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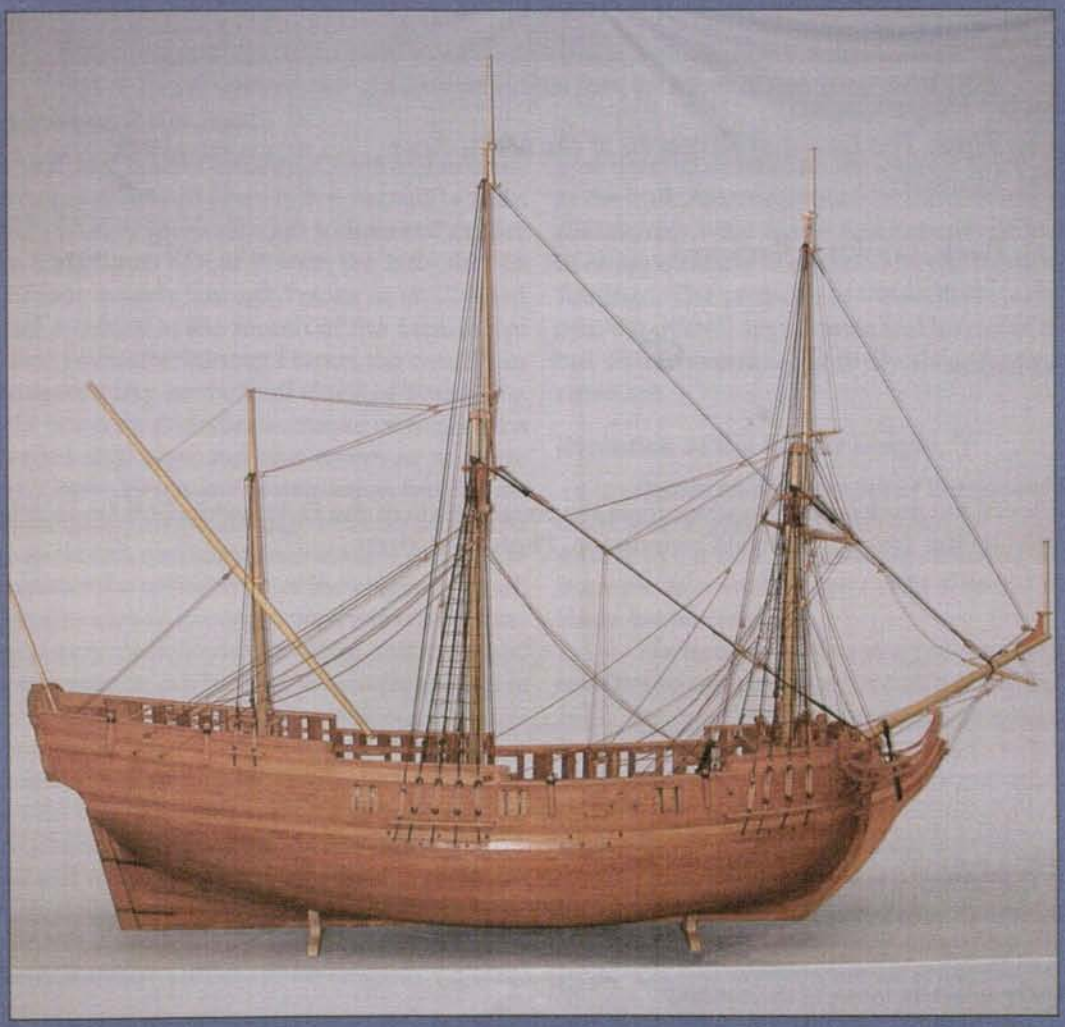

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**On the cover:** One of the models used to investigate the construction of the French ship *La Belle*, wrecked in 1686 and recently excavated by the Texas Historical Commission. Photo: G. Grieco.



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Editor: Christine A. Powell

# The Model Reconstruction of La Salle's Ship *La Belle*

**Glenn Grieco**

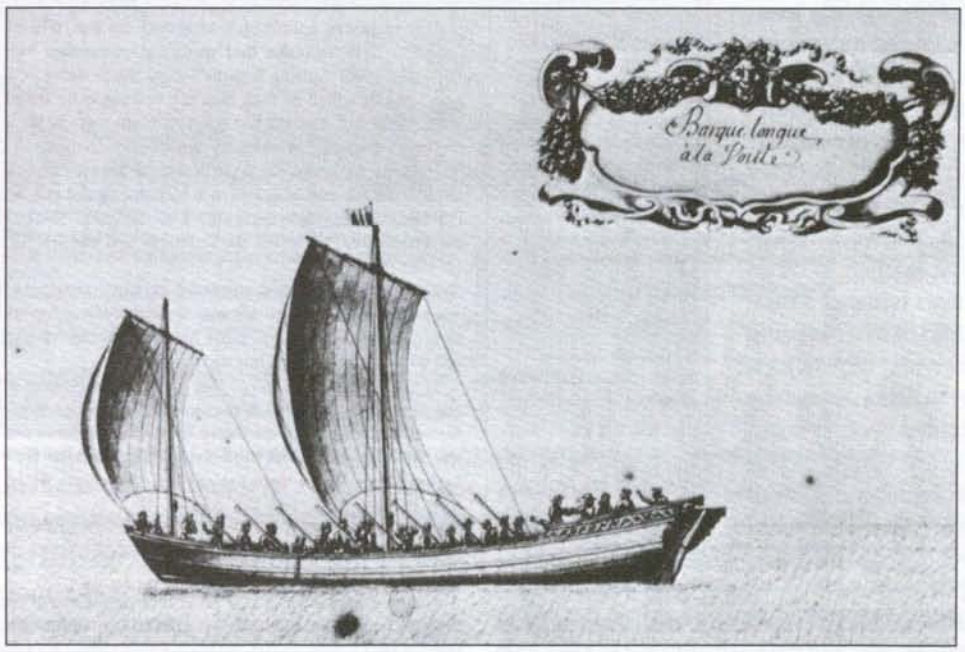



Fig. 1. *Early representation of a* barque longue *from the album of Jean Jouvé dated 1679.*

In April 1997, the Texas Historical Commission completed the excavation of a small French ship named *La Belle*. Built in 1684 and possibly given as a gift to Robert Cavalier de la Salle from King Louis XIV of France, the little ship *La Belle* was one of four vessels that left France in an ill-fated attempt to found a colony at the mouth of the Mississippi River. In 1686, two years after leaving France, the vessel ran aground in Matagorda Bay on the Gulf Coast of Texas. The wreck of *La Belle* not only provides a unique example of a poorly-documented ship type, but also serves as an early example of many new design and construction techniques in use in the French shipyards. Although only about a third of the hull has survived, sufficient information can be extracted to reconstruct the appearance of the original vessel. The archaeological evidence, in conjunction with naval documents, contemporary models and drawings, and firsthand accounts of its appearance, can be used to answer questions about its assembly and the shipbuilding practices of the seventeenth century. What type of ship was this? How was it designed and built, rigged and outfitted? For an oceangoing vessel, *La Belle* was very small, but the techniques used to build it were analogous to those used for larger ships, providing a concise and manageable example for the period.

This article documents the construction of two models of *La Belle*. The first model, constructed during the early phases of the reassembly of the archaeological remains, was used to determine the correct lines and arrangement of the hull. As conservation of the remains progressed, new discoveries were made that contribute to our knowledge of its appearance. The second model incorporates these new findings. The purpose of the models is not only to represent the overall appearance and layout of the original ship, but also to recreate the methods and sequence of its construction.

### Evolution of the *Barque Longue*

Before an accurate set of lines could be reconstructed, it was necessary to determine the type of vessel represented by *La Belle*. It is widely believed that *La Belle* is an example of a vessel type called a *barque longue*, but what was a *barque longue*?

The term *barque longue* applies to a range of small vessels first recognized as a distinct type by the French navy in 1675. The classification of *barque longue* was officially replaced by *corvette* in 1676. However, vessels in both these classes vary in size and complexity. Between the 1670s and the mid-eighteenth century, the *barque longue* grew and evolved into what was later considered a sloop of war or light frigate.

