belayed at the beakhead bulkhead.
The main royal braces reeve through a thimble made fast in the masthead rigging of the fore topmast, and run down to be belayed in the foretop.
The lifts fit over the ends of the yards after the braces, reeve through thimbles made fast beneath the mast trucks, and are belayed in the tops.
The parrels consist of a single rope with an eye at each end; it is passed round the yard and seized together to form two unequal legs; at the end of the shorter leg a second seizing is clapped on, just above the eye, so that the two legs are joined a second time. They then pass together round the mast, and the longer leg is taken in a second turn around the yard before the two eyes are seized together with a lashing.
The royal yards have no horses.

Rigging to the spritsail and sprit-topsail yards.

100. Sprit-topsail yard halliard.
101. Spritsail yard halliard. 2 3/4″. ø 23 mm.
102. Sprit-topsail yard slings.
103. Spritsail yard slings.
104. Sprit-topsail yard lifts. 1 1/2″. ø 14 mm.
105. Spritsail yard lifts. 2″. ø 17 mm.
106. Sprit-topsail yard braces. 1 1/2″. ø 14 mm.
107. Spritsail yard braces. 2″. ø 17 mm.
108. Spritsail yard standing lifts. 2 1/4″. ø 19 mm.
A small tackle of 6″ blocks serves as a halliard for the sprit-topsail yard; the lower block is made fast at the slings of the yard, and the upper block to the rigging beneath the truck of the jibboom. The hauling part is made fast to the forestay collar. The slings are formed of a single rope with an eye at each end which is middled, the loop thus formed passing round the yard; the two ends are passed twice round the jibboom in opposite directions and then seized together at the eyes. The slings serve as a parrel.
The spritsail-yard halliard is also composed of a tackle of 6″ blocks, the lower block being lashed to the slings and the upper one beneath the cap of the bowsprit. The slings are formed by a length of rope which passes round the yard and is spliced together at its ends; above the yard it is seized together by a throat-seizing turning in a thimble. A similar strop is taken round the bowsprit, and the two thimbles are joined by a lashing.
The sprit-topsail yard lifts are made fast at their standing end by means of an eye at the yardarm, reeve through 6″ single blocks lashed to the rigging over the end of the jibboom, and return aft to the beakhead bulkhead where they are belayed. The spritsail yard lifts are rigged in the same way, the lead-block being made fast beneath the bowsprit cap.
The sprit-topsail yard braces are made fast at their standing end at the yardarm, pass up to the collar of the forestay, reeve through 6″ single blocks made fast above the mouse, and return down again to be belayed at the beakhead bulkhead.
The spritsail braces are rigged double: they are made fast at their standing end on either side to the collar of the forestay close to the mouse, reeve through 7″ blocks strapped over the yardarms, return aft again to two identical blocks lashed beneath the forward side of the foremast trestletrees, and are belayed at the beakhead bulkhead.
The standing lifts of the spritsail yard consist of a 6″ deadeye lashed a third of the way in from the yardarm, with an identical deadeye turned in a strop which passes over the bowsprit beneath the cap; the pairs of deadeyes are set up by means of laniards, both standing lifts being of course symmetrical.
The horses of the spritsail and sprit-topsail yards are like those of the topsail-yards.

Rigging to the gaff mizen.

109. Throat halliards. 3 3/4″. ø 32 mm.
110. Peak halliards. 3 3/4″. ø 32 mm.
The throat halliards consist of a tackle of two 8″ double blocks, the lower one being hooked to an eyebolt in the jaws of the gaff, and the upper one being lashed to the lower masthead below the shrouds and between the trestletrees of the mizen top. The running part of this tackle reeves alternately through the sheaves of the two blocks and then passes down to the deck where it is belayed to a mast-cleat.
The peak halliard is made fast at its standing end to the strap of an 8″ double block hooked to the mizen cap; it reeves alternately through the sheaves of the double block, and of two 8″ single blocks lashed to the gaff, then passes down to the deck where it is made fast to a mast-cleat on the opposite side to the throat halliard.
The vangs are tackles composed of two upper blocks turned in 30 mm pendants fastened to the end of the gaff, and two lower blocks hooked over the quarter-galleries. I mention these in passing only, since in practice they were rarely rigged.

RIGGING TO THE SAILS

Rigging to the courses.

Sheets.

111. Foresheets. 4 3/4″. ø 41 mm.
112. Mainsheets. 5″. ø 43 mm.
The foresheets are made fast at their standing end to an eyebolt forward of the main-channels; they reeve through the block at the clue of the forecourse, then pass inboard through one of the sheaves of the fixed-block in the bulwarks, and are belayed round a kevel.
The mainsheets are made fast at their standing end to an eyebolt a little way forward of the quarter-galleries. Their running part reeves through the largest block (11″) of the three at the clue of the maincourse, then through an identical block, the strap of which is made fast to an eyebolt above the standing end. From there the sheet passes through a lead-lined hole cut at an angle in the bulwarks, and is belayed round a kevel inboard.

Tacks.

113. Foretacks. 3 1/2″. ø 30 mm.
114. Maintacks. 3 3/4″. ø 32 mm.
The foretacks are made fast at their standing end to the outboard end of the bumpkin, reeve through the 8″ block at the clue, then through a second 8″ block at the end of the bumpkin; from there they return aft to the forecastle, where they are belayed to a kevel forward of the foremast.
The maintacks are made fast at their standing end to the chestree, or else to a ringbolt just aft of them; the running part reeves through an 8″ block at the clue, passes back through one of the sheaves of

the chestrees, and then up over a bolster to the gangway, where it is belayed round a nearby kevel.

Bowlines.

115. Fore bowlines. 3 1/2". ø 30 mm.
116. Main bowlines. 3 3/4". ø 32 mm.
The fore bowlines reeve through an 11" block lashed to the bowsprit near the collar of the forestay, return aft again and reeve through an identical block fastened near the end of the bumpkin, and are belayed at the beakhead bulkhead.
The main bowlines lead forward through a snatch-sheave nailed to the plankshеer forward of the cathead, and then return aft to be belayed at a kevel in the forecastle spirketting.

Clue-garnets, buntlines, leech-lines.

117. Fore clue-garnets. 3". ø 26 mm.
118. Main clue-garnets. 3 1/4". ø 28 mm.
119. Fore buntlines (legs). 2 1/4". ø 19 mm.
120. Main buntlines (legs). 2 1/2". ø 21 mm.
121. Fore leech-lines. 1 3/4". ø 15 mm.
122. Main leech-lines. 1 3/4". ø 15 mm.
The clue-garnets serve to brail up the corners of the sail across the back. There are two of them, and they are made fast at their standing end one third of the way along the yard; they reeve through the smallest of the three blocks at the clue, pass up the after side of the sail, reeve through a similar block lashed to the yard close to the standing end, then to a third block seized to the foremost lower shroud; from there they reeve through a lead-block fastened in the spirketting, and finally belay round a cleat nearby.
The buntlines serve to clue up the bunt of the sail on the forward side. The first buntline is made fast to the cringle close to the clue, runs up to the yard, reeves through an 8" block made fast on the forward side of the yard and directly over the cringle. From there it reeves through an 8" double block lashed to the trestletrees, and then through a leg-and-fall block called the buntline block. This line then returns up again, through the second sheave of the double block, reeves through a block made fast near the bollock-blocks, passes down the sail again, and is made fast to the cringle in the middle of the foot of the sail.
A second line, the buntline fall, reeves through the second sheave of the leg-and-fall block; its diameter is 14 mm (forecourse) or 15 mm (maincourse), the buntlines themselves forming the legs of this tackle. The fall is made fast at its standing end to the bitts at the foot of the masts, and the hauling part returns down to the same place, reeves through one of the sheaves, and is belayed round a pin above.
The fore leech-lines pass across the fore side of the sail; they are made fast to the lowest leech-line cringle, reeve through a thimble in the middle cringle, and pass up to a 6" block lashed to the yard; from there they reeve through a second 6" block lashed below the forward crosstree of the top, pass back down the mast and through one of the sheaves in the bitts at the foot of the mast, and are belayed at the same bitts.
The main leech-lines are rigged somewhat differently, since there are two on each side. The second leech-line is made fast at the upper leech-line cringle, reeves through a block lashed to the yard, and then through the second sheave of a double block beneath the crosstrees. The first leech-line reeves through the other sheave like the fore leech-line, and both leech-lines then pass down the mast to the mainmast bitts, where they reeve through two sheaves and are belayed.

Rigging of the topsails.

Sheets.

123. Fore topsail-sheets. 6". ø 52 mm.
124. Main topsail-sheets. 6 1/2". ø 56 mm.
125. Mizen topsail-sheets. 3 1/4". ø 28 mm.
The sheets are single, and are fastened at the clues by means of a wall-knot; they reeve first through the shoe-block at the yardarm (through which the lifts also reeve), and then through the blocks made fast beneath the yards (12" – 13" – 7" respectively); they pass down the forward side of the mast to the topsail-sheet bitts, where they are belayed.

Topsail bowlines.

126. Fore-topsail bowlines. 2 3/4". ø 23 mm.
127. Main-topsail bowlines. 3". ø 26 mm.
128. Mizen-topsail bowlines. 1 1/2". ø 21 mm.
The fore-topsail bowlines reeve through the threefold block at the forward end of the jibboom (through one of the other sheaves of which the fore-topgallant stay passes). From there the bowlines pass back along the bowsprit, reeve through one of the rack-blocks, and are belayed round one of the pins of the bulkhead pinrail.
The main-topsail bowlines reeve on either side through 10" single blocks lashed to the after foremast shrouds above the catharpins; they pass down the shrouds to reeve through lead-blocks, and are belayed round shroud-cleats.
The mizen-topsail bowlines cross over and reeve through the second sheave of the double blocks at the topsail yardarms (through the first sheave of which the topsail-yard braces reeve), and from there they lead down to belay at the poop pinrails.

Clue-lines, buntlines, leech-lines.

129. Fore-topsail clue-lines. 2 1/2". ø 21 mm.
130. Main-topsail clue-lines. 2 1/2". ø 21 mm.
131. Mizen-topsail clue-lines. 1 3/4". ø 15 mm.
132. Fore-topsail buntlines. 2". ø 17 mm.
133. Main-topsail buntlines. 2 1/4". ø 19 mm.
134. Mizen-topsail buntlines. 1 1/2". ø 14 mm.
135. Fore-topsail leech-lines. 2". ø 17 mm.
136. Main-topsail leech-lines. 2 1/4". ø 19 mm.
137. Mizen-topsail leech-lines. 1 1/2". ø 14 mm.
138. Reef-tackles.
The clue-lines are made fast at their standing end to the yards, pass down the after face of the sail, reeve through blocks (8" – 7" – 7" respectively) at the clue, pass up again and reeve through similar blocks lashed to the yards next to their standing end; from there they pass down again to the head of the lower masts, through a third block of the same size lashed to the rim of the tops, then down through one of the sheaves of the bitts at the foot of the masts, where they are belayed. The mizen-topsail clue-lines are belayed at the poop pinrails.
The buntlines are made fast at the foot-cringle near the clue, reeve through a thimble seized in the other cringle near the bunt, and pass up the forward side of the sail; they reeve through a block (8" – 7" – 7" respectively) lashed to the yards near the tie-blocks, and from there their hauling end reeves through a double block (8" – 7" – 7" respectively) made fast to the forward side of the topgallant trestletrees; it then passes down through the lubber's hole to the bitts at the foot of the masts, or in the case of the mizen-topsail buntlines, to a pin in the pinrail.
The leech-lines of the fore-topsail are made fast at their standing

end to the lower leech-cringle, and the running part reeves through a thimble seized in the upper cringle. From there it passes up to an 8″ block lashed to the yard, then to the second sheave of the double block which serves the buntline, down again to the deck, and is belayed at the foremast bitts. The main-topsail leech-lines are rigged in the same manner, save that the leech-cringles are arranged somewhat differently. The mizen-topsail leech-lines are belayed round a pin in the pinrail.
The reef-tackles are single whips, made fast to the lowest reef-cringle. They pass upwards and reeve through a sheave let into the yardarm, thence to a 6″ block lashed at the slings of the yard, pass down through the lubber's hole of the mizen-top, and are belayed at the mizen-bitts or at the pinrail.
While still on the subject of the topsails, I should mention in passing the spilling-lines, the reef-lines and the reef-points (see *74-G.S.*, Vol. III, p. 185).

Rigging to the Topgallants.

Sheets.

139. Fore-topgallant sheets. 2 1/2″. ø 21 mm.
140. Main-topgallant sheets. 2 1/2″. ø 21 mm.
141. Mizen-topgallant sheets. 1 1/4″. ø 11 mm.
The topgallant sheets also serve as lifts for the topsail-yards (see the rigging of the yards).

Clue-lines.

142. Fore-topgallant clue-lines. 1 3/4″. ø 17 mm.
143. Main-topgallant clue-lines. 1 3/4″. ø 17 mm.
144. Mizen-topgallant clue-lines. 1 1/4″. ø 11 mm.
The clue-lines are made fast at the clue, pass up the after side of the sail, and reeve through a double block (7″–5″) lashed to the underside of the yard, pass down again the length of the lower shrouds, and are belayed like the sheets.

Bowlines.

145. Fore-topgallant bowlines. 1 1/2″. ø 14 mm.
146. Main-topgallant bowlines. 1 1/2″. ø 14 mm.
147. Mizen-topgallant bowlines. 1″. ø 8 mm.
The fore-topgallant bowlines reeve through a thimble secured in the rigging at the end of the jibboom, run back along the bowsprit, reeve through one of the rack-blocks, and are belayed at the beakhead bulkhead.
The main-topgallant bowlines each lead forward to 6″ blocks lashed to the fore-topgallant crosstrees, run down the length of the lower shrouds and are belayed at a shroud-cleat.
The mizen-topgallant bowlines cross over and reeve through 6″ blocks lashed to the aftermost main-shrouds above the catharpins; from there, they run down the lower shrouds and are belayed to shroud-cleats.

Rigging to the royals.

148. Fore-royal sheets. 1″. ø 8 mm.
149. Main-royal sheets. 1″. ø 8 mm.
150. Fore-royal clue-lines. 1″. ø 8 mm.
151. Main-royal clue-lines. 1″. ø 8 mm.
152. Fore-royal bowlines. 1″. ø 8 mm.
153. Main-royal bowlines. 1″. ø 8 mm.
The royal sheets double as lifts for the topgallant yards (see rigging to the yards).
The clue-lines are rigged in the same way as the topgallant clue-lines, and they are belayed in the tops next to the sheets.
The fore-royal bowlines pass down to the forward end of the jibboom, reeve through a thimble made fast there, then back down the bowsprit, reeving through one of the rack-blocks; they are belayed round a pin in the bulkhead pinrail. The main-royal bowlines are rigged like the braces.

Rigging to the spritsail and sprit-topsail.

Sheets.
153. Sprit-topsail sheets. 2″. ø 17 mm.
154. Spritsail sheets. 2 1/2″. ø 21 mm.
The sprit-topsail sheets are formed by the spritsail-yard lifts; they are made fast by means of a toggle to the clue of the sprit-topsail, reeve through a 7″ single block at the yardarm of the spritsail-yard, then through an 8″ block fastened by means of a strop to the end of the bowsprit; passing down the bowsprit, they reeve through the rack-blocks, and are belayed at the beakhead bulkhead.
The spritsail sheets are made fast at their standing end to a ringbolt in the ship's side, reeve through a block made fast at the clue of the sail, and are belayed at the beakhead bulkhead.

Clue-lines and buntlines.
155. Sprit-topsail clue-lines. 1 1/2″. ø 14 mm.
156. Spritsail clue-lines. 2″. ø 17 mm.
157. Spritsail buntlines. 1 3/4″. ø 15 mm.
The sprit-topsail clue-lines reeve through a 6″ single block lashed to the yard, then through the sheaves of the rack-blocks, and are belayed at the beakhead bulkhead.
The spritsail clue-lines run up to a 7″ block lashed under the yard, then back through the sheaves of the rack-blocks, and are belayed at the beakhead bulkhead.
The spritsail buntlines are made fast at their standing end to the foot-cringle near the clue, reeve through a thimble in one of the inner cringles, run up the inner face of the sail, and reeve through one of the sheaves of a 7″ double block lashed at the slings of the yard; from there they reeve through the sheaves of the rack-blocks and are belayed at the beakhead bulkhead.