Perhaps the earliest representation of a *barque longue* is from the album of Jean Jouvé dated 1679. This small, undecked vessel carried only a simple two-masted rig and, at most, a few swivel guns as armament (fig. 1). This was

certainly not a vessel intended for a transatlantic crossing. Eventually, with the addition of a deck, these ships began to carry light four-pounder carriage guns.

The only official record of *La Belle* refers to it as a *barque* of forty to fifty tons. Joutel's journal provides the most complete description of *La Belle*. Referred to as a *bark* throughout the journal, Joutel introduces *La Belle* as "a little frigate, carrying six guns." Falconer's *Marine Dictionary* defines a bark as "a general name given to small ships: it is however peculiarly appropriated by seamen to those which carry three masts without a mizzen top-sail." It is difficult to determine whether the definitions and translations provided by Falconer's dictionary can be applied to a vessel built a century earlier. However, there is less ambiguity in Joutel's use of the word frigate. One of the defining features of frigates is the use of a three-masted ship rig. Joutel later mentions a collision between *l'Amiable* and *La Belle* in which "the vessel *La Belle* would have been in danger of perishing, but escap'd with the loss of its mizzen, which came by the board."

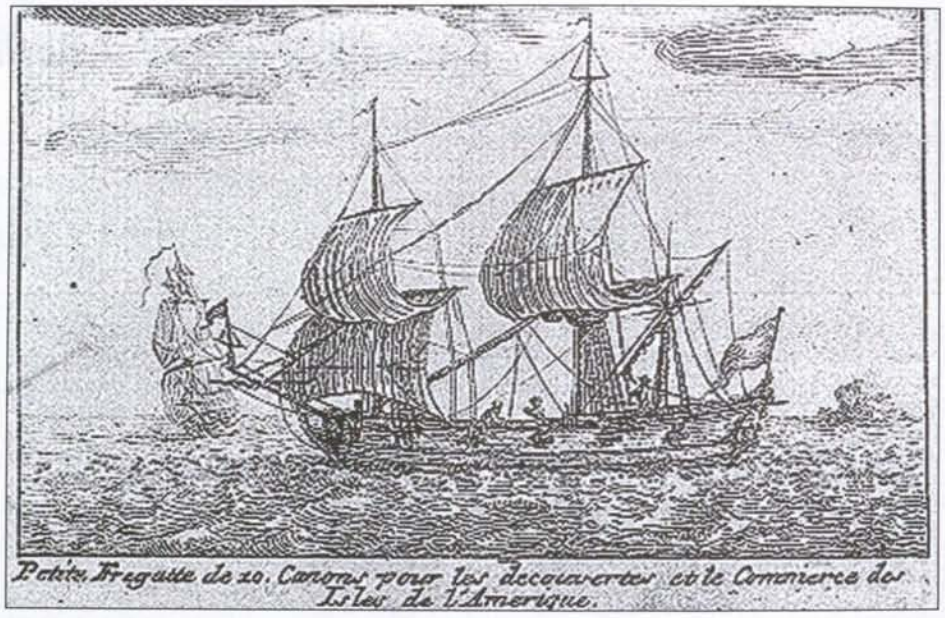


Fig. 2. *Drawing of a light frigate from the album of Guéroult du Pas.*

Another eyewitness account from the Spanish sailor Juan Enriquez Barroto provides further evidence that the vessel had three masts. Coming upon the remains of *La Belle* in 1687, one year after it ran aground, Barroto states: "On the beach was found the other gun carriage and the main yard, which was measured and found to be sixteen cubits. We brought this yard and that of the fore topsail for making oars, and from that of the foresail boom was made four oars. Captain Pedro de Yriarte took that of the mizzen also." The mizzen yard would have carried a lateen sail and would be easily distinguishable from the yards for the fore and main masts.

If these eyewitness accounts are accurate, it is difficult to refute the assertion that *La Belle* carried three masts. As a commander on board *Le Joly*, Henri Joutel had sufficient knowledge of French ships to give a reliable description of the rigging of *La Belle*. This is significant, for it provides the only evidence that the *barque longue* had evolved into a form that could be considered a light frigate.

What evidence do the archaeological remains hold to indicate how *La Belle* was rigged? Remains of mast steps for both the foremast and the main mast have survived. However, the absence of a mizzen mast step among the recovered material does not rule out the possibility of a mizzen mast.

Taking into consideration the steep rake of its sternpost, the proposed reconstructed length of *La Belle* places the main mast slightly forward of the longitudinal center point. No reliable contemporary representations of two-masted vessels place the main mast so far forward, suggesting that a third mast was needed to balance the rig. This would be particularly true if the main mast was square rigged, as indicated by Baroto's reference to the main yard. Thus the preponderance of evidence, both historical and architectural, points to *La Belle* being a three-masted vessel.

From Joutel's journal, it is known that *La Belle* was armed with six guns. It appears that six four-pound cannon composed the typical armament for a *barque longue* of this size.

When the remains of *La Belle* were first encountered by two pilots from Baroto's ship, they reported finding "a lost ship that has three fleurs-de-lis on its poop; six pieces of artillery, mounted, woolded, and hove down; two iron swivel guns without chambers, which they brought in our canoe." From this description, it appears that there were six carriage guns on deck secured with lashings. Baroto himself observed five swivel guns the next day "that fire a ball up to four pounds... still upon their carriages, lashed to the side of the ship." The discrepancy in the number of observed carriage guns may indicate a misuse of the term carriage in the second passage. One swivel gun recovered from the wreck had a bore diameter close to that of a four-pound ball. It is possible that the swivel guns would have been lashed to the sides of the vessel when not in use. While discussing the ordnance, he states that the hull has "eight portholes and as many other flues." If the word *flue* indicates the pipe or post attached to the side of the vessel to support a swivel gun, then seven of eight guns were accounted for at the time. The single swivel gun recovered by the Texas Historical Commission could be the eighth gun that fell from the side of the hull before the ship was found by Baroto.

What of the eight portholes mentioned by Baroto? It was common for vessels to have more gunports than the actual number of guns on board. Cannon could be moved from one side of

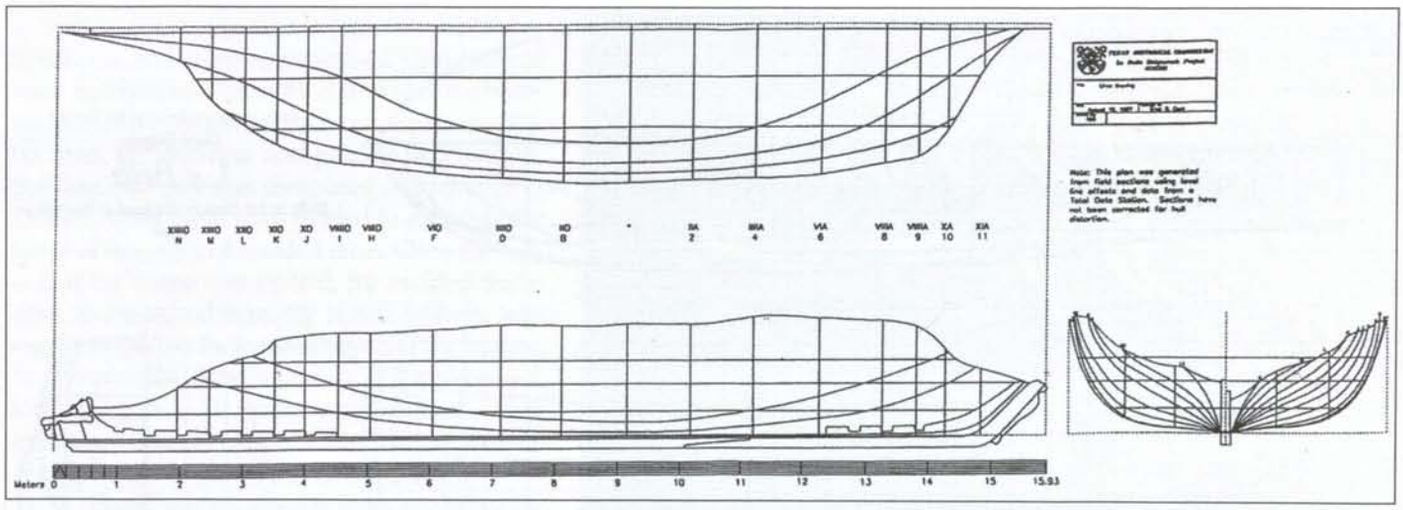


Fig. 3. *Reconstructed lines of* La Belle *from data gathered during the excavation and disassembly. Courtesy Texas Historical Commission.*

the vessel to the other to increase the firepower of a broadside or to transfer weight to adjust the vessel's trim while sailing.

All evidence indicates that *La Belle* was a frigate, just as Joutel described. Its appearance may have been similar to a light frigate illustrated by Guéroult du Pas in 1710 (fig. 2).

**Reconstructing a set of lines**

A large amount of data is available for a reconstruction of the lines of *La Belle*. The dockyard manuscript prepared in December 1686, two years after it was built, gives many of the overall dimensions needed for its reconstruction. A set of reconstructed lines based on the archaeological remains, drawn by Greg Cook for the Texas Historical Commission (fig. 3), provides a good first impression of the shape of its hull.

The first step in producing a set of lines for *La Belle* was to determine the shape of the midship section. Fortunately, a large portion of the starboard side of the hull at midships has survived. Adjusted so the centerline of the frame is vertical, the remains of the midship frame form the basis of the reconstruction. In Joutel's description, the draft of *La Belle* is given as seven feet (2.268 m). If this is accurate, the archaeological remains represent almost the entire midship section up to the waterline. Figure 24 shows a representative section near midships that combines the archaeological and archival data.

Once the shape of the midship section was determined, the next step was to define the longitudinal profile of the vessel (fig. 4). The length of the keel was known from both the archaeological remains and the dockyard

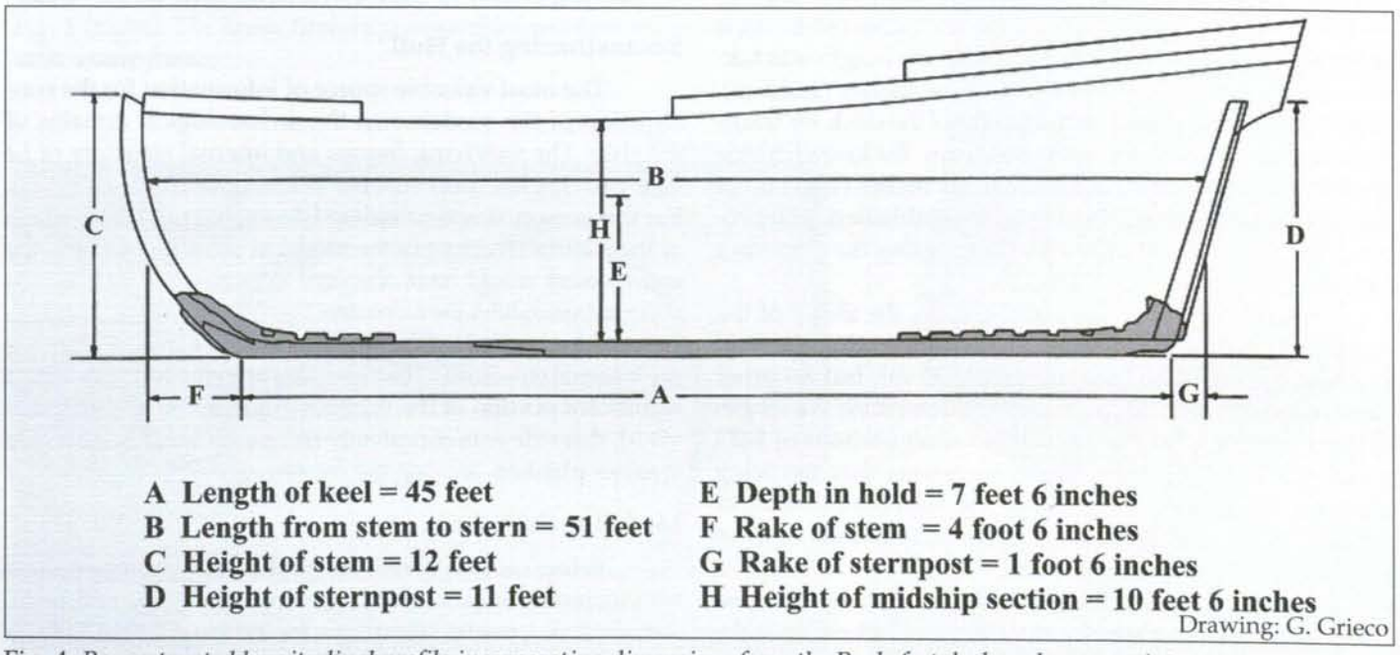



Fig. 4. *Reconstructed longitudinal profile incorporating dimensions from the Rochefort dockyard manuscript.*

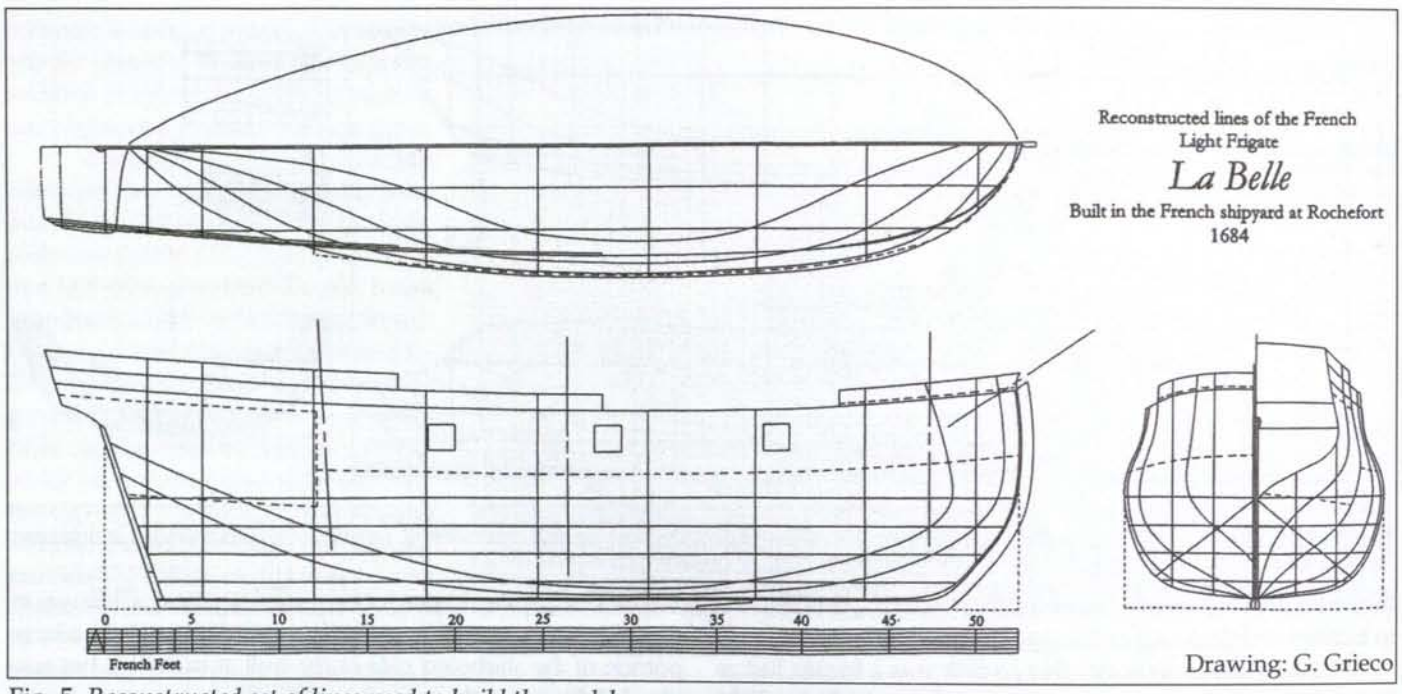



Fig. 5. *Reconstructed set of lines used to build the models.*

manuscript, and the rest of the hull was reconstructed from the remaining dimensions provided in the document. It appears that the overall length of the vessel was measured from the rabbet of the stem to the rabbet of the sternpost at about the height of the deck. The value for the rake of the stem describes the distance between the forward end of the keel and the forward end of the overall length. The rake of the sternpost is measured from the after end of the keel to the aft perpendicular of the vessel. Knowing that the after face of the sternpost is raked seventy-four degrees and that the rake measures one foot, six inches (48.8 cm), it was calculated that the height at which the length was taken was approximately eight feet, three inches (2.683 m). This corresponds closely to the height of the deck. By transferring this height to the stem and using the known value for the rake of the stem of four feet, six inches (1.463 m) at this point, the curve of the bow was established. The profile of the bow was completed by continuing the curve to a height of twelve feet (3.902 m).