Rigging to the studdingsails.

Lower studdingsails.

158. Lower fore studdingsail halliards. 2 1/4″. ø 19 mm.
159. Lower main studdingsail halliards. 2 1/2″. ø 21 mm.
160. Lower fore studdingsail sheets. 2 1/4″. ø 19 mm.
161. Lower main studdingsail sheets. 2 1/2″. ø 21 mm.
162. Lower fore studdingsail tacks. 2 1/4″. ø 19 mm.
163. Lower main studdingsail tacks. 2 1/2″. ø 21 mm.
164. Swinging-boom guys. 2 1/2″. ø 21 mm.
The lower fore studdingsails have no yards. There are two halliards, an inner and an outer, fastened to the upper corners of the sail. The outer halliard reeves through a 7″ block lashed to the end of the boom, then runs up to a second block of the same size turned into a pendant hanging from the fore-topmast head; from there it runs down the mast and is belayed at the foot. The inner halliard reeves through a 7″ block lashed to the foreyard near the yardarm; from there it reeves through a second block of the same size lashed at the slings, and thence down the mast to the foot like the outer halliard. The sheet is middled and made fast to the inner clue; the two legs are belayed at convenient cleats.

The tack reeves through a 7″ block at the outboard end of the studdingsail-boom, and then passes right aft to reeve through one of the sheaves of the fixed-block (where the foresheet also reeves); it is belayed to a kevel inboard.
The studdingsail-boom is made fast to the forecastle by several lashings, and a hook-tackle suspended from a pendant over the foremast head may be used to support it, at about one third of its length outboard.
The lower main studdingsails are bent to half yards at their inner head, and the inner halliard reeves through an 8″ block lashed to the end of the yard, then through another block of the same size made fast near the topsail sheet block; it is belayed at the mainmast bitts.
The outer halliard secures the studdingsail along the swinging-boom; made fast to the outer boom-iron, it reeves through an 8″ block lashed to the outer end of the boom, runs up to another 8″ block turned in to a pendant at the topmast head, and then runs down to belay at the mainmast bitts.
The sheet is middled and made fast to the inner clue, and the two legs are belayed at convenient cleats. The tack reeves through an 8″ block made fast to the end of the boom, then passes aft to just forward of the mizen-shrouds where it reeves through an 8″ double block in the plankshеer, and is belayed at a pin in the poop pinrail.
The swinging-boom is stayed by two guys: the fore guy is made fast to a timber-head on the forecastle, and the after guy reeves through the second sheave of the block which takes the tack of the studdingsail; it is belayed at a pin in the poop pinrail.
A topping-lift may also be used (see *74-G.S.*, Vol. III, p. 197).

Topmast studdingsails.

165. Fore-topmast studdingsail halliards. 2 1/2″. ø 21 mm.
166. Main-topmast studdingsail halliards. 2 1/2″. ø 21 mm.
167. Fore-topmast studdingsail sheets. 2 1/2″. ø 21 mm.
168. Main-topmast studdingsail sheets. 2 1/2″. ø 21 mm.
169. Fore-topmast studdingsail tacks. 2 1/2″. ø 21 mm.
170. Main-topmast studdingsail tacks. 2 1/2″. ø 21 mm.
The topmast studdingsails are bent to small yards, to the middle of which is fastened a single halliard which reeves through a 6″ jewel-block at the topsail yardarm, then through a second 6″ block lashed to the yard near the bollock-block, whence it runs down to the foot of the mast where it is belayed.
The sheet reeves through an 8″ block lashed to the lower yard a little way inboard from the yardarm, and then leads to the top where it is belayed.
The tack reeves through an 8″ block at the outboard end of the topmast studdingsail boom and is belayed in the top. The tack of the main topmast studdingsail is rigged somewhat differently: it reeves through one of the sheaves of the fixed-block on the poop, and is belayed at a nearby cleat.

Topgallant studdingsails.

171. Fore-topgallant studdingsail halliards. 1 1/2″. ø 13 mm.
172. Main-topgallant studdingsail halliards. 1 1/2″. ø 13 mm.
173. Fore-topgallant studdingsail sheets. 1 1/2″. ø 13 mm.
174. Main-topgallant studdingsail sheets. 1 1/2″. ø 13 mm.
175. Fore-topgallant studdingsail tacks. 1 1/2″. ø 13 mm.
176. Main-topgallant studdingsail tacks. 1 1/2″. ø 13 mm.
The halliard used to hoist their small yard reeves through a 6″ block made fast to the end of the topgallant yard, and then leads down to the top where it is belayed.
The sheet reeves through a 6″ block some way in from the topsail yardarm and then also leads to the top where it is belayed.
The tack reeves through a 6″ block at the outboard end of the topgallant studdingsail-boom and is belayed in the top.
N.B. The *Bonhomme Richard* has no mizen studdingsails.

Crow's-feet of the tops.
177. Foretop crow's-foot.
178. Maintop crow's-foot.
179. Mizen-top crow's-foot.
For these items of rigging consult *The 74-G.S.*, Vol. III, pp. 154-5.

Rigging of the jibs

180. Standing jibstay. 4″. ø 34 mm.
181. Standing jib halliard. 2″. ø 17 mm.
182. Standing jib sheet. 3 3/4″. ø 32 mm.
183. Inner jib halliard. 1 3/4″. ø 15 mm.
184. Inner jib sheet. 3 1/4″. ø 28 mm.
185. Fore-topmast staysail halliard. 2 3/4″. ø 23 mm.
186. Fore-topmast staysail sheet. 3″. ø 26 mm.
Downhauler and out-hauler. 1 1/4″. ø 11 mm.
The standing jib runs on a jibstay, by means of hanks. The jibstay is made fast to a traveller on the jibboom, and from there it runs up to the head of the fore-topmast, through a cheek-block lashed to the port side of the masthead, and down again to the foretop, where it is belayed. The traveller is manoeuvred by means of an out-hauler which reeves through a sheave in the truck of the jibboom, then through the rack-block, and is belayed at the bulkhead. Another rope called an in-hauler is made fast to the traveller, and serves to haul it aft; it is also made fast at the bulkhead.
The standing jib halliard reeves through a cheek-block on the starboard side of the topmast head, and runs down to the foot of the foremast. The tack is seized to a ring on the traveller. The two sheets reeve through 10″ blocks lashed to the inside of the bulwarks forward of the fore-shrouds, and are belayed to range-cleats.
The inner jib is bent to its own halliard, which runs up to the head of the fore topmast where it reeves through a cheek-block on the port side before running down to the foot of the foremast. The tack is made fast to a traveller, not of iron this time, but a rope traveller fitted with trucks like a parrel; an out-hauler reeves through one of the sheaves in the truck of the jibboom and then through one of the sheaves of the rack-blocks; it is belayed at the bulkhead. There is also an in-hauler. The two sheets are rigged like those of the standing jib, reeving through 8″ blocks, and belayed to range-cleats.
The fore-topmast staysail runs on the fore-topmast preventer-stay. The halliard reeves through the starboard cheek-block and then runs down to belay at the foremast bitts. The tack is made fast to an eyebolt in the jackstaff standard. The two sheets are rigged like those of the jibs. A down-hauler is rigged, and its lead-block (6″) is fastened at the tack.

Rigging to the mainmast staysails.

Main-staysail.

187. Halliard. 2 1/2″. ø 21 mm.
188. Sheets. 2 3/4″. ø 23 mm.
189. Tack. 2 3/4″. ø 23 mm.
The main-staysail stay (ø 27 mm) has an eye at its upper end which allows it to be seized to the mainstay above the mouse; the lower end reeves through a 10″ block lashed to the foremast below the collar of the mainstay; it is set up and secured by means of a tackle (6″ blocks). The halliard runs up to an 8″ block lashed to one of the crosstrees of the maintop, passes down again to reeve through a lead-block at the foot of the mainmast on the starboard side, and is belayed to itself. The tack is made fast to the anchor-stopper cleat

on the forecastle. The clue of the sail has a thimble, which takes a tackle of 6″ blocks made fast beneath the gangways. The sail is rigged with a down-hauler, belayed at the foot of the foremast.

Main-topmast staysail.

190. Halliard. 2 1/2″. ø 21 mm.
191. Sheets. 2 1/4″. ø 19 mm.
192. Tacks. 2 1/4″. ø 19 mm.
This sail is bent to the main-topmast preventer-stay. Its halliard reeves through a cheek-block on the starboard side of the mainmast head, passes down to reeve through a 7″ lead-block to starboard of the foot of the mast, and is belayed to itself. The nock is made fast to the strap of the topmast preventer-stay block, while the lower tack is secured to the mainstay collar. The two sheets reeve through one of the sheaves of the fixed-blocks, and are belayed to a pin or to a nearby cleat. There is a down-hauler as for the main staysail.

Middle-staysail.

193. Halliard. 2 1/2″. ø 21 mm.
194. Sheets. 2 1/4″. ø 19 mm.
195. Tacks. 2 1/4″. ø 19 mm.
The staysail stay (ø 27 mm) is made fast to a rope traveller fitted with trucks which moves on the fore-topmast; the other end reeves through the cheek-block on the port side of the main-topmast and is belayed in the maintop. The halliard reeves through a thimble made fast to the main-topgallant stay close to the masthead, and then passes down to a 7″ lead-block on the port side of the foot of the mainmast; it is then belayed to itself. The nock is seized to the traveller, and the lower tack to the rigging at the foremast head. The two sheets reeve through one of the sheaves of the fixed-block already described. There is a down-hauler as for the other staysails.

Rigging to the mizen-mast staysails.

Mizen staysail.
196. Halliard. 2″. ø 17 mm.
197. Sheet. 2″. ø 17 mm.
198. Tacks. 2″. ø 17 mm.
The staysail stay (ø 21 mm) has an eye at its upper end to allow it to be seized to the mouse of the mizen-stay, while the other end reeves through a 9″ block seized to the mainmast above the mizen-stay; it is belayed round the strap of this block. The halliard reeves through a 7″ block lashed to the stay at the mizen-mast head, passes down the mast to reeve through one of the sheaves of the mizen bitts, where it is also belayed. The tack of the sail is lashed to the mainmast above the mizen-stay. The sheet is single, and is belayed to one of the pins in the poop pinrail. There is a downhauler as for the other staysails.

Mizen-topmast staysail.

199. Halliard. 1 1/2″. ø 14 mm.
200. Sheet. 1 1/2″. ø 14 mm.
201. Tacks. 2″. ø 17 mm.
This staysail runs on the mizen-topmast stay. Its halliard reeves through a 6″ block seized to the masthead rigging, and passes down on the port side to belay at one of the pins of the poop pinrail. The upper tack is made fast to the halliard block, and the lower tack to the mizen-stay. The single sheet is belayed at the poop pinrail. The downhauler is rigged like those of the other staysails.

Rigging to the mizen-course.

202. Brails. 1 1/2″. ø 14 mm.
203. Sheet (hauling part). 1 1/2″. ø 14 mm.
A crow's-foot at the lower corner of the sail passes through a 6″ block turned into the end of a throat-brail; this then leads up to another 6″ block fastened under the gaff at the throat, and then down again to belay at a pin in the pinrail. There are three middle-brails and a peak-brail, all of which lead up to reeve through 6″ blocks on the gaff; the peak-brail leads from there directly to a pin in the pinrail, while the middle-brails reeve first through a threefold block before belaying at a mast-cleat on the mizen-mast. The arrangement of brails is identical on both sides of the sail. The clue has a thimble turned in it to take the hook of a tackle which serves the purpose of sheets, the hauling end of which is belayed to a cleat situated next to the taffarel fife-rail.
The lower tack is lashed round the mizen-mast, and a lacing is taken through eyelets in the sail and round the mast along the mast-leech. The nock is secured to an iron eyebolt below the jaws of the gaff, which are secured by a collar.

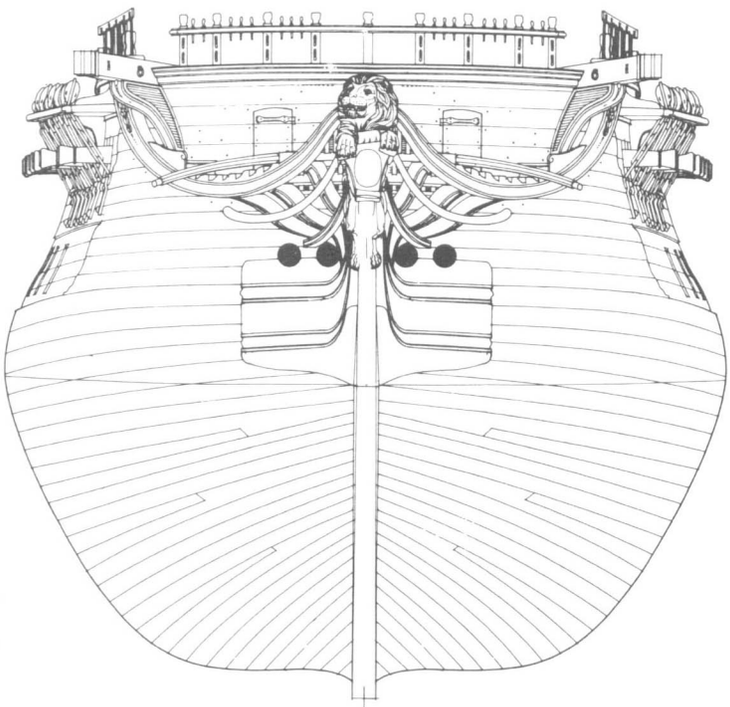
Cables and cablets.

According to Regulations the *Bonhomme Richard* should have been supplied with 6 cables measuring 120 fathoms [194.4 m] for the main anchors, and with 4 cablets for the stream anchors. According to the inventory, the cables measured 18 inches in circumference (ø 15.5 cms); in principle, the small bower cable would have measured somewhat less: 16 or 17 inches. The circumference of the cablets would have been half that of the cables, 9 and 8 1/2 inches. According to the inventory the cat-block was 14 inches [38 cms] long; the cat-fall would thus have measured 4 inches in circumference (ø 34 mm), the anchor-stoppers 7 3/4 inches (ø 67 mm), and the shank-painters 6 1/2 inches (ø 56 mm).