To complete the lines of the stern, the shape of the transom was determined. The height of the wing transom is given as nine feet, four inches (3.035 m), but no other dimensions are provided. In order to determine the length of the wing transom, the French naval regulations of 1673 were examined. The document mandates that the wing transom should be two-thirds of the extreme breadth, or ten feet (3.252 m), if the extreme breadth is measured to the outside of the midship frame.

For the reconstruction, the shape of the vessel was assumed to be a sloop or light frigate. The main deck ran from the bow to just aft of the mizzen, where a break in the deck of two feet (sixty-five cm) forms the floor of a small stern cabin. A short quarterdeck in the stern and a forecastle deck in the bow were located three feet (1.138 m) above the main deck.

Based on these data, a set of lines were created (fig. 5). Sections provided in reconstructed lines drawn by Greg Cook were used to guide the process. Remains of internal bulkheads served as templates and provided a means of checking the curvature of these sections. A series of lines were drawn and manipulated until a fair hull was established, conforming closely to the reconstructed lines of the vessel.

### Reconstructing the Hull

The most valuable source of information for the construction of the models was the archaeological remains of the ship. The surviving frames and internal structure of *La Belle* provide the most reliable evidence of its construction. For this reason, it was considered desirable to display as much of the internal structure of the model as possible. Planking the entire vessel would have obscured important information. In order to best exhibit the reconstruction of the actual archaeological remains, one side of the vessel was left unplanked, allowing the internal structure to be viewed within the hull. Because a significant portion of the starboard side of the ship has survived, this side was completely reconstructed. The port side was not planked, leaving the frames exposed.

### Modeling the Frames

Before construction of the models could begin, accurate templates were required for each component of the keel, stem, sternpost, and frames. Templates for the longitudinal timbers were derived directly from the construction drawings. In order

to create molds for the thirty square frame timbers, additional drawings were required. Using a set of lines superimposed over the drawing of the framing plan, the curvature of each frame pair was lifted from the drawing and plotted as a section. Because each pair was composed of overlapping timbers, three faces were plotted to establish the bevel of the external molded faces. Once the outline of the frame was plotted, the molded thickness, as measured from the actual timbers, was used to establish the internal bevels of the frames. To complete the drawing, the locations of the butt joints between each timber were marked. Using these drawings, templates for the individual floors and futtocks of each frame were obtained.

Paper copies of each template were affixed to pieces of wood, which were then planed to the appropriate sided dimensions. Each timber was then sawn to shape and filed to obtain the correct bevel (fig. 6). Using the body plan of the hull as a mold loft, the frames were assembled from the individual floors and futtocks (fig. 7).

Photo: G. Grieco

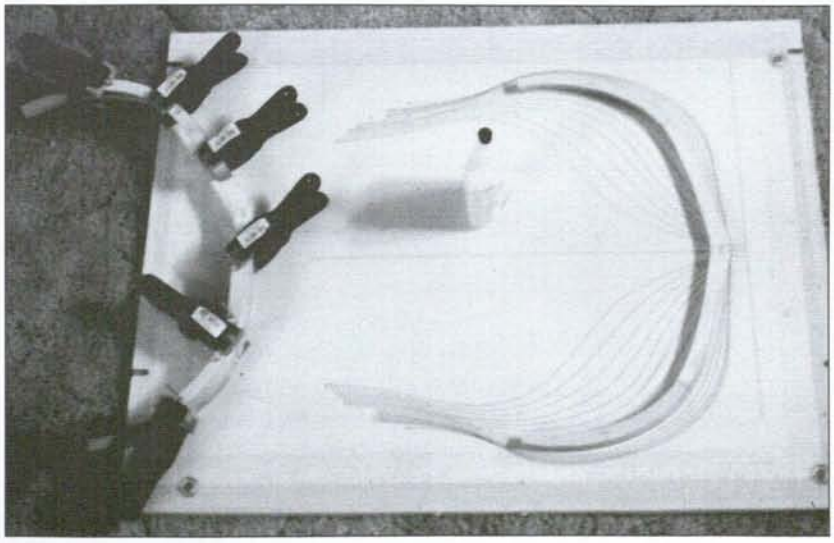
Fig. 6. *Rough cut model frame timbers before beveling and assembly into frames. Two completed frames can be seen in the background.*

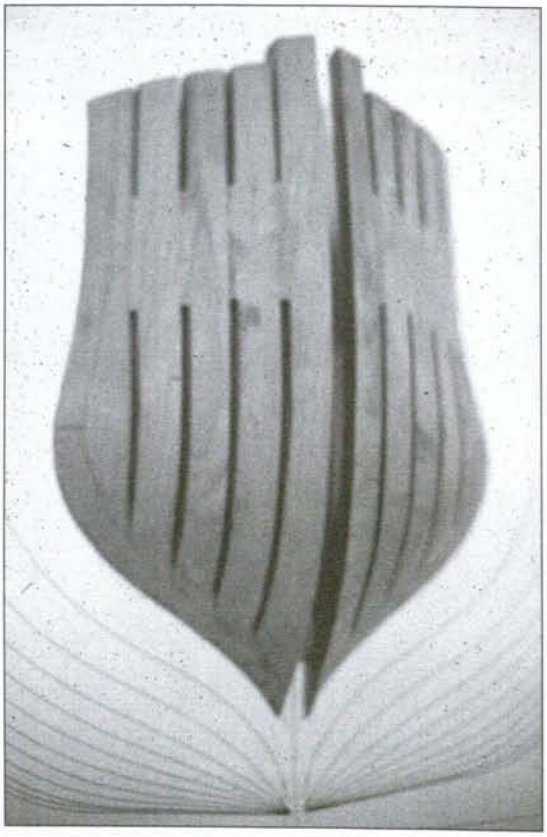
The construction of the keel, stem, and apron was relatively straightforward. Fastened together using the appropriate scarfs, the only deviation from the original construction was the use of bamboo dowels in place of iron fasteners. Although the types of fasteners used on *La Belle* were known, data regarding their precise locations was not available at the time that the models were built. To avoid confusion, only those iron fasteners whose locations had been accurately determined were represented in the model. The remaining fasteners were represented by bamboo "treenails" using the general overall pattern of the original fasteners.

Fig. 7(below). *Lofting the frames using the body plan of the hull as a guide.*

Fig. 8 (right). *The hawse timbers preassembled and fastened to the forward-most square frame.*

Photos: G. Grieco





A characteristic feature of French ship construction is the absence of cant frames. In keeping with this tradition, the frames of *La Belle* are all square frames. To fill in the curvature of the bow forward of the first square frame, an assembly of hawse timbers creates a nearly solid wall of timber up to the stem (fig. 8). Bolted together laterally, and fastened at their heels to the forward-most frame, these timbers were often reduced in their sided dimension over part of their length to permit air circulation between them.

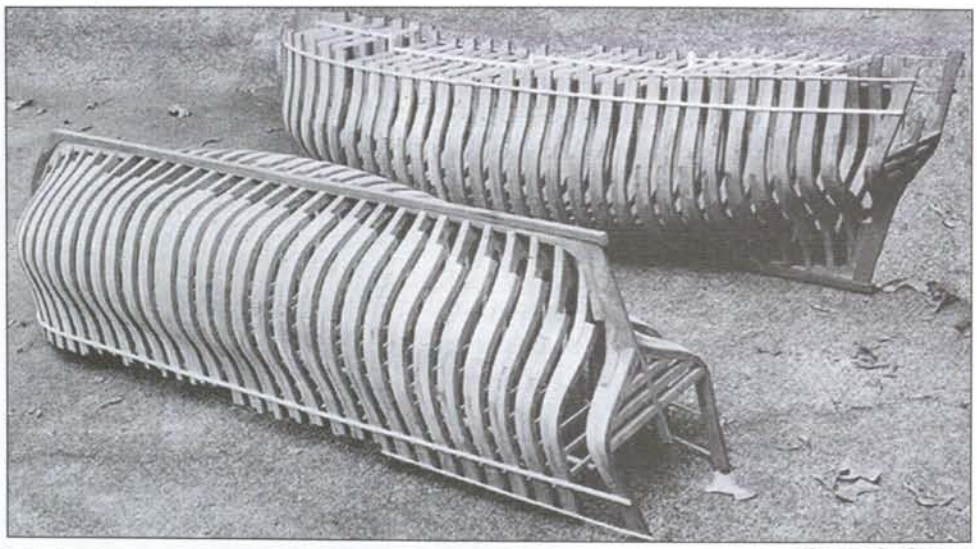


Fig. 9. *The two completed frame models.* Photo: G. Grieco

The sequence of raising the frames on the models may be a bit of a departure from the actual sequence. While constructing the models, the midship frame was raised first. Then, every third frame forward and aft was fastened into position on the keel. After every third frame was erected, the intermediate frames were inserted. Recent observations of the remains of *La Belle* suggest that the floors and futtocks of the intermediate frames were installed separately after the other frames were erected.

Figure 9 shows the two completed frame models. From this point, the construction of the two models varied in many ways. A complete description of the construction of each of the models would be repetitive. Instead, this study will focus on the construction of the second model, highlighting the lessons learned from the construction of the first when appropriate.

**Hull Planking**

The remains of at least fourteen strakes of planking were excavated on the starboard side of the shipwreck. The reconstructed midship section indicates the likely existence of one more plank below the wale. If this is the case, the seams of all the lower planks are represented at midships. The widths of the inner faces of the hull planking were recorded for nine frames at the time that the hull remains were disassembled. Using the planking width, the seams of each plank were transferred to the appropriate frame on the model. The locations of scarfs, stealers, and drop strakes were marked on the outside of the frames. Using a batten, it was simply a matter of connecting the dots to determine the run of the individual strakes. The scarfs and plank ends then fell easily into place within the strakes. In reconstructed areas not represented by archaeological remains, the batten was allowed to run fair to complete the strakes. By allowing the shape of the hull to determine the run of the planking, remarkably uniform hood ends were obtained in the bow and stern (fig. 10).

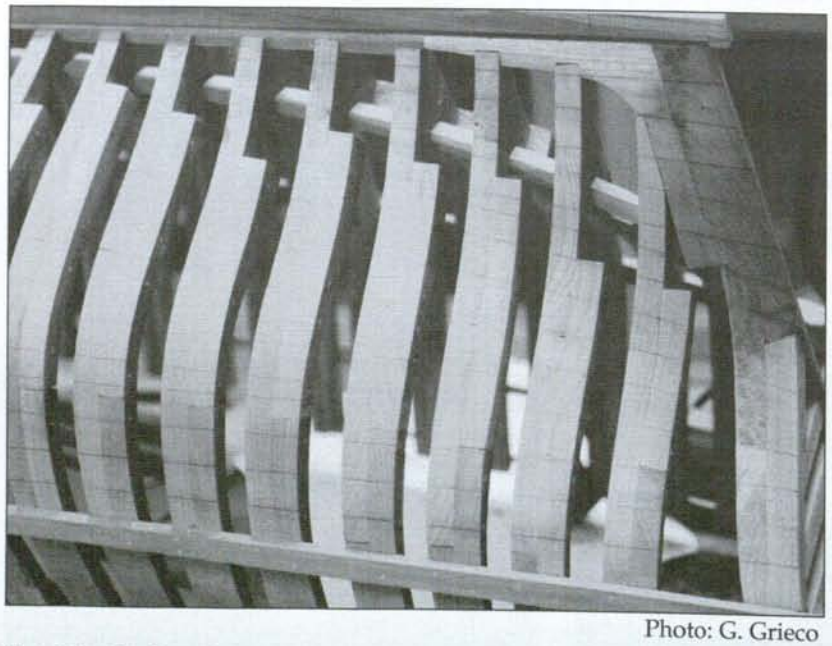


Photo: G. Grieco

Fig. 10. *Fair lines drawn through the points marked on the frames.*

Strips of poster board were used as spiling battens. With the batten clamped to the frames, the contour of the exposed edge of the previous plank was transferred to the batten using a compass. The batten was then used as a template for the next plank.

The fair run of the planking allowed the use of straight-sided planks. Where the edges of adjacent planks diverged, stealers were used. The capacity to use straight, almost parallel-sided planks minimized waste and increased the efficiency of the planking. The ease with which the hull was planked and the similarity between the

shapes of the spiles and the original planks indicate that the reconstructed shape of the model is close to that of the actual vessel.

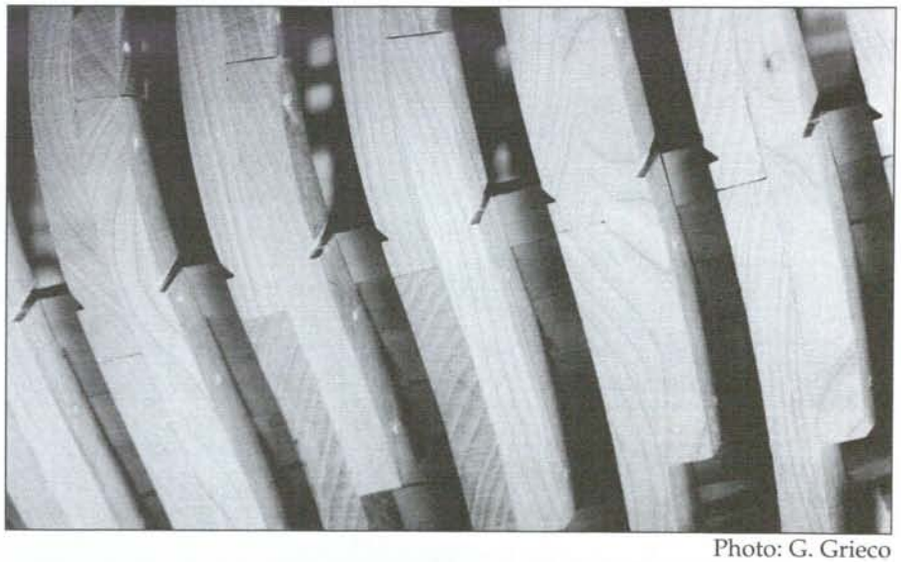


Photo: G. Grieco

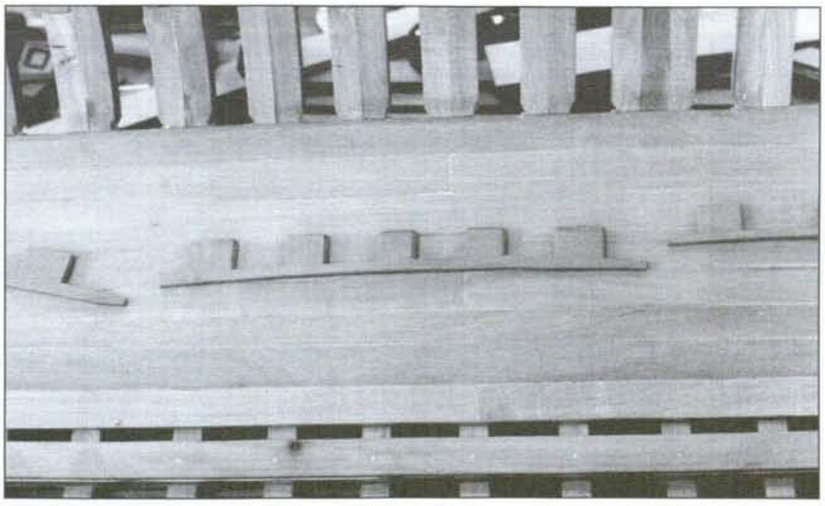
Fig. 11. *Notches cut in forward and after faces of the frames for the filler pieces.*

### Ceiling

Some difficulties were encountered during the first attempt at installing the ceiling on the model. Although it had been assumed that the process began at the keelson and proceeded outward, it quickly became evident that this was not the correct sequence. The inner strakes feathered out to sharp points at the bow and stern, where they encountered the four outer strakes, indicating that they were installed last. In the case of *La Belle*, an outer notched strake was inserted first, followed by two ceiling planks. A second stringer was then notched to fit like the outer timber. With these four strakes in place, the remaining planks were installed, working from the keelson outward.