RIGGING

1. Fore shrouds
2. Main shrouds
3. Mizen shrouds
4. Fore winding-tackle pendant
5. Fore-tackle pendant
6. Main winding-tackle pendant
7. Main-tackle pendant
8. Mizen-tackle pendant
9. Forestay
10. Fore preventer-stay
11. Mainstay
12. Main preventer-stay
13. Mizen-stay
14. Forestay collar
15. Fore preventer-stay collar
16. Mainstay collar
17. Main preventer-stay collar
18. Mizen-stay collar
19. Gammoning
20. Bobstay
21. Horses
22. Bumpkin-shrouds
23. Futtock-staves
24. Futtock-shrouds, fore and main
25. Mizen futtock-shrouds
26. Fore and main winding-tackles
27. Fore- and main-tackles
28. Mizen-tackles
29. Main-topmast shrouds
30. Fore-topmast shrouds
31. Main-topmast backstays
32. Fore-topmast backstays
33. Mizen-topmast shrouds
34. Mizen-topmast backstays
35. Main-topmast stay
36. Main-topmast preventer-stay
37. Fore-topmast stay
38. Fore-topmast preventer-stay
39. Mizen-topmast stay
40. Fore-topgallant shrouds
41. Main-topgallant shrouds
42. Mizen-topgallant shrouds
43. Fore-topgallant backstays
44. Main-topgallant backstays
45. Mizen-topgallant backstays
46. Fore-topgallant stay
47. Fore-royal stay
48. Main-topgallant stay
49. Main-royal stay
50. Mizen-topgallant stay
51. Crupper
52. Jibboom guys
53. Jibboom horses
54. Foreyard slings
55. Mainyard slings
56. Crossjack yard slings
57. Fore jeers
58. Main jeers
59. Crossjack yard jeers
60. Fore lifts
61. Main lifts
62. Crossjack-yard lifts
63. Fore-braces
64. Main-braces
65. Crossjack-yard braces
66. Fore-truss
67. Main-truss
68. Truss-tackles
69. Horses of the lower yards
70. Fore-topsail sheet-block
71. Main-topsail sheet-block
72. Mizen-topsail sheet-block
73. Fore topsail-yard tie
74. Main topsail-yard tie
75. Mizen topsail-yard tie
76. Fore topsail-yard brace
77. Main topsail-yard brace
78. Mizen topsail-yard brace
79. Fore topsail-yard lifts
80. Main topsail-yard lifts
81. Mizen topsail-yard lifts
82. Fore topsail-yard parrel
83. Main topsail-yard parrel
84. Mizen topsail-yard parrel
85. Fore topgallant-yard halliard
86. Main topgallant-yard halliard
87. Mizen topgallant-yard halliard
88. Fore topgallant-yard braces
89. Main topgallant-yard braces
90. Mizen topgallant-yard braces
91. Fore topgallant-yard lifts
92. Main topgallant-yard lifts
93. Mizen topgallant-yard lifts
94. Fore royal halliard
95. Main royal halliard
96. Fore royal braces
97. Main royal braces
98. Fore royal lifts
99. Main royal lifts
100. Sprit-topsail yard halliard
101. Spritsail yard halliard
102. Sprit-topsail yard slings
103. Spritsail yard slings
104. Sprit-topsail yard lifts
105. Spritsail yard lifts
106. Sprit-topsail yard braces
107. Spritsail yard braces
108. Spritsail yard standing lifts
109. Mizen-course, throat halliards
110. Mizen-course, peak halliards
111. Foresheets
112. Mainsheets
113. Foretacks
114. Maintacks
115. Fore bowlines
116. Main bowlines
117. Fore clue-garnets
118. Main clue-garnets
119. Fore buntlines
120. Main buntlines
121. Fore leech-lines
122. Main leech-lines
123. Fore topsail-sheets
124. Main topsail-sheets
125. Mizen topsail-sheets
126. Fore-topsail bowlines
127. Main-topsail bowlines
128. Mizen-topsail bowlines
129. Fore-topsail clue-lines
130. Main-topsail clue-lines

131. Mizen-topsail clue-lines
132. Fore-topsail buntlines
133. Main-topsail buntlines
134. Mizen-topsail buntlines
135. Fore-topsail leech-lines
136. Main-topsail leech-lines
137. Mizen-topsail leech-lines
138. Reef-tackles
139. Fore-topgallant sheets
140. Main-topgallant sheets
141. Mizen-topgallant sheets
142. Fore-topgallant clue-lines
143. Main-topgallant clue-lines
144. Mizen-topgallant clue-lines
145. Fore-topgallant bowlines
146. Main-topgallant bowlines
147. Mizen-topgallant bowlines
148. Fore-royal sheets
149. Main-royal sheets
150. Fore-royal clue-lines
151. Main-royal clue-lines
152. Fore-royal bowlines
153. Main-royal bowlines
153. Sprit-topsail sheets
154. Spritsail sheets
155. Sprit-topsail clue-lines
156. Spritsail clue-lines
157. Spritsail buntlines
158. Lower fore studdingsail halliards
159. Lower main studdingsail halliards
160. Lower fore studdingsail sheets
161. Lower main studdingsail sheets
162. Lower fore studdingsail tacks
163. Lower main studdingsail tacks
164. Swinging-boom guys
165. Fore-topmast studdingsail halliards
166. Main-topmast studdingsail halliards
167. Fore-topmast studdingsail sheets
168. Main-topmast studdingsail sheets
169. Fore-topmast studdingsail tacks
170. Main-topmast studdingsail tacks
171. Fore-topgallant studdingsail halliards
172. Main-topgallant studdingsail halliards
173. Fore-topgallant studdingsail sheets
174. Main-topgallant studdingsail sheets
175. Fore-topgallant studdingsail tacks
176. Main-topgallant studdingsail tacks
177. Foretop crow's-foot
178. Maintop crow's-foot
179. Mizen-top crow's-foot
180. Standing jibstay
181. Standing jib halliard
182. Standing jib sheet
183. Inner jib halliard
184. Inner jib sheet
185. Fore-topmast staysail halliard
186. Fore-topmast staysail sheet
187. Main staysail halliard
188. Main staysail sheets
189. Main staysail tack
190. Main-topmast staysail halliard
191. Main-topmast staysail sheets
192. Main-topmast staysail tacks
193. Middle staysail halliard
194. Middle staysail sheets
195. Middle staysail tacks
196. Mizen staysail halliard
197. Mizen staysail sheet
198. Mizen staysail tacks
199. Mizen-topmast staysail halliard
200. Mizen-topmast staysail sheet
201. Mizen-topmast staysail tacks
202. Mizen-course brails
203. Mizen-course sheet



BELAYING POINTS

Beakhead bulkhead

21. Horses
52. Jibboom shrouds
96. Fore-royal braces
104.• Sprit-topsail lifts
105. Spritsail lifts
106. Sprit-topsail braces
107. Spritsail braces
115. Forecourse bowlines
126. Fore-topsail bowlines
145.• Fore-topgallant bowlines
152.• Fore-royal bowlines
Spritsail sheets
155.• Sprit-topsail clue-lines
156.• Spritsail clue-lines
157.• Spritsail buntlines
• Standing jib out-hauler (port-side)
• Inner jib out-hauler (starboard side)
Standing jib down-hauler
Inner jib down-hauler
Fore-topmast staysail down-hauler

No less than 37 items of rigging are belayed at the beakhead bulkhead, 14 of which (marked •) reeve first through the sheaves of the rack-blocks. The 8 beakhead stanchions fitted with sheaves take the fore, fore-topsail, fore-topgallant and fore-royal bowlines, while the lower sheaves take the down-haulers and out-haulers of the headsails; these lines are all belayed to their respective stanchions. The head-rigging is belayed to 20 belaying-pins and 9 stanchions, so that in some cases one pin may serve more than 1 line.

Foot of the foremast

35. Main topmast-stay (to ringbolt)
48. Main topgallant-stay (to ringbolt)
68. Foreyard truss-tackles
Main staysail stay tackle
Main staysail down-hauler
Main topmast-staysail down-hauler
Standing jib halliard

14 items of rigging are belayed at the foot of the foremast, some to mast-cleats, and others reeving through lead-blocks before being belayed to themselves.

Foremast bitts

76. Fore-topsail braces
88. Fore-topgallant braces
119. Forecourse buntlines
121. Forecourse leech-lines
132. Fore-topsail buntlines
135. Fore-topsail leech-lines
138. Reef-tackles

Fore-shrouds

60. Foreyard lifts
73. Fore-topsail halliard
85. Fore-topgallant halliard
94. Fore-royal halliard (starboard side)
117. Forecourse clue-lines
127. Main-topsail bowlines
146. Main-topgallant bowlines

All these lines reeve through lead-blocks seized to eyebolts in the spirketting, then lead up to a shroud-cleat where they are belayed and coiled.
The halliards are frequently coiled in frames in view of their length.
The hooks of the fore-tackle and fore winding-tackle are made fast to ringbolts in the spirketting, the falls being seized up.

Foretop

36. Main-topmast preventer-stay
49. Main-topgallant stay
79. Fore topsail-yard lifts
91. Fore topgallant-yard lifts
97. Main-royal braces
99. Main royal-yard lifts
142. Fore-topgallant clue-lines
150. Fore-royal clue-lines
167. Fore-topmast studdingsail sheets
171. Fore-topgallant studdingsail halliards
173. Fore-topgallant studdingsail sheet
175. Fore-topgallant studdingsail tack
Standing jibstay
Middle staysail stay

While a large number of lines are belayed in the foretop, those for the studdingsails and the royals are only rigged when required, since these sails are only bent in the most favourable weather. The stays and staysail stays are belayed round themselves and are coiled as appropriate. The other smaller lines are belayed to small cleats nailed to the rim of the top.

Foot of the mainmast

39. Mizen-topmast stay
18. Collar of mizen-stay
63. Forebraces
68. Truss-tackles
187. Main staysail-halliard
190. Main-topmast staysail-halliard
193. Middle staysail-halliard
Mizen-staysail down-hauler
Mizen-topmast staysail down-hauler

The mizen-stay collar embraces the mainmast some feet above the deck-planking. The mizen-topmast stay reeves through a thimble seized to an eyebolt and doubles back to be made fast to itself.
The forebraces reeve through a lead-block and are belayed to a mast-cleat nailed to the mast.
The staysail-halliards reeve through lead-blocks and are belayed to themselves.

Mainmast bitts

120. Maincourse buntlines
122. Maincourse leech-lines
133. Main-topsail buntlines
136. Main-topsail leech-lines
138. Reef-tackles
159. Lower main studdingsail halliards
165. Main-topmast studdingsail halliards
Since the lower main studdingsails each have an inner and outer halliard, these reeve through the sheaves of a double lead-block and are belayed to the same pin.

Maintop

50. Mizen topgallant-stay
80. Main topsail-yard lifts
92. Main topgallant-yard lifts
99. Main royal-yard lifts
143. Main topgallant clue-lines
151. Main royal clue-lines
168. Main-topmast studdingsail sheets
172. Main-topgallant studdingsail halliards
174. Main-topgallant studdingsail sheets
176. Main-topgallant studdingsail tacks
The comments made concerning the lines belayed in the foretop apply equally here.

Quarterdeck pinrails

61. Mainyard lifts
74. Main topsail-yard halliards
86. Main topgallant-yard halliards
95. Main royal-yard halliard (starboard side)
118. Maincourse clue-lines
136. Main topsail leech-lines
147. Mizen-topgallant bowlines
The height of the bulwarks on the quarterdeck allow a pin-rail to be fitted, which is preferable to shroud-cleats. The various lines belayed there sometimes reeve through lead-blocks seized as usual to an eyebolt in the spirketting before being belayed.
The lower blocks of the main-tackle and main winding-tackle are hooked into eyebolts like those of the foremast tackles.

Mizen-mast bitts

109. Mizen-course throat-halliards
110. Mizen-course peak-halliards
Mizen-staysail stay
The fact that there are mizen topsail-sheet bitts allows these lines to be belayed there. Otherwise they are belayed to mast-cleats nailed to the mizen.

Poop pin-rails

65. Crossjack yard braces
78. Mizen-topsail braces
87. Mizen-topgallant halliards
89. Main-topgallant braces
128. Mizen-topgallant bowlines
131. Mizen-topgallant clue-lines
134. Mizen-topgallant buntlines
137. Mizen-topgallant leech-lines
138. Reef-tackles
163. Lower main studdingsail tacks
196. Mizen-staysail halliard (starboard side)
197. Mizen-staysail sheet (starboard side)
199. Mizen topmast-staysail halliard (port side)
200. Mizen topmast-staysail sheet (port side)
Lower main studdingsail swinging-boom after-guy
These pin-rails are fastened to the stanchions of the poop breastwork and have 16 pins on either side, to which all these various lines are belayed; the larger ones may reeve first through lead-blocks in the poop spirketting.

Mizen-top

81. Mizen topsail-yard lifts
144. Mizen-topgallant clue-lines

Miscellaneous

116. Main bowlines
These reeve through a snatch-sheave nailed horizontally to the planksheer forward of the catheads. They are belayed to a range-cleat.
113. Fore-tacks
Belayed to cleats at the inboard ends of the catheads. The same cleats serve for the anchor-stoppers.
114. Main-tacks
Reeve through the chestrees and are belayed to range-cleats nailed to the planksheer close by.
111. Foresheets
162. Lower fore studdingsail tacks
Both these lines reeve through the sheaves of the fixed-block in the bulwarks athwart the main-hatch; the foresheet is belayed to a kevel, the studdingsail tack to a range-cleat.
112. Mainsheets
Reeve through a diagonal hole in the bulwarks forward of the break of the poop, and are belayed to a kevel.
64. Mainbraces
170. Main-topmast studdingsail tack
These two lines reeve through two of the sheaves of a fixed-block in the bulwarks over the poop. The remaining two sheaves are for the tack of the mizen-topmast studdingsails (if bent – the *Bonhomme Richard* has none), and for a main preventer-brace.
123. Fore topsail-sheets
124. Main topsail-sheets
125. Mizen topsail-sheets
These are belayed to their respective topsail-sheet bitts; note the presence of mizen topsail-sheet bitts.

Note: Some of the lines are not numbered, in particular the out-haulers, down-haulers and staysail stays. I hope that this will not cause any difficulties.

BLOCKS

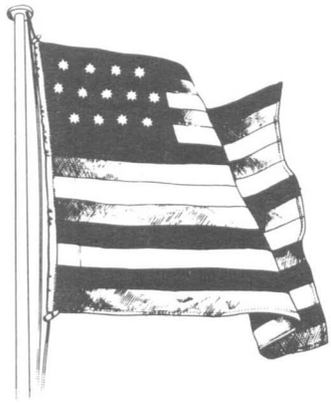
Proportions of blocks for given rope sizes (except sheet-blocks)

Actual Dimensions				*1/4" Scale Dimensions in 100ths of a mm*	
Circumference of Rope in Fr. Inches	*Diameter in mm (rounded)*	*Length of the Shell*		*Diameter*	*Length of the Shell*
		Fr. Inches	*mm*		
1″	9	4″	108	19	225
1 1/4	11			23	
1 1/2	13	5	135	27	281
1 3/4	15			31	
2″	17	6	162	36	337
2 1/4	19			40	
2 1/2	22	7	190	46	396
2 3/4	23			48	
3″	26	9	244	54	501
3 1/4	28			58	
3 1/2	30	10	271	63	564
3 3/4	32	11	298	67	621
4″	34	12	325	71	677
4 1/4	37			77	
4 1/2	39	14	370	81	771
4 3/4	41			85	
5″	43			90	
5 1/4	45	16	427	94	890
5 1/2	48			100	
5 3/4	50			104	
6″	52	18	494	108	1029
6 1/4	54			113	
6 1/2	56	20	532	117	1108
6 3/4	58			121	
7″	60			125	
7 1/4	63			131	
7 1/2	65			135	
7 3/4	67			140	
8″	69			144	
8 1/4	71			148	
12″	103	Forestay		215	
12 1/2	107	Mainstay		222	
18″	155	Anchor cable		323	
16″	139	Anchor cable		290	
9″	78	Cablet		161	
8″	69	Cablet		143	
7 3/4	67	Anchor stoppers		139	
6 1/2	56	Shank-painters		117	
4″	34	Cat-fall		71	*

**Length of the the cat-block: 14″* [370 mm]; scale equivalent: 710/100

Dimensions of blocks

Lengths/Diameters of Shell	**Other Dimensions of Shell**
Ordinary single, double and treble blocks: 10 × ø of rope	Breadth: 7/9 × length Thickness: 1/3 – 1/2 – 3/4 × length
Shoe-block (length of shell): 13 × ø of rope	Breadth: 7/9 × length Thickness: 1/2 × length
Shoe-block (length of block): 13 × ø of smallest rope	Breadth: 2/6 × length Thickness: 1/4 × length
Long-tackle block: 12 × ø of rope	Breadth: 1/2 & 2/5 × length Thickness: 4/10 × length
Deadeyes: 12 × ø of rope	Thickness: 1/2 × diameter
Hearts: Length: 3.8 × ø of stay Breadth: 2.9 × ø of stay	Thickness: 1/2 × length



Notes on the guns of the Bonhomme Richard

The drawings of the great guns which appear on the following pages are derived from two manuscripts which belonged formerly to J. Maritz, who was "Inspector-General of Land and Sea Ordnance"; they are written in his own hand. The first dates from 1758 and shows the "old model" guns, while the second, which dates from 1761, shows the pattern which was to be adopted in 1766. Although further changes were ordered in 1778, none of these new guns had yet been cast when the *Bonhomme Richard* was being armed.

The drawings of the carriages are based on the extremely precise information contained in an anonymous manuscript dating from the 1770's, and preserved in the Archives Nationales (Fond Marine) G177.