The filler piece that sealed the edges of the ceiling was set into shallow beveled notches in the sides of the frames (fig. 11). Tool marks around the notches indicate they were sawn using the outer edge of the ceiling stringer as a guide. This could not have been accomplished if the external planking was in place at this height. The hull was planked either ceiling-first or simultaneously inside and out. Only iron spikes were used to fasten the ceiling planks until the outer planking was attached. Treenails were then used to fasten the outer hull planking from the outside through to the ceiling. As it was difficult to control the direction of the auger when boring holes for the treenails, the treenail pattern on the external planking is more uniform than that on the ceiling.

The tight fit between the filler pieces and the external planking suggests two possibilities. Either the filler pieces were installed prior to the planking and faired to the depth of the adjacent frames, or the outer plank was attached after the notches were cut, with considerable care taken to shape the filler pieces to the complex contour of the inner faces of the frames and planking. Judging from the tight fit between the filler piece and the external planking, the first method seems more likely. Figure 12 shows these filler pieces prior to installation, and figure 13



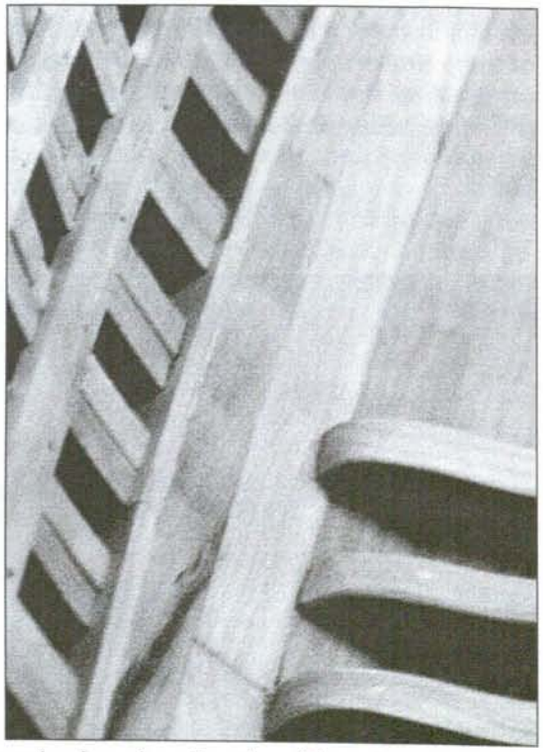
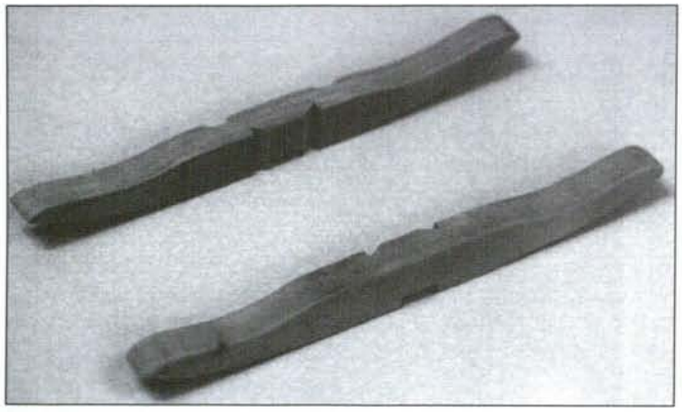


Fig. 12 (left). *Filler pieces cut to fit around the frames.* Fig. 13 (right). *Filler pieces in place along the edge of the outermost ceiling plank. The riders of the mast step can be seen in the lower right corner.*

Photos: G. Grieco



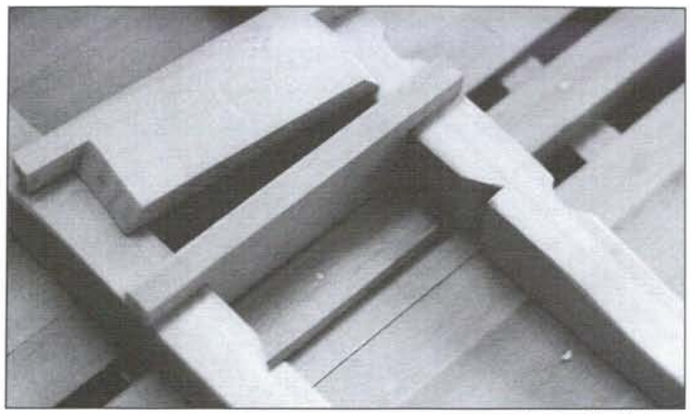


Photo: G. Grieco

Fig. 14 (left). *Forward and aft rider timbers of the main mast step. The notches in the faces of the riders will accept the ends of the mast step partners.*

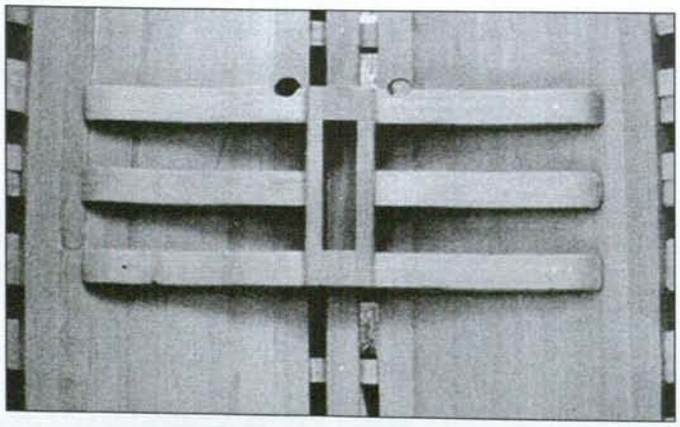
Fig. 15 (right). *Installation of the mast step partners.*

shows them in place, bordering the ceiling plank on the model. The riders of the mast step can be seen in the bottom right corner.

**Mast Steps**

Aside from slight erosion at the ends of the port arms of the floor riders, the main mast step has survived in its entirety. Figure 14 shows the two rider timbers prior to installation over the ceiling. The curvature of the lower face of these timbers was taken directly from the archaeological remains. Because they fit snugly against the ceiling in the model, these timbers helped to verify that the shape of the hull in this area was accurate. Figure 15 illustrates the way in which the beveled ends of the mast step partners locked tightly between the notches in the riders, preventing lateral movement of the heel of the mast. Figure 16 shows the complete mast step assembly with buttress timbers and filler pieces inserted between the ends of the partners.

Although only part of the foremast step has survived, the symmetry of the structure permitted a full reconstruction (fig. 17). A plank inserted between the notches in the opposing arms supported the aft face of the heel of the foremast.