The French East India Company obtained its guns partly from Sweden, partly from England, but mainly from the foundries in the neighbourhood of Angoulême in France.

According to the ship's log, the 18-pdrs were taken on board on May 18th 1779; they would have been supplied from the gun-park at Lorient. They were of the so-called "old model", characterised by their length of barrel of 9 feet [2.92 m], measured from the muzzle-moulding to the after side of the base-ring; they weighed 4,100 pounds [2,005 kgs]. Their age is unknown, but they were certainly cast sometime before 1766, when the new shorter (8′) and lighter model was introduced.

During the battle with the *Serapis*, it is claimed that two of these guns burst at the beginning of the action. According to a letter written by Jones to Benjamin Franklin (October 5th 1779), only the three starboard guns were in action at the time. Assuming that they were double-shotted (which might have been the cause of the accident), it was at the second salvo that they burst. Other reports claim that all three guns burst, or alternatively only one. Since it was relatively rare for guns to burst, it strikes me as surprising that two should be put out of action simultaneously, and in the absence of any definite proof (at least until the guns are recovered from the bottom of the sea!), I would suggest that in fact only the second gun actually burst, and that the two neighbouring guns were dismounted by the explosion (all three guns being close together at the stern).

We are told that there were 60 men in the gun-room at the time, which corresponds to a crew of 10 men for each gun, the regulation number in the French Navy. In the Navy however, only one broadside was intended to be manned, and on the rare occasions when both the port and starboard batteries were in action, the guncrews had to fight both guns, moving from one to the other. Jones had not followed this practice, which explains the large number of casualties in the gun-room when the explosion occurred. When informed of the accident, Jones ordered the remaining guns to cease fire, and redistributed their crews.[1]

The principal armament of the *Bonhomme Richard* was made up of the 28 12-pdrs on the upper deck. These guns were drawn from the upper deck battery of the *Ajax*. According to the ship's log, 26 guns were taken on board on May 18th, and two more the following day. Twelve of these guns were of the "old" model, 8′6″ long [2.76 m], 3,300 pounds [1,614 kgs], and these I placed at the after gunports because of their greater weight. The remaining guns were of the "new" (1761) model, and were thus 7′6″ [2.44 m] long, and weighed 3,100 pounds [1,516 kgs]. The bore of the 12-pdrs was 4 inches 5 lines 9 points [121 mm].

In a letter dated May 17th 1779, Sartine, Minister for the Navy, gave formal approval for the use of the upper deck guns of the *Ajax*, but suggested that they should be carefully inspected, adding that he did not recommend proving them since "such proofs only strain them more than they are already". The guns had however already been taken on board by the time the letter arrived in Lorient, and we can only assume that they were subjected to a close inspection; in all events, none of the 12-pdrs burst during the engagement with *H.M.S. Serapis*.

John Paul Jones had requested that all the guns supplied be fitted with firing-locks, but it would appear that his wishes were not complied with. It should be noted in this context that while trials had taken place in both the English and the French Navies, firing-locks did not become standard issue until much later[2], old habits dying hard; instead, the slower but more reliable linstocks were supplied.

The quarterdeck armament was composed solely of 8-pdrs, all of which were of the "new" model. These guns were 6′10″ long [2.22 m], weighed 2,100 pounds [1,027 kgs], and had a bore measuring 3 inches 11 lines [106 mm]. The ship's log records, on June 2nd: "at 4 A.m. The Launch with 20 men was sent on board the Cutter [*Le Cerf*?] to Assist in Getting her on the Ground. at 7 P.M. Returned, brought 10 four pound Guns". Assuming the cutter in question was indeed *Le Cerf*, whose armament was composed of 18 6-pdrs, I can only suppose that these 4-pdrs were reject guns brought on board as additional ballast. No further mention is made of them, and we are not told where they were stowed. Depending on which model they were, they would have weighed about 750 pounds [367 kgs] each.

We know that when the *Bonhomme Richard* set sail in June (to escort a convoy), she was armed with 8 8-pdrs, of which two were on the forecastle, the remainder being on the quarterdeck. The forecastle guns were removed in July, so that the total armament of the *Bonhomme Richard* when she encountered the *Serapis* was thus 40 guns.

Looking at the ammunition, the log tells us that they took on board 420 18-pound roundshot, 1,966 12-pound shot, and 566 8-pound shot. This works out at 70 shot per gun, which can be compared with the regulation issue in the French Navy of 60. For grapeshot, 332 rounds were supplied for the 12-pdrs, equivalent to 12 rounds per gun, compared with the regulation 10; for the 8-pdrs, 80 rounds of cannister were supplied, which accords therefore with the Regulations. If the log is exhaustive, it would appear that no double-headed shot were taken on board, and no grape or cannister for the 18-pdrs[3].

So much therefore for the great guns of the *Bonhomme Richard*: a makeshift assortment, and one which Jones undoubtedly had reservations about at the time, since it was in July that he wrote to Franklin to tell him that he would have preferred to cut the ship down by a deck and arm a single battery of 30 18-pdrs. From the comfortable position of wisdom after the event, one is able to doubt whether or not this would have made any significant difference to the outcome of the cruise which was about to begin![4]

●

[1] Jones was no doubt influenced by the understandable reluctance of his men, and by the need to transfer some or all of the remaining 18-pdrs from one side of the ship to the other, each gun weighing more than two metric tonnes, plus the weight of the carriages.

[2] Firing-locks were first adopted as "standard issue" in the French Navy in 1787.

[3] We can be almost certain that the log does not provide an exhaustive list of all the stores taken on board, since we know for a fact that the quarterdeck 8-pdrs fired double-headed shot during the action with the *Serapis*.

[4] It was well-known that cut-down two-deckers rarely made successful frigates, tending to be too stiff and thus to work their spars in violent rolling motions.

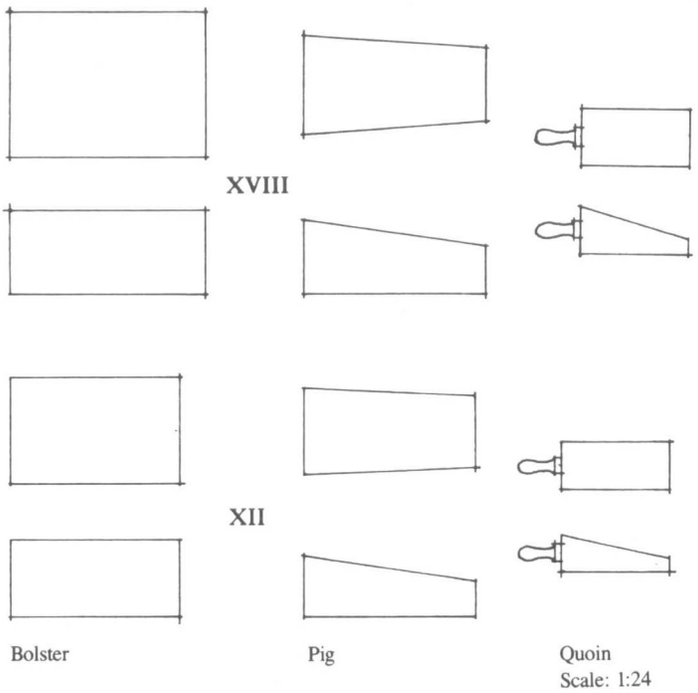
Notes concerning the guns

All the ship's guns are of cast iron, and for the model they can be cast or turned, using either white metal or brass; the brass should be blackened. The utmost care must be used when shaping the barrels. There are four different types of gun on board, and I have traced their outline at 1/24 scale so that a reduction lathe can be used by those who have access to one.

For all the ironwork of the carriages, consult *The Seventy-Four Gun Ship*, Volume II, pp 162-3. The thickness of the bolts is 11 1/4 lines [25 mm] for the 8-pdrs, 13 1/4 lines [30 mm] for the 12-pdrs, and 15 lines [34 mm] for the 18-pdrs. The thickness of the capsquares is the same for all three calibres of gun, at 5 lines [11 mm].

The breechings are 2′6″ long [813 mm] for every foot of length of the barrel, and their diameter is equal to half the diameter of the bore. The single blocks of the gun-tackles are respectively 7″, 8″ and 9″ long [190 mm – 217 mm – 244 mm], and the double blocks are 7 1/2″, 8 1/2″ and 9″ [203 mm – 230 mm – 244 mm] in length. The falls are 9 lines [20 mm], 10 lines [22 mm] and 11 lines [25 mm] in diameter.

The carriages should be painted with red ochre, and all the ironwork including the barrels should be black.



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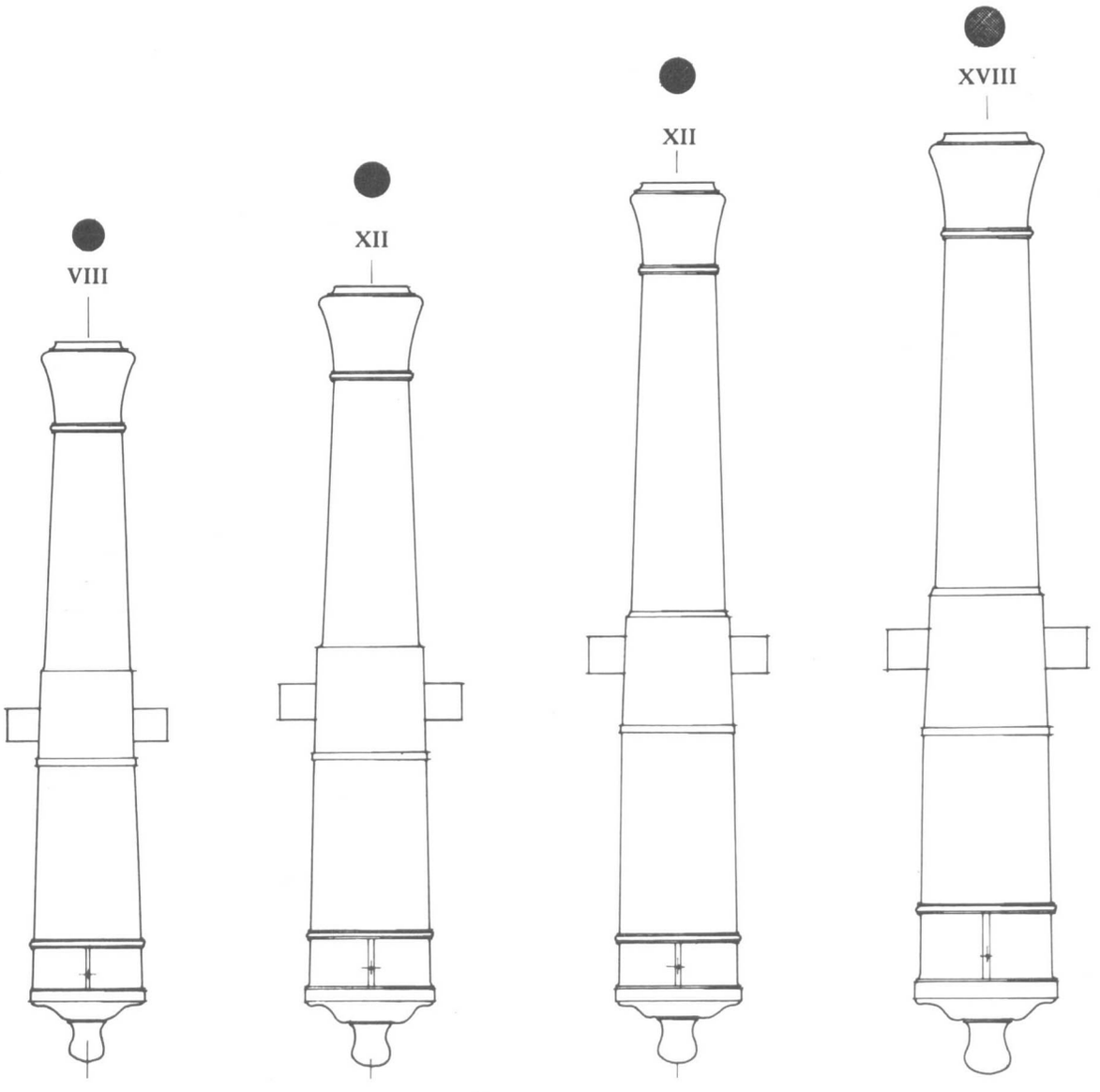
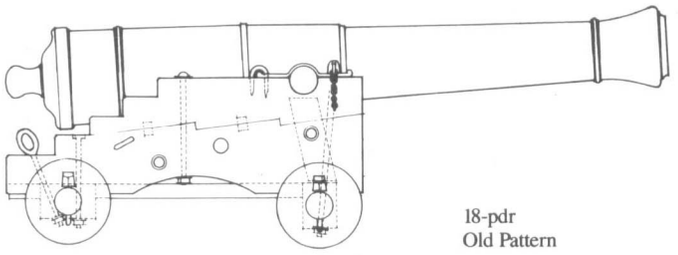
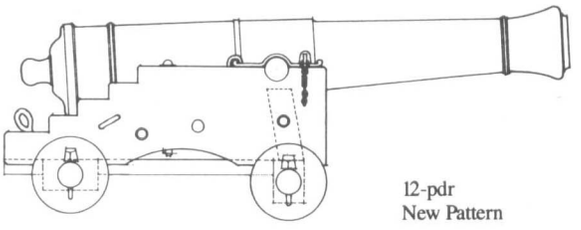
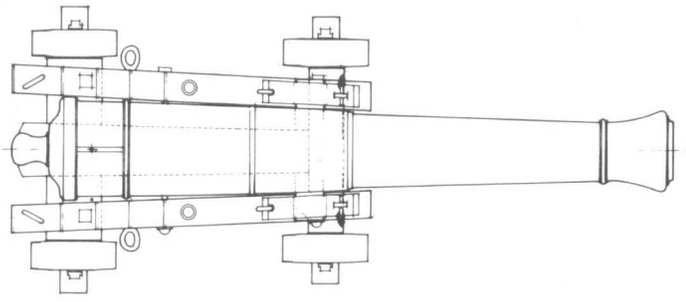