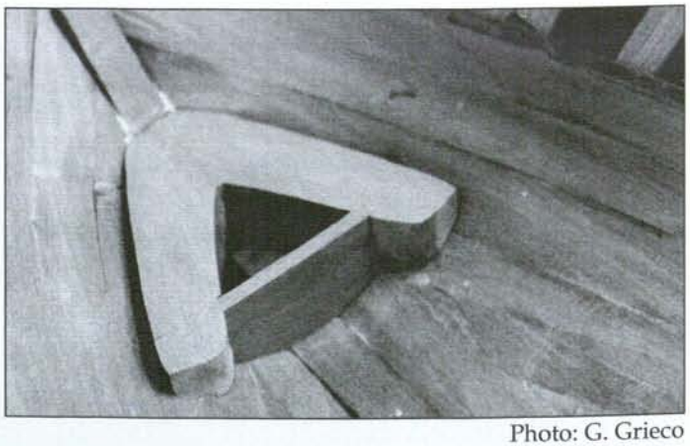


Photo: G. Grieco

Fig. 16 (left). *Completed main mast step assembly.*

Fig. 17 (right). *Heavy breast hook in the bow serving also as the step for the foremast.*

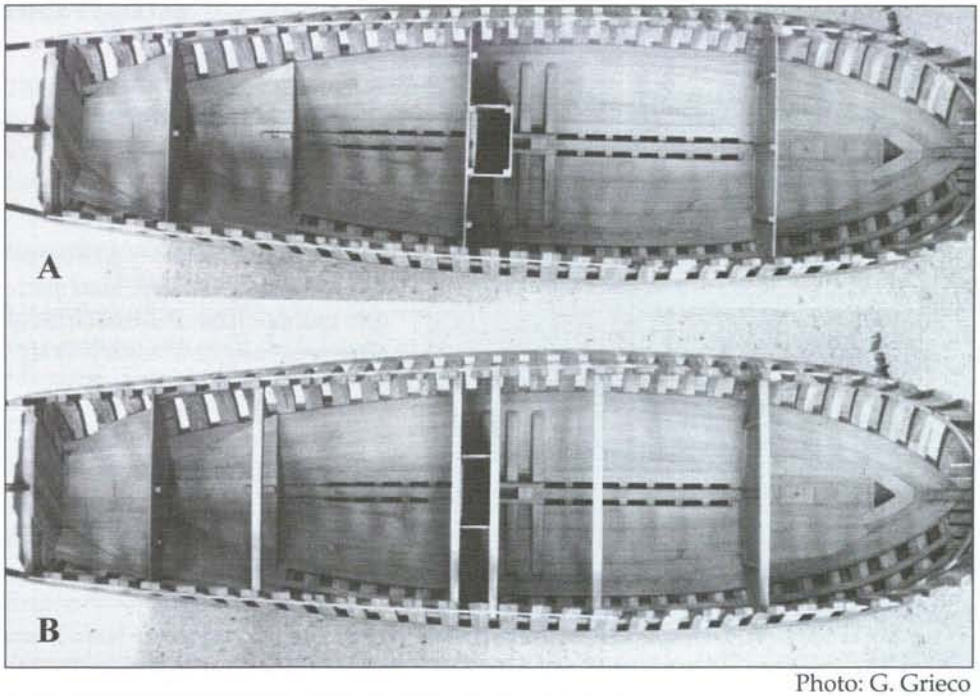



Photo: G. Grieco

Fig. 18. *A. Internal structures before the installation of deck beams. B. Installation of deck beams required by internal structure.*

**Deck Framing**

Nothing remains of the original deck structure of *La Belle*. Without the benefit of archaeological remains, the scantlings of the timbers are difficult to determine. Careful examination of models, drawings and treatises such as the *Album de Colbert* and the *Album del Marquez de la Victoria* helped to determine the relative sizes of the individual timbers forming the deck framing. Once the sizes of the deck beams were estimated the scantlings of the other components of the deck were calculated.

The first step in installing the deck was to determine the run of the deck clamps. Estimating the height of the clamps from the deck heights on several early eighteenth-century drafts, it appears that on a vessel with one continuous deck from bow to stern, the upper face of the clamp is typically flush with the upper edge of the lower wale at midships. This point was established for the wale during the reconstruction of the midship section. Running parallel with the top of the lower wale through the waist of the vessel, the clamp begins to diverge toward the stern as it rises on the inside faces of the futtocks to butt against the forward face of the wing transom. However, if *La Belle* was a sloop of war or light frigate, its main deck would not have run all the way to the stern. Olivier made the following observations concerning sloops of war of twelve guns: "Such vessels should have but a single deck, with the guns only as far as the mizzen mast, where the upperworks should be raised two feet, with a quarterdeck three feet above the upper deck. In the event that we should build sloops of war of ten, eight, six or four guns, they should be fitted out like those of twelve guns." A break in the deck just aft of the mizzen mast, with a deck two feet (sixty-five cm) below it and a quarterdeck three feet (1.138 m) above, suggests the presence of a stern cabin. For this reason, the main deck clamp would have supported deck beams back to frame XIID. From XIID aft, the deck beams of this small stern cabin would have been supported by the ceiling plank two feet (sixty-five cm) below the clamps.

Having less sheer than the wales, the clamp typically dips below the level of the lower wale in the bow. This configuration varies from ship to ship. Ships often had a small bulkhead just aft of the hawse holes to catch water draining from the anchor hawser. Forward of this bulkhead was a scupper with its outboard end centered between the two wales. If the clamp dipped too low, this area would not drain properly. To avoid this problem, the deck clamp was positioned at a height that allowed a drainage angle of about thirty degrees from the top of the deck

Next, the locations of the deck beams were determined. Figure 18A indicates the deck beams whose presence is indicated by the surviving internal structures. The lower image, 18B, shows the beams that supported the stanchions of the three bulkheads and the pump well, as well as the beam that supported the upper end on the notched stanchion amidships. The upper image in figure 19A illustrates the addition of beams to support the fore, main, and mizzen masts. Forward of the first bulkhead and the notched post, beams were added to frame the forward and main hatches. The hatch aft of the pump closet required another beam. The lower image shows the addition of a beam aft of the foremast to support the bitts of the wind-

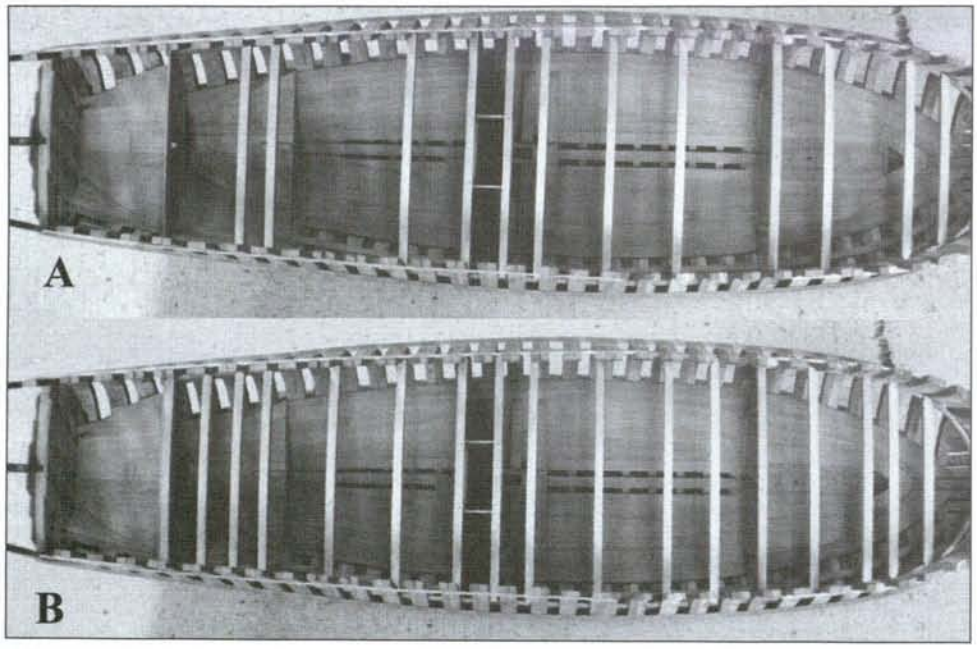
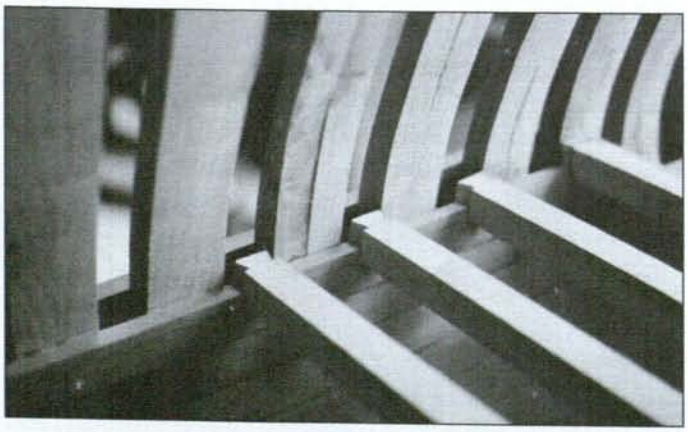