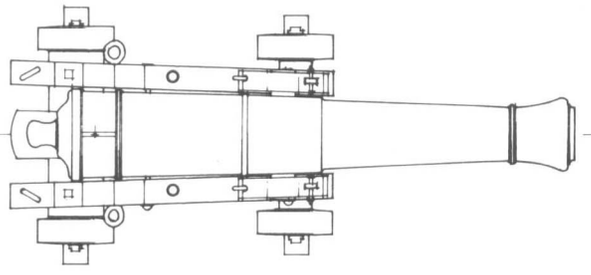


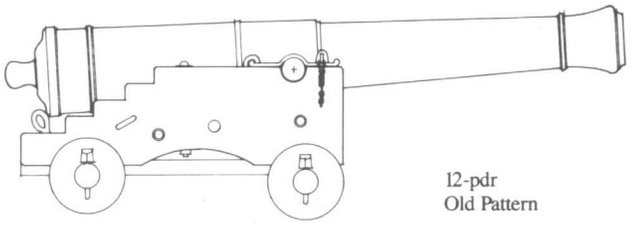
18-pdr
Old Pattern



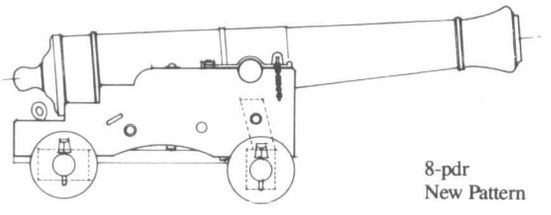
12-pdr
New Pattern



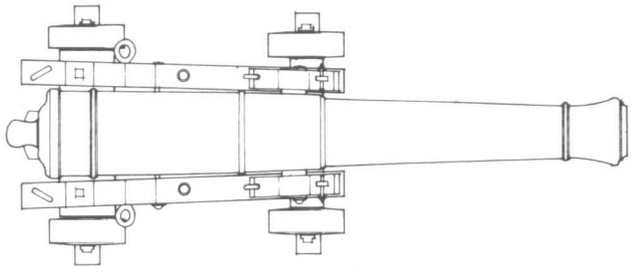


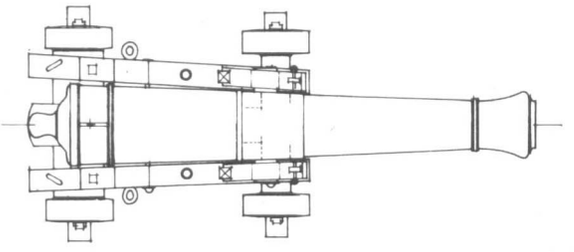


12-pdr
Old Pattern

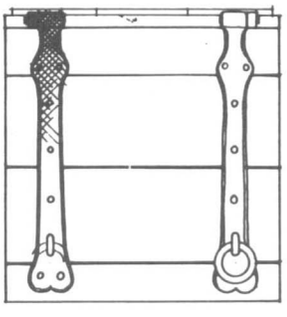


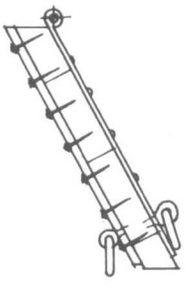
8-pdr
New Pattern





Scale: 1:36





Gundeck port-lid
Scale 1:24

NOTES ON THE IRONWORK

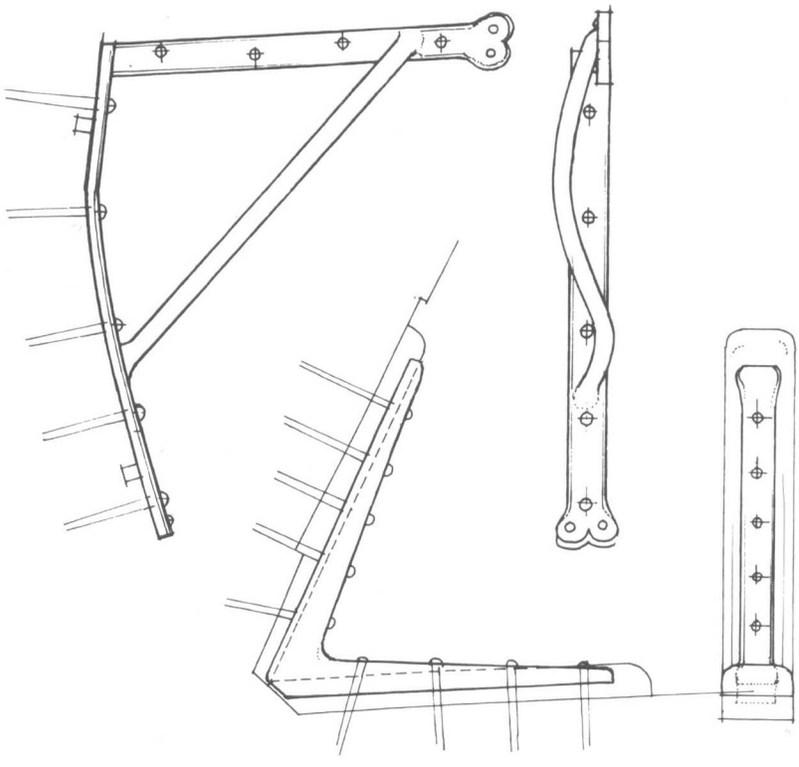
All too often I find that modelmakers pay too little attention to the ironwork on their models, often making it over-scale. With a view to making such errors easier to avoid, I have listed below the real-life dimensions of most of the items of ironwork, so that a scale size of 1:48 can be calculated by simple division.

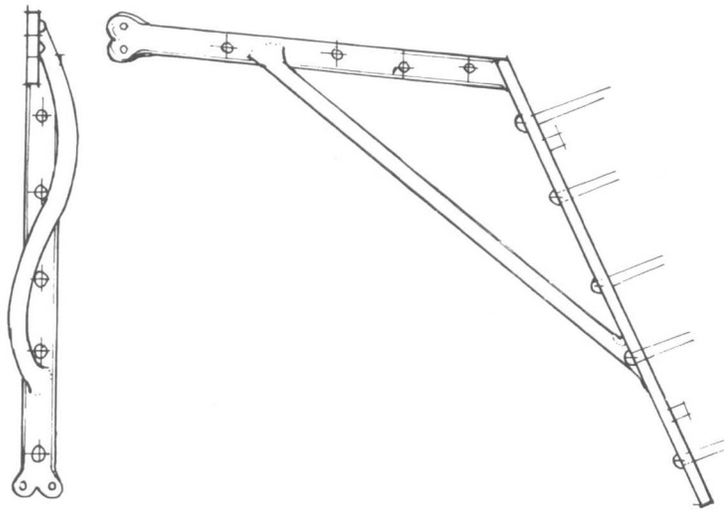
Iron Knees. The shortage of compass timber in the late 18th century meant that most of the knees joining the beams to the sides of the ship, which had formerly been of timber, had to be replaced by wrought-iron knees. The same applied on occasions to the breasthooks, and to the knees reinforcing the transoms at the stern. For the *Bonhomme Richard* I have however only chosen to represent iron knees for the beams of the gundeck and upper deck. The gundeck knees are made from iron bar 1 1/2 inches [70 mm] thick, and are fastened with four bolts to the forward or after face of the beam; the horizontal arm measures 4′4″ [1.38 m]. A second bar of the same thickness is fastened to the internal planking, a timber filling-piece being inserted where necessary; this vertical arm is 4′9″ long [1.54 m], and is fastened with five bolts. The bars are 4″ [108 mm] wide, and they meet at a right-angle, the two bars being welded together at this point. An angle-piece of iron 2 1/2″ wide [68 mm] and 2″ [54mm] thick is welded across the angle formed by the two bars and provides reinforcement.[1]

The upper deck knees are similar in construction, the bars being 3 2/3″ [100 mm] wide and 1 1/3″ [36 mm] thick. The horizontal arm is 4′0″ long [1.30 m], the vertical arm 4′8″ [1.51 m], and the angle-piece is 2″ [54 mm] in diameter.

The dilapidated state of the *Bonhomme Richard* was such that further iron knees called standard knees were also required. These are a sort of bracket of wrought-iron, and a timber shole is inserted between the deck-planking and the bracket; the horizontal arm is fastened to the deck by means of four bolts, while the vertical arm is fastened in the same manner to the spirketting by 5 bolts. The straps forming the knee are 3 inches 10 lines [104 mm] wide, and half that thickness; the two arms are about 4′4″ [1.15 m] long. There are 10 standard knees of this type on either side of the gundeck.

[1] The knees are reinforced at the throat until they are one third the breadth of the keel; this thickness diminishes so that one third of the way along the arm they are only half as thick as they are wide, and at the ends only one quarter as thick.





Scale: 1:24

On the left is an iron gundeck knee. Note the shape of the angle-piece when seen from the front; this is to enable the bolts to be driven into the arm.

On the right is an upper deck knee. In this case the angle-piece incorporates an elbow.
In the middle can be seen a standard knee. Note the wooden sholes.

Ironwork of the Rudder. The section of the braces and rudder-irons is determined by the diameter of the pintle-hole, which in turn is 6/7ths of the beam reduced to lines; in the case of the *Bonhomme Richard* this complicated formula gives 36.7 lines × 6/7ths = 31 lines or 70 mm. The width of the braces (on the sternpost) is 1 1/3 times the diameter of the pintle-hole, or about 40 lines [90 mm], while their thickness is 1/3 the diameter of the pintle-hole, or 10 lines [22 mm]. The rudder-irons are somewhat heavier, the proportion being 5/12ths or 13 lines [29 mm]. The pintles project beyond the pintle-holes by 3 times the diameter of the hole, or 93 lines [210 mm], giving therefore an overall length of 300 mm. The straps are fastened with round-headed nails, the head measuring 8 lines in diameter [18mm]. Care should be taken to bevel the sharp edges of the straps and to respect the way the irons are assembled and the pintle-scores are shaped: the pintles and the googings are welded, and the irons are let into the timber of the rudder and of the stern.

Capstan-hoops. The hoops of the main capstan are 1/3″ [10 mm] thick and 2 1/2″ [68 mm] wide. The hoops of the fore jeer capstan are the same thickness, but only 2″ [54 mm] wide.

Reinforcement of the bitt-standards. Strap-iron 1/2″ thick [14 mm] and 3″ wide [88 mm]. Diameter of the iron bitt-pin 1″ [27 mm].

Chains. The section of the links of the main-chains is laid down as 1/288th part of the beam, or 1 1/2″ [40 mm]. The preventer-bolts are the same diameter in the shank, and their hemispherical heads are twice the diameter of the shank. The links of the fore-chains are 1/10th smaller in section, while the mizen-chains are 7/12ths of the thickness of the main-chains, or 10 1/2 lines [23 mm]. The chains of the backstays in the fore- and main-channels are of the same section as the mizen-chains.

Port-hinges. Their breadth is once again determined by a formula, this time 2 1/4 times the breadth of the keel reduced to lines: 2.25 × 14 = 31.5 lines or 71 mm; their thickness at the swelling of the hinge is 1/4 of the breadth or 8 lines [18 mm]; this reduces by a third at the bottom to give a thickness of 12 mm. The outer edges of the hinges are placed 4″ [108 mm] in from the fore and after edges of the port-lid. The lining of the port-lids is fastened by diamond-headed nails measuring 8 lines [18mm] along each face of the head; the nails are driven in staggered rows, and there are 85 for each port-lid.

Bolts. Nails. Ringbolts. The rule for determining the diameter of the bolts states that they should be 10 points [1.9 mm] for every inch of thickness of the keel. In the case of the *Bonhomme Richard* this means 140 points or roughly 1 inch [27 mm]. Their heads are larger, measuring 1/12th of the breadth of the keel or 14 lines [32 mm]. The size of the nails is determined by the thickness of the timbers which they fasten: the shank is divided into 9 parts, four of which represent the part which is buried in the plank to be fastened; the diameter of the shank is 1/24th of the length, and the head is 1/12th. For the *Bonhomme Richard* this gives the following: the heads of the nails fastening the lower wales measure 14 1/2 lines [32 mm], while those fastening the ordinary hull-planking of the underwater hull measure 10 1/2 lines [23 mm]. The heads of the gundeck nails measure 12 lines [27 mm], the upper deck nails 11 lines [25 mm], and those of the forecastle and quarterdeck 9 lines [20 mm]. The planking of the underwater hull is fastened to each frame by two nails and two treenails (a common convention on contemporary models is to omit these, since they are of timber). The hull-planking above the waterline is fastened by four nails in each frame, the heads of which are the same size as those of the deck-nails.

I am aware that it is much easier to list these small details than to execute them, but if it is decided to show them, then it is vital that they be made to to the correct scale; some simplification is of course permissible, but too many models are spoiled by these items being grossly over-size.

The ringbolts and hooks of the guns on the gundeck are made from iron rod with a section equal to 16 points for every inch of the breadth of the keel, which for the *Bonhomme Richard* means 18 lines [40 mm]. For the upper deck guns, the section should be 1/12th less, or 16 1/2 lines [37 mm], and on the quarterdeck the corresponding section is 3/4 of those on the gundeck, or 13 1/2 lines [30 mm]. The internal diameter or eye of all the rings is equal to three times the section of the metal. The section of the ringbolts for the anchor-stoppers is equal to 13 points for every inch of the breadth of the keel, or 15 lines [34 mm].

Ironwork of the masts. The hoops of the foremast, mainmast and bowsprit are 40 lines [90 mm] wide and 5 lines thick [11 mm]. The hoops of the lower yards and their studdingsail boom-irons are 3″ wide [81 mm] and 5 lines thick [11 mm]. The boom-irons of the topmast studdingsails are a third less. The iron strapping of the mainmast cap is 3 1/2″ wide [95 mm], and 8 lines thick [18 mm], that of the foremast cap one fifth less, and that of the mizen a third less. The strapping of the topmast caps is half the size of those of their respective lower masts.

The iron straps at the outboard ends of the main topgallant crosstrees are 4 1/2″ wide [122 mm] at their widest point, and 1″ [27 mm] thick. Those of the other topgallant crosstrees are proportionately reduced by the same amount as the strapping of the mast-caps.

The strapping of the bowsprit cap is 4 1/2″ wide [122 mm] and 1 1/3″ thick [36 mm].

The straps in the tops are 3 3/4″ wide, 3 1/3″, and 2 2/3″ [101 – 90 – 72 mm]; their thickness is equal to one third of their width. These straps take the ends of the futtock-plates of the topmast-shroud deadeyes, and these are 10 and 6 lines thick [23 & 14 mm].

Other Items. The plate in the main-channels for the main lower studdingsail swinging-boom is made of strap-iron 6″ wide [163 mm], and 10 lines [22 mm] thick. The large bracket in the mizen-channels for the mainsheet block is made of strap-iron of the same dimensions, and the crank supporting it is 1 1/2″ [40 mm] thick at its upper end.

The cranes are made of bar-iron, the corners of which are rounded off, and are of 1 1/2″ section [40 mm].

The hoops of the anchor-stock vary in width from 4″ [108 mm] to 2″ [54 mm], and are from 1/3″ to 2/3″ thick [9 – 17 mm].

The hoops of the catheads are the same dimensions as those of the main capstan.

A number of sheaves are made of bronze, the dimensions of which are as follows. Cathead sheaves: thickness 1 1/3″ thick [36 mm], diameter 12″ [324 mm]. Main topsail-sheet bitt sheaves: 2 1/4″ [61 mm] and 7″ [190 mm]. Fore topsail-sheet bitt sheaves: 2″ [54 mm] and 6 1/6″ [168 mm]. Mizen topsail-sheet bitt sheaves: 14 lines [32 mm] and 4″ [108 mm]. Jeer-bitt sheaves: 16 lines [36 mm] and 11″ [300 mm]. Sheaves of the fixed-block for the foresheet: 26 lines [59 mm] and 9″ [244 mm]. Sheaves of the poop fixed-block: 17 lines [48 mm] and 9″ [244 mm]. Sheaves in the block of the main-topmast heeling: 26 lines [59 mm] and 19″ [515 mm]. Fore-topmast heeling: 2″ [54 mm] and 18″ [488 mm]. Mizen-topmast heeling: 14 lines [32 mm] and 14″ [379 mm].

Chestree sheaves: 10 lines [22 mm] and 9″ [244 mm].

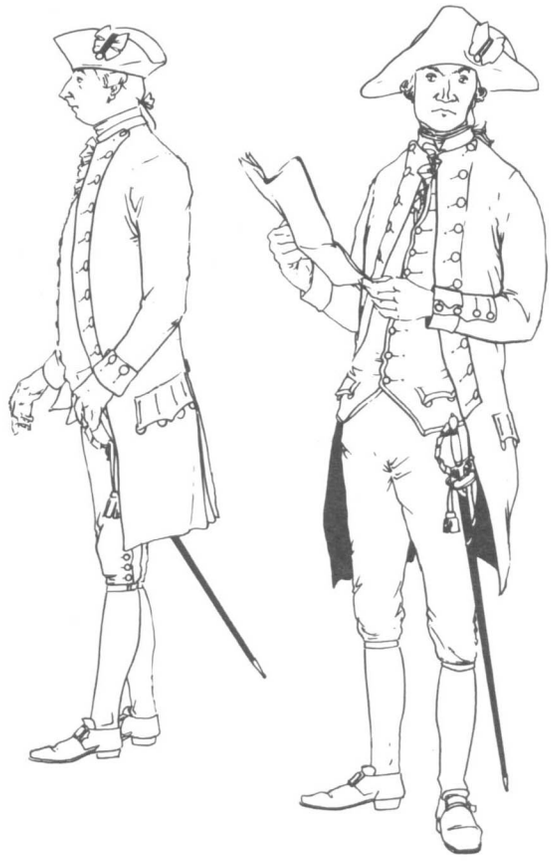
For the dimensions of the bronze working-barrels of the pumps, see *74-G.S.*, Vol II, page 145.

For lead, which I mention only in passing, see also *74-G.S.*

Flags and Colours

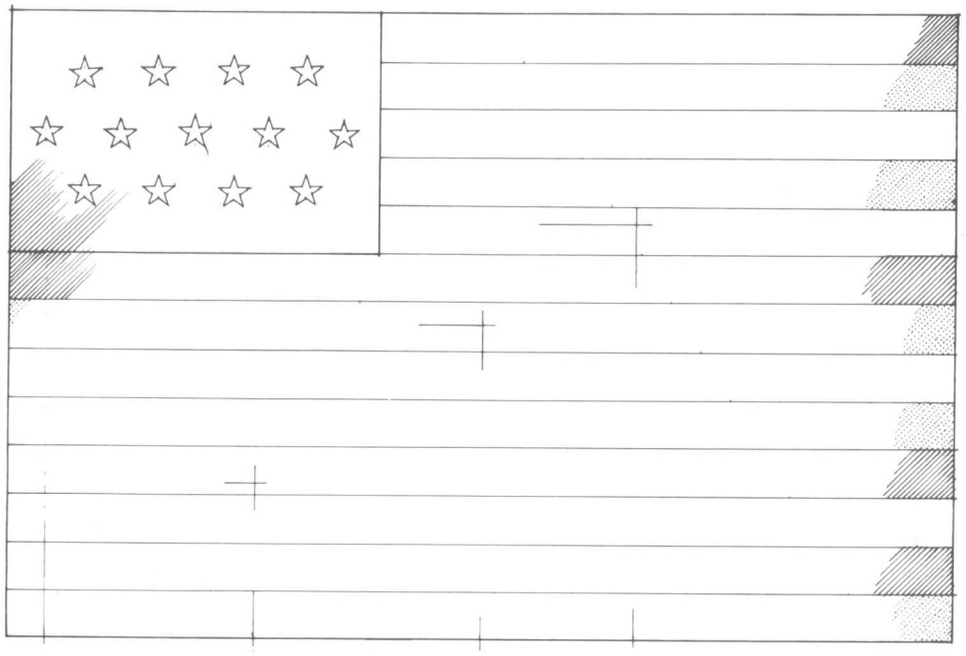
In accordance with convention on French ships, the *Bonhomme Richard* would have hoisted a large ensign at the stern indicating her nationality. The fly of this ensign is equal to the ship's beam, and the hoist measures 2/3 the length of the fly. Alternatively, smaller colours might be hoisted as an ensign, measuring either 2/3 or 1/4 the size of the large ensign.
In harbour, on Sundays or holidays, a jack would be flown, the jackstaff being made fast to the jackstaff-standard on the bowsprit. The jack is half the size of the large ensign.
The information at our disposal concerning the ensign flown by the *Bonhomme Richard* derives from a Dutch artist who, on October 5th 1779, carefully executed a watercolour showing the ensign flown by the *Serapis*. After his own ship had sunk, Jones transferred his flag to his prize. It is illustrated as having 13 blue, white and red stripes representing the 13 States of the Union. The upper corner of the hoist comprises a blue canton with thirteen white stars. The ensign of the *Alliance* however, depicted by the same artist, has only red and white stripes, showing that at this stage there was still some hesitation as to the official flag of the young nation. Did the artist conscientiously show the stars as being 8-pointed, or was this merely a conventional interpretation? We do not know, and in face of this doubt we have retained the depiction from the Texel[1]. While it would be perfectly possible to substitute the more usual five-pointed stars, we have no document to support such a change in the case of the *Bonhomme Richard*.
Ships of war also flew a pendant at the maintruck, the fly being one and one third of the beam, and the hoist 1/9 of the fly. The pendants were spread by small yards. Presumably Jones would not have flown a white pendant, which was peculiar to French ships. Possibly his pendant was divided along the fly red over white; alternatively, it could have had a blue hoist with the white stars, and then thirteen red and white stripes parallel with the hoist; the fly finished, depending on its length, in two quarters red and white[2].
Jones, as a senior captain and commodore of a squadron, would in the French Navy have been entitled to hoist a broad pendant at the mainmast. This would have measured 2/9 of the beam at the hoist, and 2/3 at the fly. It was swallowtailed for 2/3 of its length, ending in two points, although sometimes it was simply triangular in shape. I should add that this pendant was flown as a flag, and thus not spread by a yard. According to eyewitness accounts, Jones' pendant was blue.
It is reasonable to suppose that the arms borne by the lion figure at the head might have consisted of a shield on a blue background, with thirteen white stars on a blue field. At the stern the badge in the upper part of the taffarel might be decorated in the same way. However, this is entirely hypothetical, and another alternative might be thirteen vertical stripes, seven red and six white.

[1] A depiction dated 1793 shows the stars as having six points.
[2] Another alternative was two white and one red stripe at the tail of the fly.



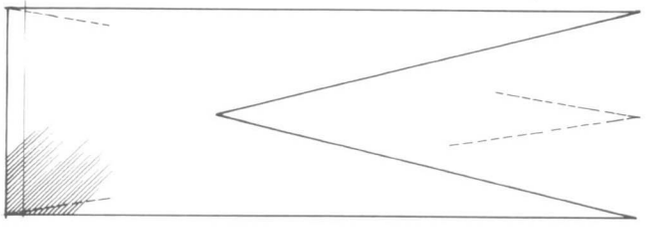
Notes on the paintwork of the Bonhomme Richard

From the items of expenditure listed in 1769-70 (Archives of the Port of Lorient, IP.265) for the *Duc de Duras*, we know which colours were used for her repainting prior to her third voyage (transporting troops to Ile de France). They are those which were most commonly employed: red ochre in generous quantities below decks; without board, black for the wales, yellow ochre for the planking in between, and some blue for the upper works about the quarterdeck. Thus there are no great surprises.
According to a number of eyewitness accounts, Jones painted the whole of the outside of the *Bonhomme Richard* in black, including (according to the log), the lower masts "fore and aft" (foremast and mizen). Since she was not coppered, the underwater hull should be shown as white, as far as the load waterline. Logically, red ochre would have been retained below decks.
Jones was clearly marking out his ship as different in painting her black overall, so that she should not have been mistaken for a naval vessel: all ships of war, of whatever navy, were painted in combinations of black and red or yellow ochre, as I have indicated above.
Thus a priori it would have been extremely difficult to pass off the *Bonhomme Richard* as an English 64, despite eyewitness reports which made that error.

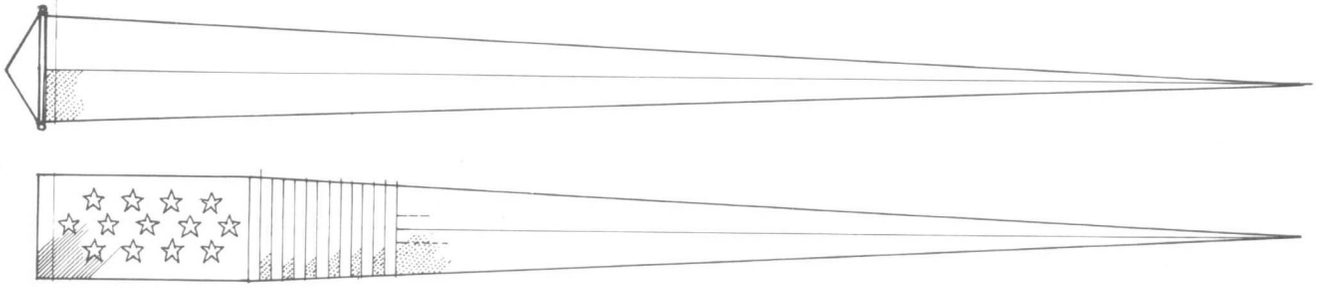


Ensign (national colours)

Scale: 1:96



Broad Pendant



Pendant

I have shown on the large ensign the dimensions of the jack and of the smaller ensigns, which were 2/3 and 1/4 the size of the large ensign.

The broad pendant is blue overall, but might have been triangular or swallowtailed.

The pendant was flown from a small yard, and I have shown two alternative treatments.

For the weather-vanes, see The 74-G.S., *Vol. II, p. 128.*

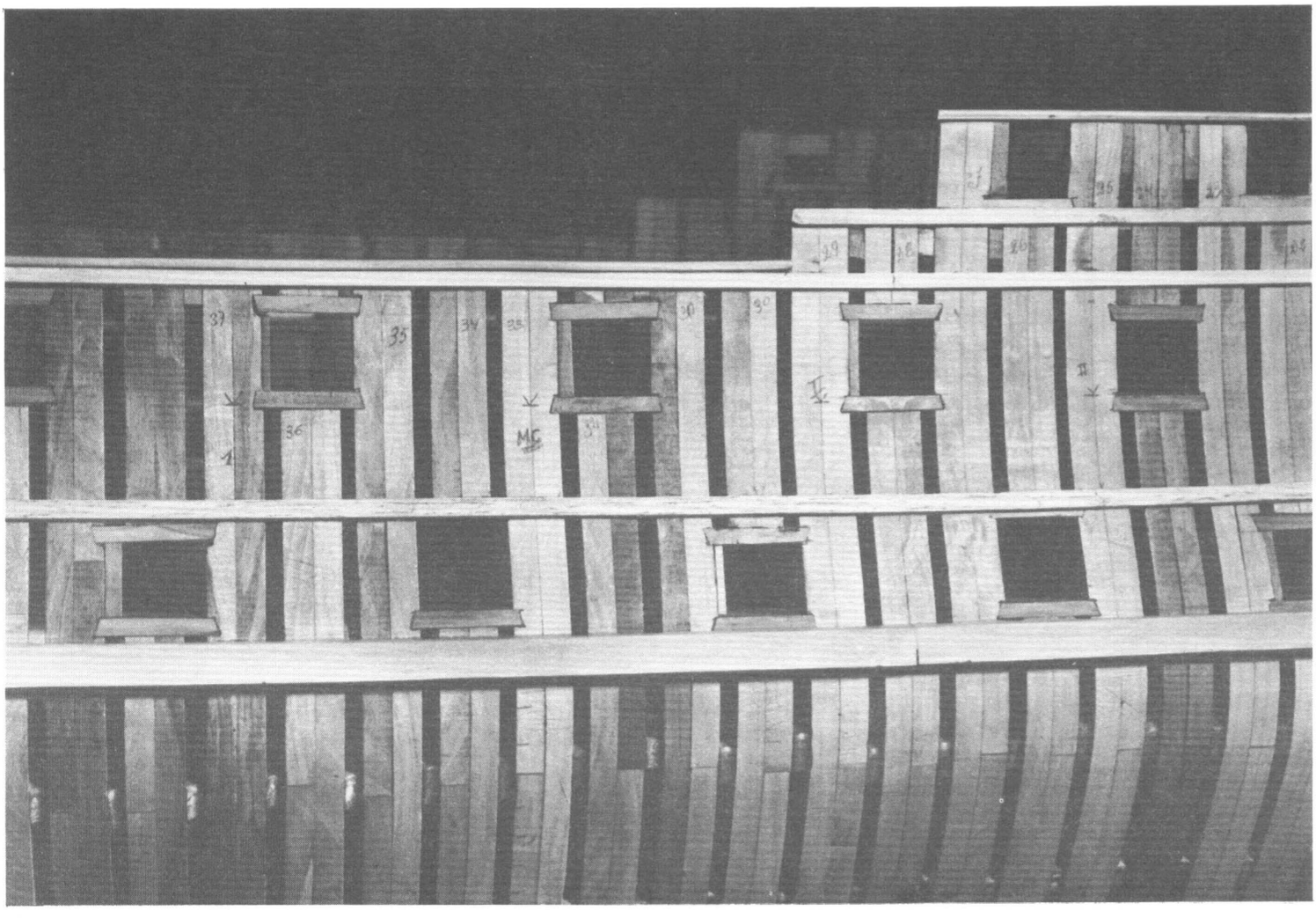
SHIP MODELS

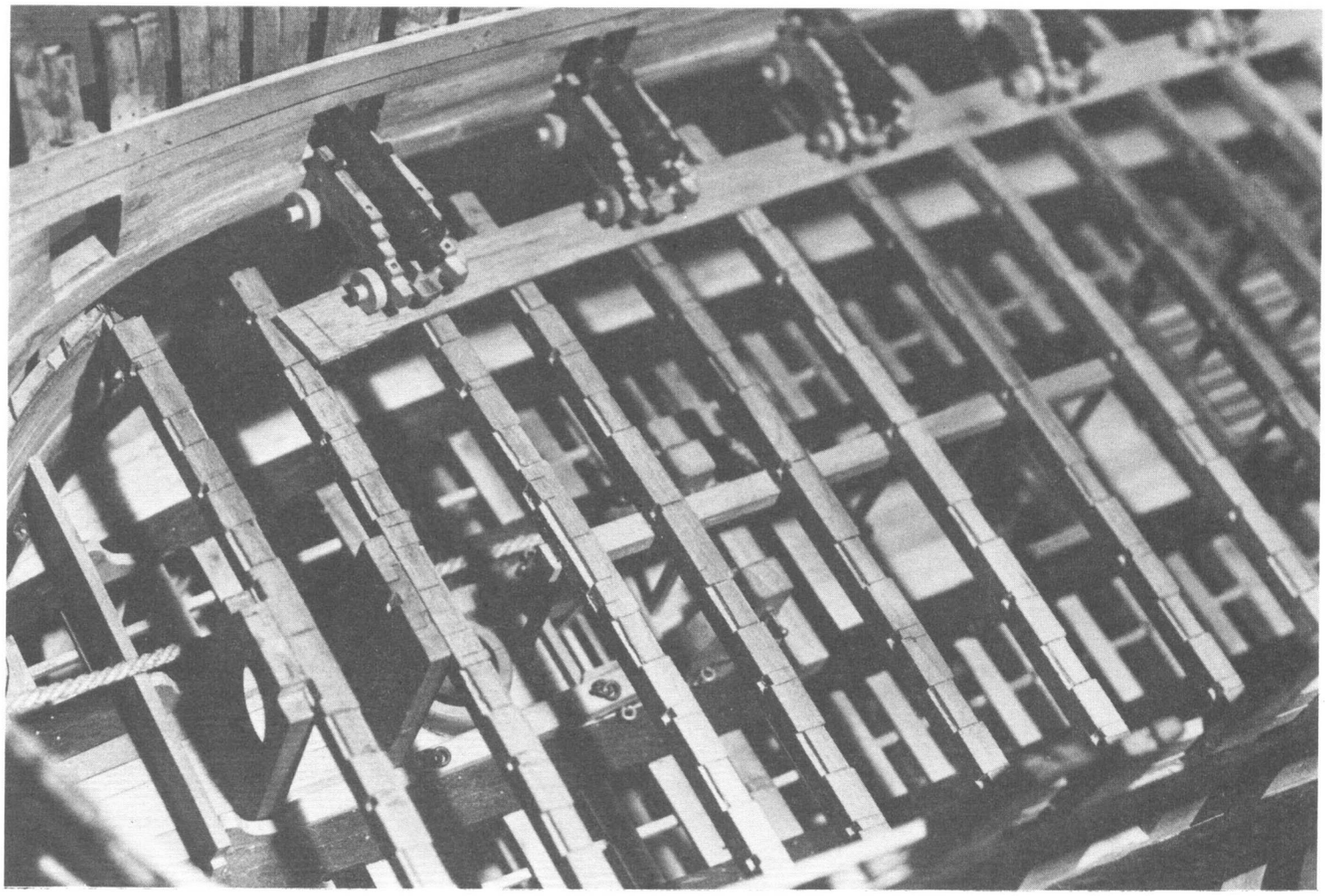
The photographs which appear in these last few pages on the *Bonhomme Richard* give an idea of what is possible, given enough patience and skill, working from the plans which accompany this booklet. There are in fact two models shown, which I owe to the efforts of two remarkable modelmakers, François Ayroult and Arthur Molle*, both of whom started work more or less as soon as the plans left my drawing-board. Those readers familiar with the companion work *John Paul Jones and the Bonhomme Richard* will recognise François Ayroult's model, which featured in the final chapter; it is built to the same scale as the plans at 1/4″ to the foot, while Arthur Molle's model is somewhat larger – he has "adopted" the scale of 1/36, in which he is more comfortable.

It would have been delightful to have been able to illustrate two finished models complete with masts and rigging, but in view of the many hundreds, not to say thousands of hours necessary for such a task, and the inevitable time constraints imposed by printing schedules, it is only possible in these pages to give an idea of the final appearance of these models, both of which are worthy of the finest museum collections. Indeed, both models were exhibited in their unfinished state in the recent remarkable exhibition at the Musée de la Marine in Paris, *Chefs-d'Oeuvre 1987,* where they attracted many admiring comments from visitors.

The meticulous workmanship, the scrupulous attention to even the smallest details, the care taken with every timber of the hull and of the upper works, extending even to the internal fitting-out of the hold, all bear witness to the remarkable rebirth of ship modelling to the standards of the masters of the 18th century which has occurred in recent years. One can but marvel at the perfect marriage of artistic skill and manual craftmanship exhibited by such models, which are very real additions to our cultural heritage. I must confess that it is with some impatience that I await the results of the efforts of other modelmakers, which in a sense are the three-dimensional "materialisation" of what on my drawing-board I am forced to express in two dimensions only; such models are the true reward for my months of research.

The photographs of Arthur Molle's model are identified with an asterisk.

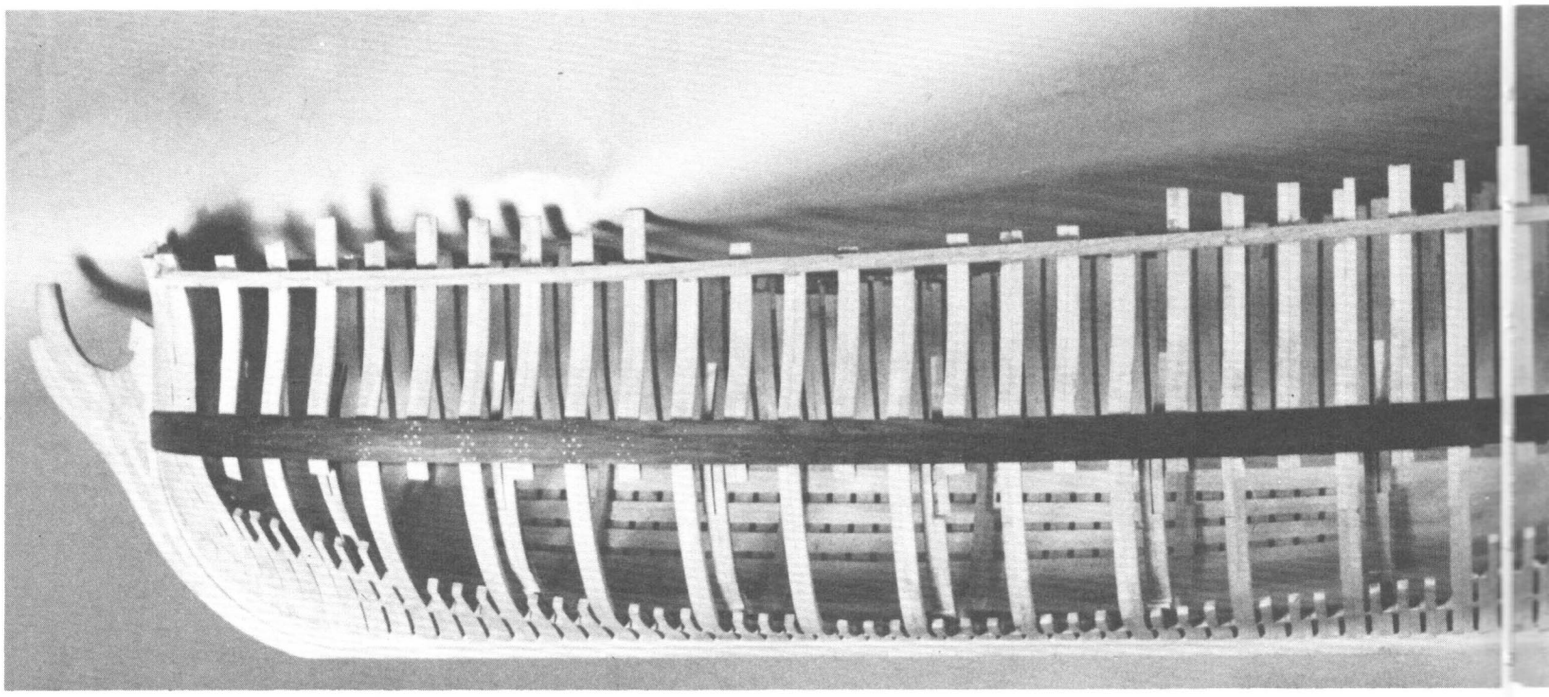


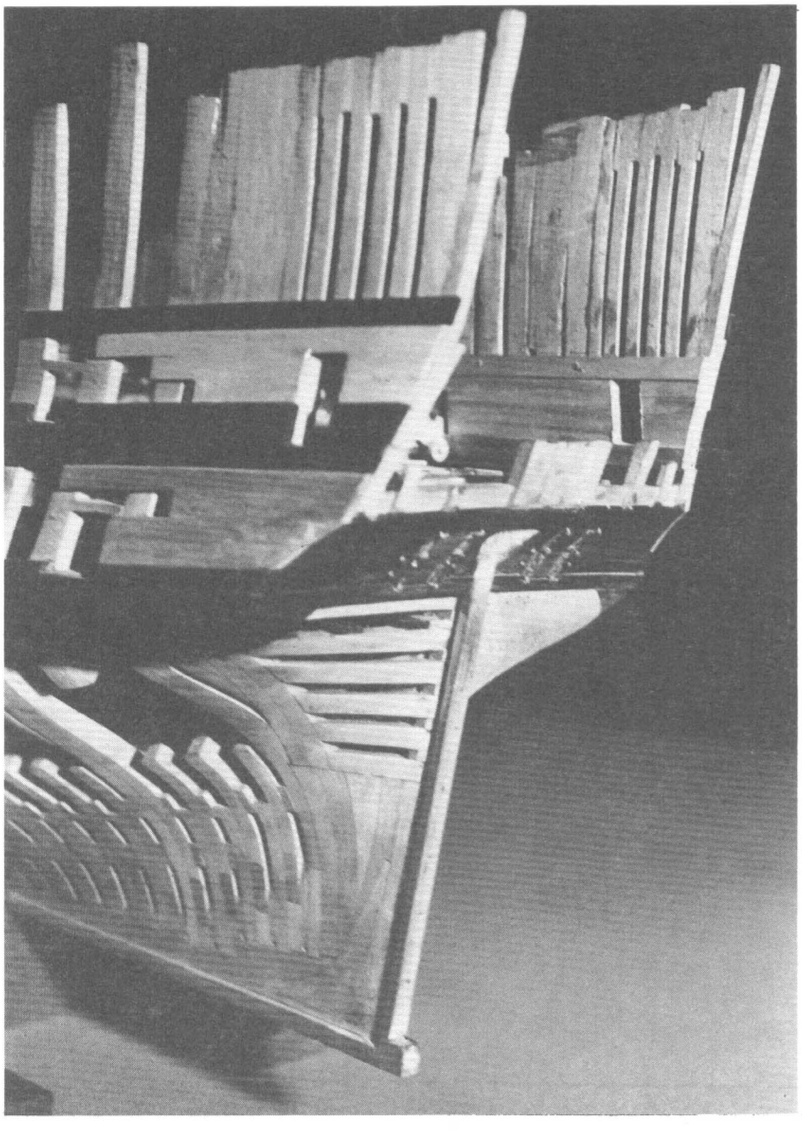


1.* *Close-up of the timbering of the hull, showing clearly on the gundeck the original gunports, and those enlarged for 18-pdrs.*

2. *A large number of details can be made out in this picture. The beams of the upper deck are in place, and the guns are temporarily in position. The scores to receive the carlings and the binding-strakes have been cut, and the waterway, which is made of ebony, is in place.*

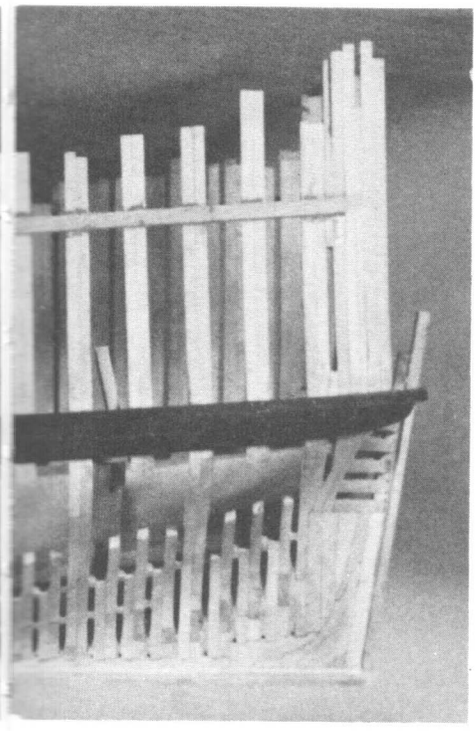
On the gundeck can be seen: the manger, the step of the bowsprit, the wedges surrounding the partners of the foremast, and the riding-bitts, which are shown complete with their stopper-rings and an iron bitt-pin. Note also the carling under the beams, supporting with the help of a line of pillars the upper deck beams amidships.



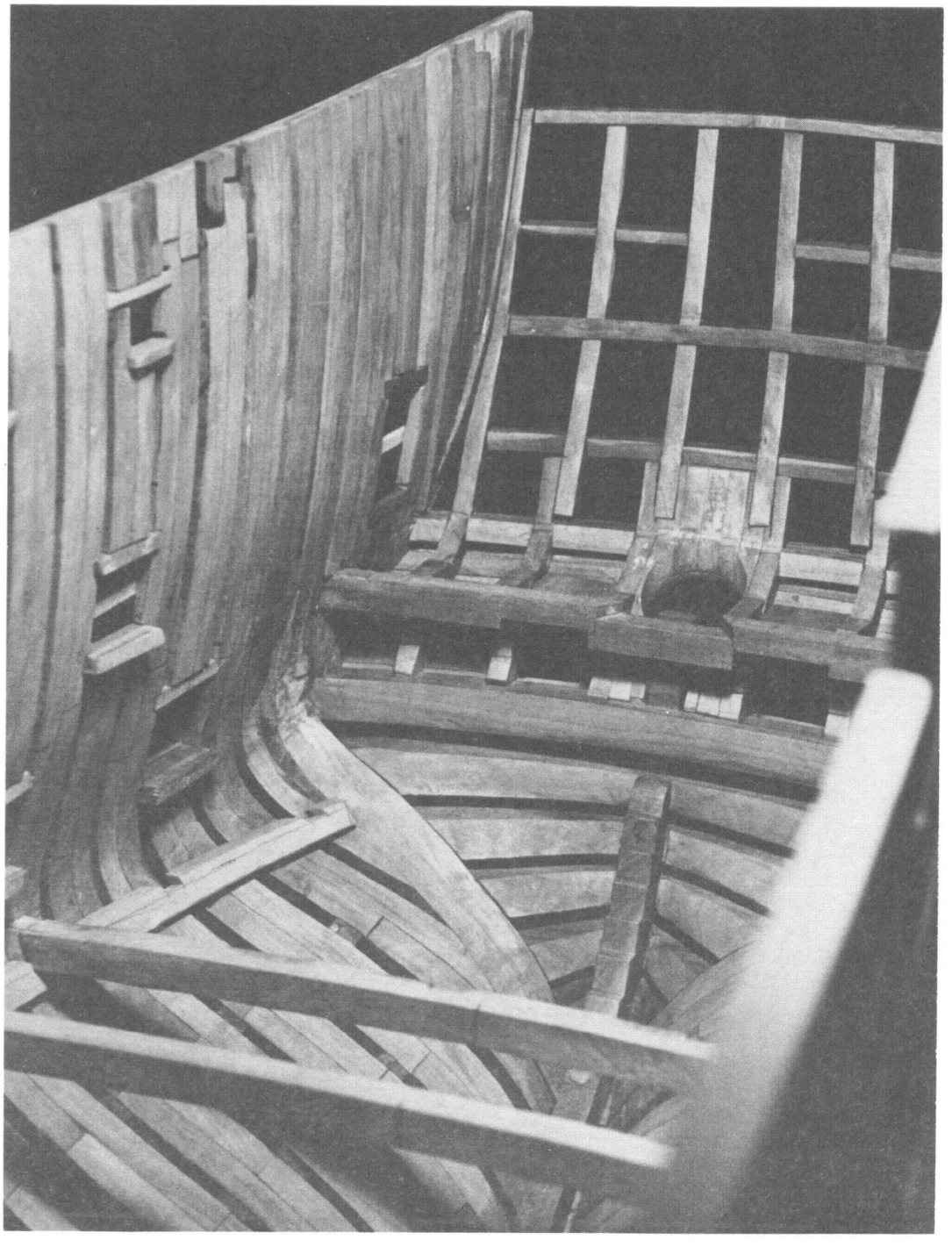


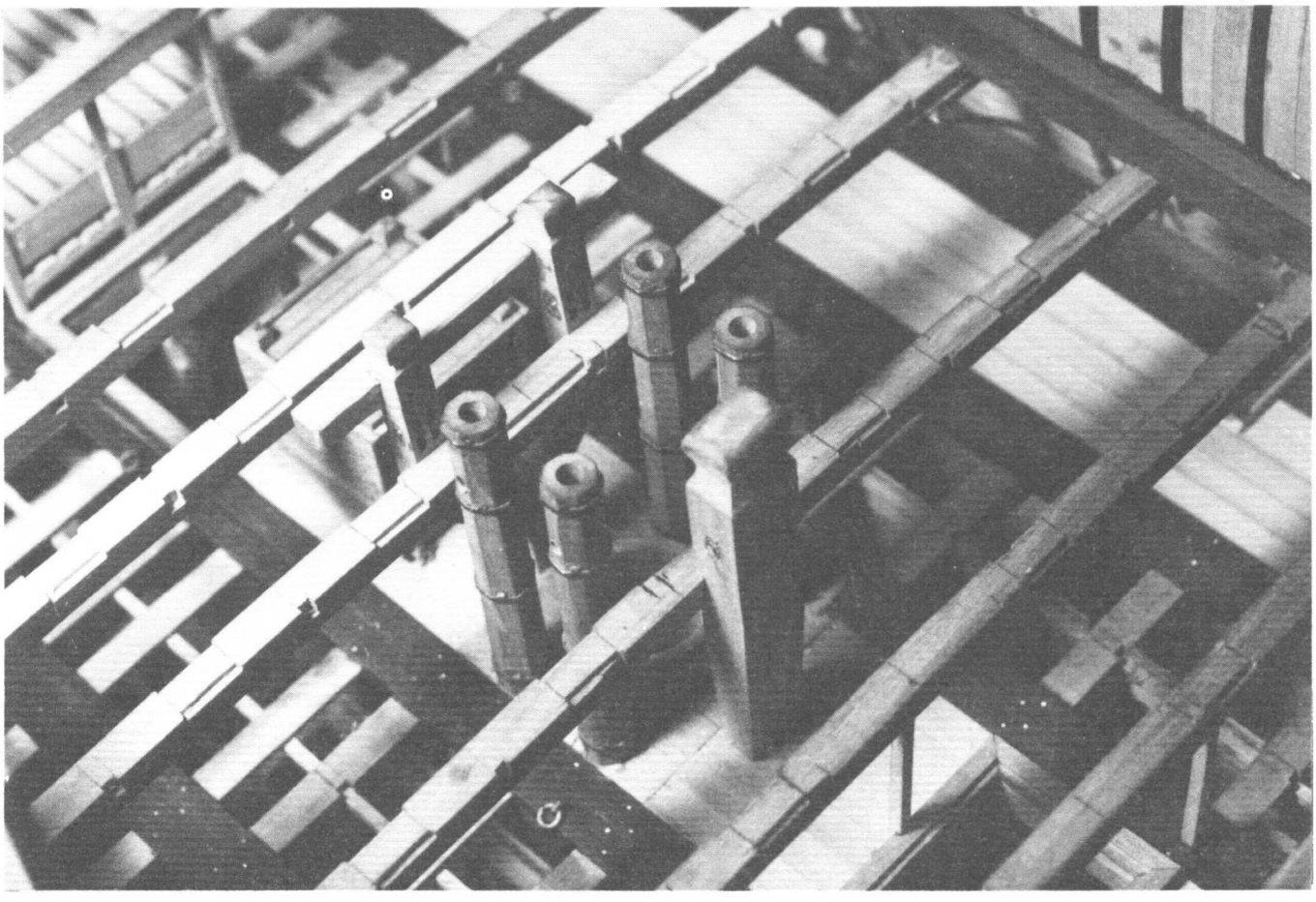
4. *View of the stern; the model is only planked below the lower wale on the starboard side. The wales are made of ebony, as is the wing transom, including the counter. The upper wale and waist-rail are also of ebony, while the remainder of the model is built of pearwood. The contrast of these two woods is part of the artistic input of the modelmaker, and personally I find it very much to my taste.*

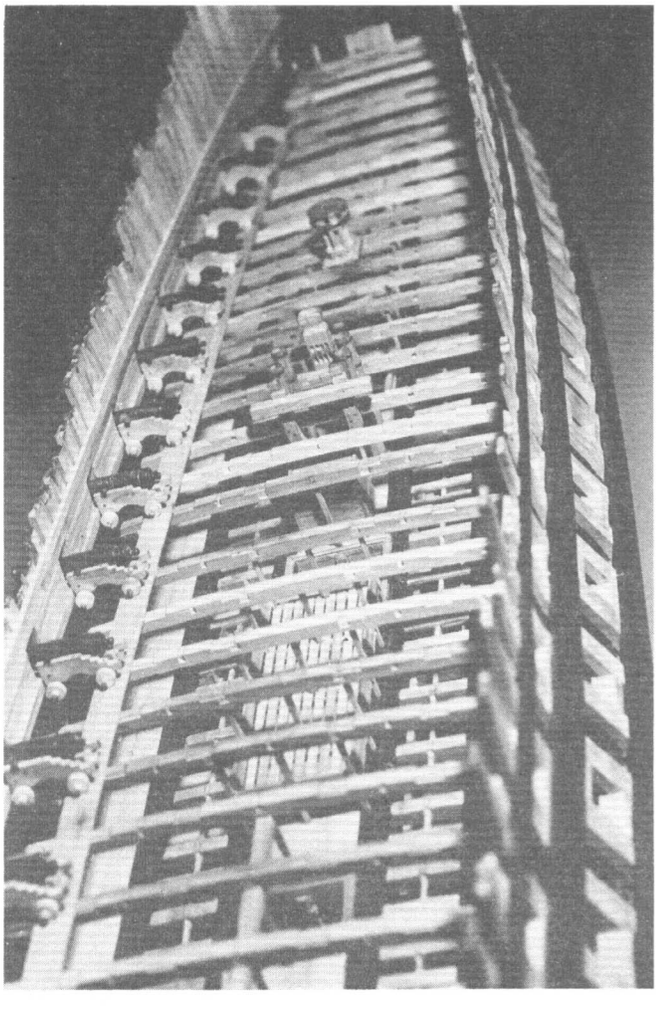
5.* *This view of the inside of the stern of Arthur Molle's model, in view of the larger scale employed, shows clearly all the various timbers in this complex part of the vessel. Note the solid timbers surrounding the helm-port, and the steps cut in the sternson knee, contrasting with the relative light timbers of the upper part of the stern.*



3. *The model is unplanked on the port side in order to show the internal arrangement of the hold. The station frames and the riders provide the essential stiffening. The way the filling-frames have been cut out to provide the openings was inspired by a number of 18th century models in the Musée de la Marine in Paris.*





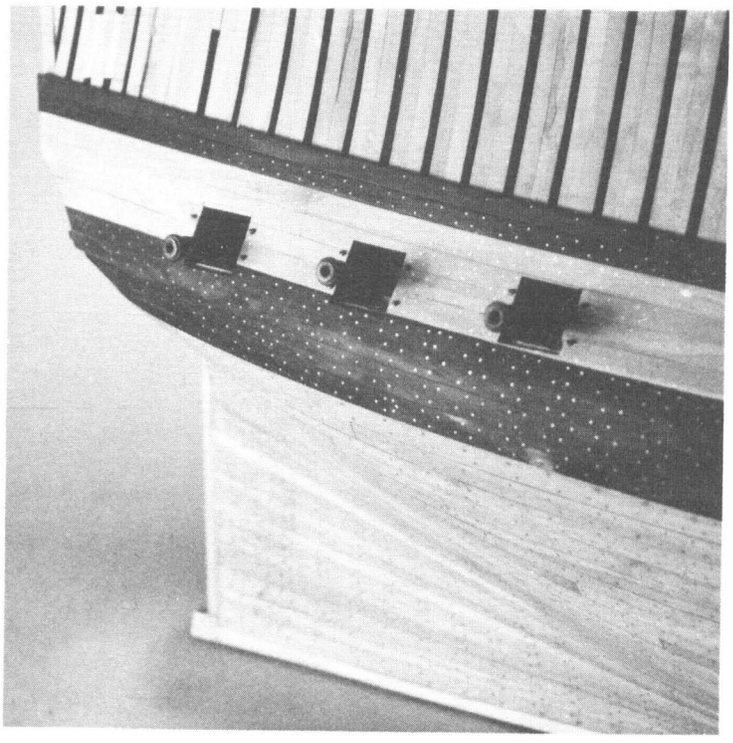


6. *View of the four "Royal" pumps surrounding the partners of the mainmast. Note the discharge holes in the upper barrel of the two nearest pumps, to which a wooden dale or a canvas hose is connected in order to carry off the water to the scuppers. Note also the care with which the iron hoops have been made, and the neatness of the scores in the deck beams.*

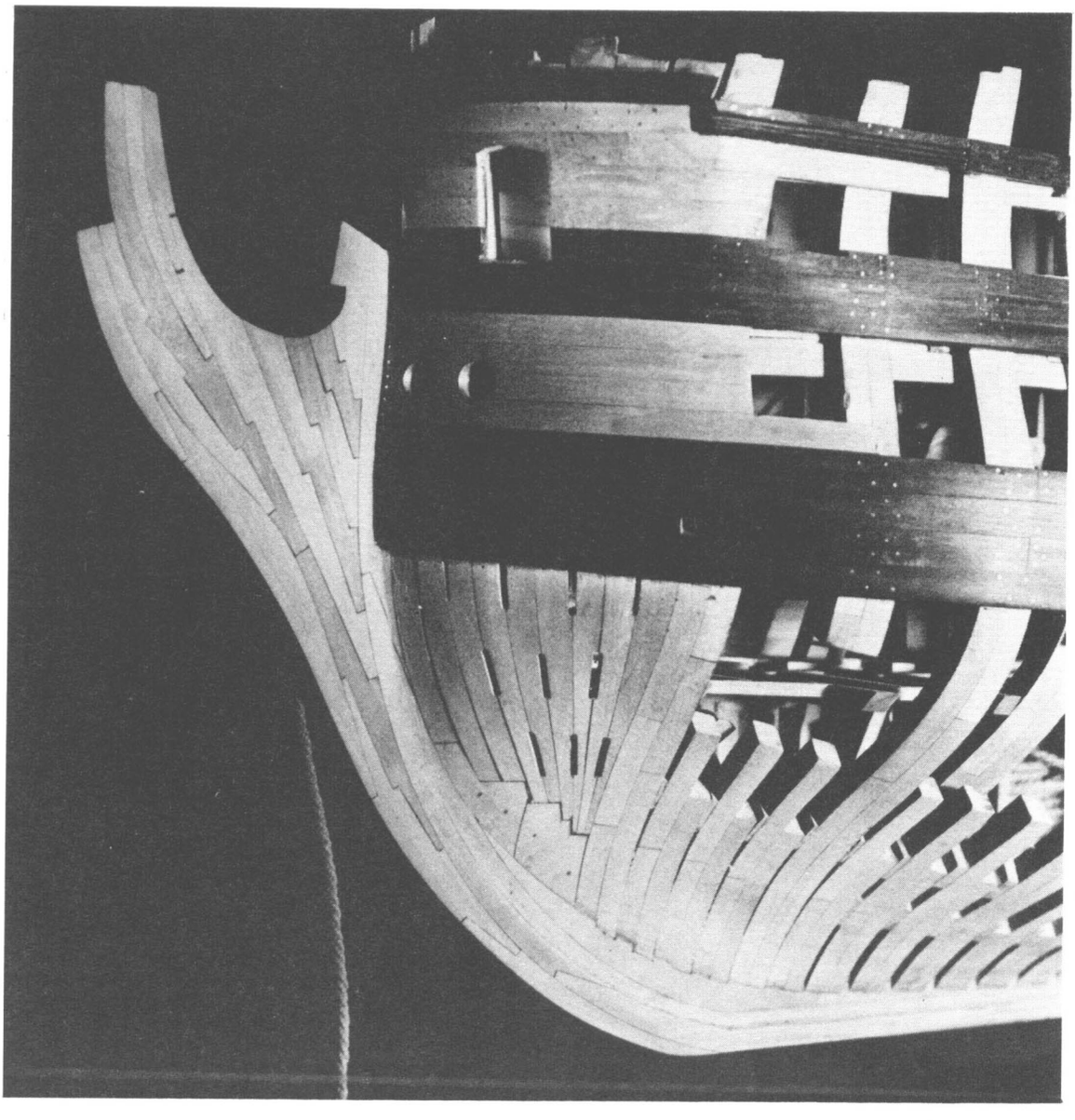
7. *The planking on the upper deck has not yet been completed, and the guns have been fitted in place temporarily on the starboard side. On the gundeck can be seen: the main hatch, and forward of it the sheep pen; abaft, the bread oven.*

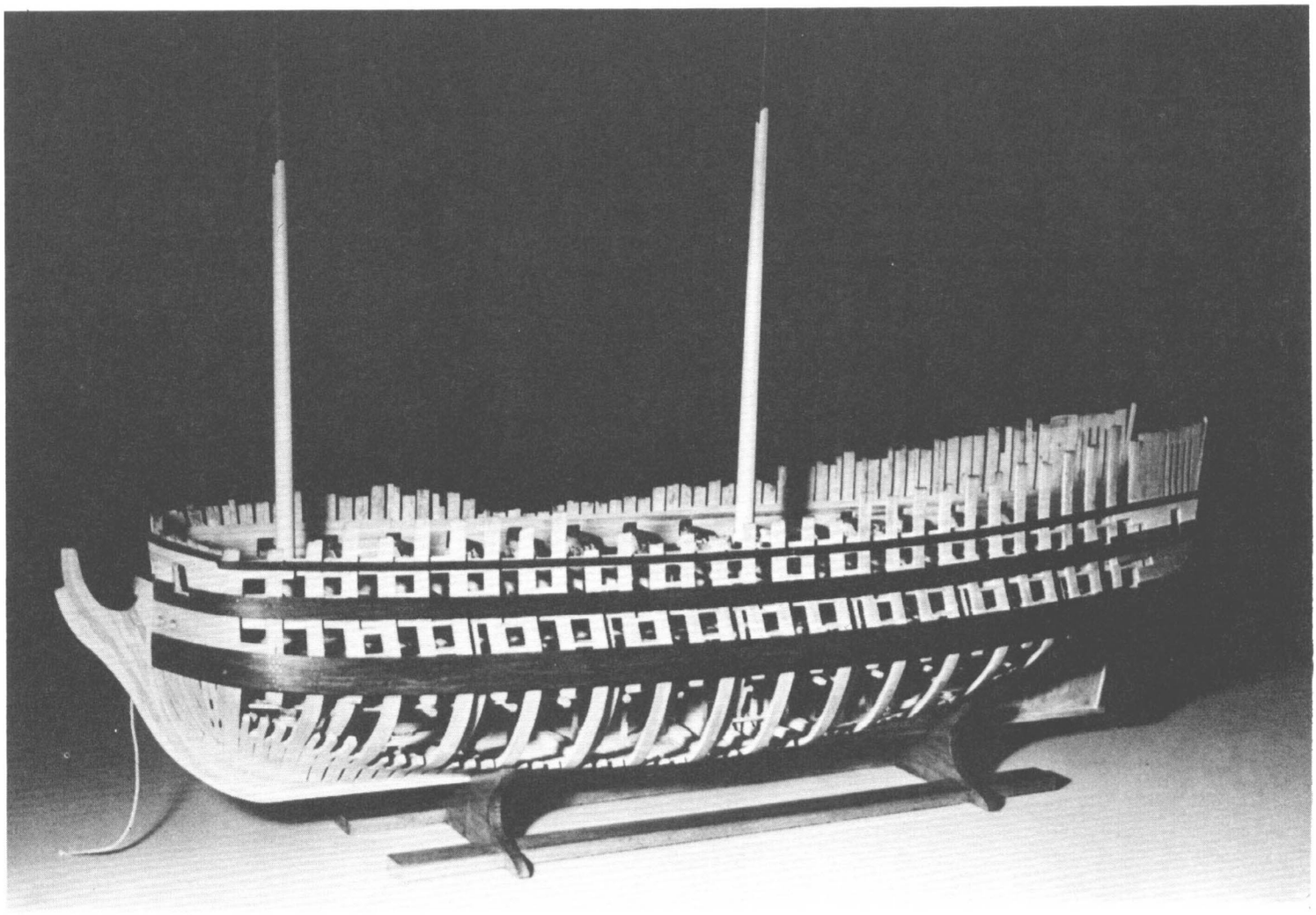
On the upper deck, note the main topsail-sheet bitts, the pumps, and the knight of the jeer-bitts, with its bronze sheaves.

8. *View of the starboard quarter. The three 18-pdrs are at their ports, and it should be noted that these guns, even though they are largely invisible in the darkness of the gunroom, are complete with their carriages, tackles, and even guncrews' implements. It is in his attention to such small details that François Ayroult's virtuosity can best be recognised; he is as conscientious in the darkness of the between decks as he is in the clear light of the forecastle and quarterdeck.*



9. *Close-up of the head, showing clearly the complex assembly of timbers fayed together to form the knee of the head and the stem. The hawse-holes and the doorway giving onto the platform of the head are open; note also the small square manger-scupper in the lower wale.*





10. *View of the port side, where the planking of the hull has been left off to show the internal arrangements and fittings. While all the floors have been fitted, only the futtocks of the station frames have been shown below the wale, those of the filling-frames being omitted. This gives us a clear view of the cables in the tier, the well, and the complexities of the mast-steps. Clearly visible are the original gunports which were planked over in the* Duc de Duras, *and those which were enlarged when the ship was fitted out as the* Bonhomme Richard: *as we have seen, there were eight of these in all on the gundeck, but in the end only the 3 aftermost ports in the gunroom were armed with 18-pdrs, of which at least one was to burst right at the beginning of the action with* H.M.S. Serapis.

The closed head is clearly visible, as are the hawse-holes, and at the forward end of the upper deck the doorway out onto the head. Note also the spaces left between the hawse pieces, the purpose of which was to provide some ventilation to the timbers, thereby reducing the risk in a part of the ship which was particularly prone to rot. Still at the level of the upper deck, note the doorway providing access to the quarter-galley at the stern.

11. *This overall view of the starboard side of the hull shows the three 18-pdrs at their ports on the gundeck, and the lids of the five other unarmed ports. On the upper deck, there are fourteen 12-pdrs, and note the foremost port which is unarmed: this is the bowchase-port, and the usual practice is to move the neighbouring gun forward when required. In principle this would be the only gunport of the upper battery to be fitted with a full lid like those of the gundeck ports. The planking of the hull has been perfectly executed: against the dark background of the ebony wales can be seen the heads of the nails, and such is François Ayroult's concern for accuracy that even these are strictly to scale.*

The run of the planking enables us to appreciate the lines of the underwater hull, which might almost be described as elegant. The foremast and the mainmast have been temporarily stepped, with the mizen still missing. The cable run out through one of the starboard hawse-holes is naturally to scale; anyone who is surprised to see such a detail at this relatively unfinished stage of construction has only to experience the difficulty of passing out a cable from the inside of a completed model!