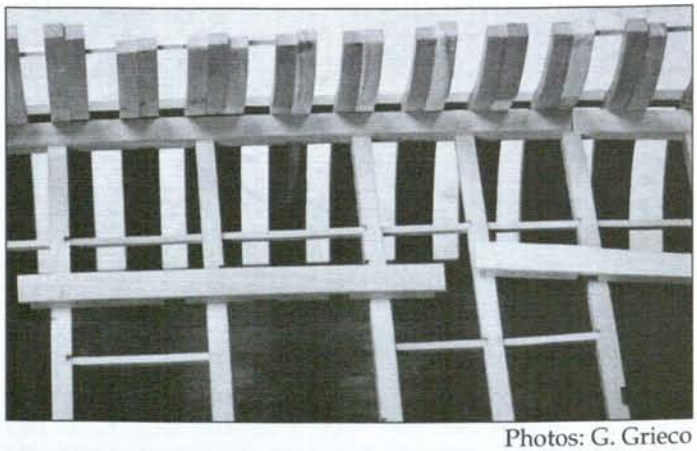

Fig. 19. *A. Installation of deck beams necessitated by hatches, mast partners and windlass. B. Installation of three remaining deck beams to bridge the remaining spans of deck.*

lass. Three additional beams were positioned to break up spans of more than three feet (97.6 cm). In order to tie the clamps together at the bow and to add lateral strength, a breasthook was notched down into the clamps and bolted through the futtocks. With molded dimensions equivalent to those of the deck beams, the breasthook also served as a fastening surface for the forward ends of the waterways and planking.

Construction of the deck framing began by dovetailing the deck beams two inches (5.4 cm) into the clamps (fig. 20). The dovetail joints increased the lateral strength of the hull and tied the sides of the vessel together. With all the beams placed in their proper positions, the locations of the hatch carlings and mast partners were marked. These timbers had the same dimensions as the deck beams and were set into beveled notches in the fore and aft faces of the beams. Next, the locations of the carlings, windlass bitts, main bitts, and bowsprit step were determined.

Next, the beams were reinserted into the clamps. Filler pieces measuring two inches by four inches (5.4 cm by 10.8 cm) were inserted between the dovetails in the beams to fill the space between the top of the clamps and the bottom of the waterways. The two waterway timbers were then placed over the ends of the beams (fig. 21). The waterway timbers measured eight inches by four inches (21.7 cm by 10.8 cm) and were notched over the deck beams to a depth of two inches (5.4 cm). With the waterways in place, the carlings and ledges were inserted.





Photos: G. Grieco

Fig. 20 (left). *Dovetailing of beams into the beam clamps.*

Fig. 21 (right). *Short sections of the inner waterway timber notched to fit over the deck beams.*

### Deck Planking

On both models, only the starboard side of the deck was planked. This not only permits the inspection of the internal construction features, but also allows the details of the deck framing to be seen. Due to the absence of archaeological evidence, the deck planking pattern on *La Belle* will never be determined for certain. The deck planking of the model approximates the appearance and planking patterns of models from the seventeenth and early eighteenth centuries.

Thin strips were cut from black plastic binder cover sheets to insert between the planks to represent the tarred seams. Each plank was fastened to each deck beam using two one inch (2.7 cm)diameter treenails. Figure 22 shows the completed deck planking.

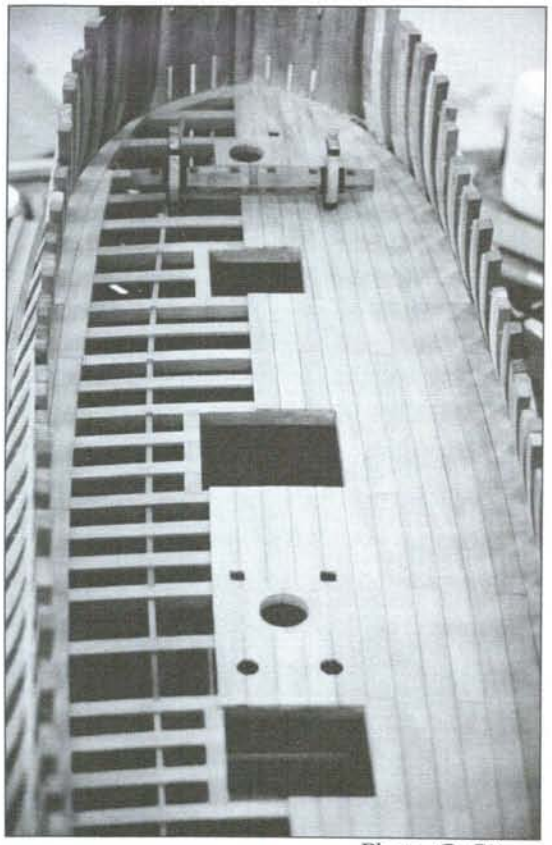


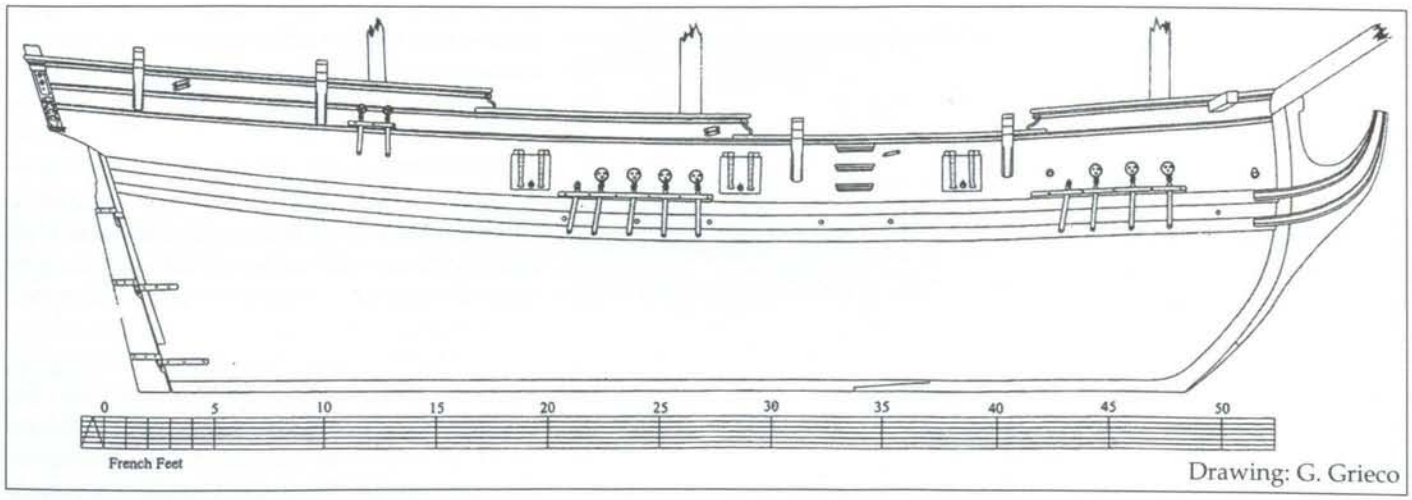
Photo: G. Grieco

Fig. 22. *Deck planking on the starboard side of the model.*

### Gunports

Before the gunports were cut and framed, their locations were determined. Many factors were considered in determining the placement of cannon on a narrow-decked vessel like *La Belle*. Structures such as hatch coamings, masts, pumps, and bitts, can prevent them from being withdrawn from their ports. Outside of the hull, the location of the fore and main mast channels can dictate the placement of gunports. The breadth of the vessel is also a limiting factor. The barrel of a four-pounder cannon is six feet (1.951 m) long. With a deck less than fourteen feet (4.553 m) wide and a foot of tumblehome in the waist, two cannon barely fit abreast with the port lids closed. Forward and aft of midships, the narrowing of the deck would prevent this arrangement entirely unless the guns were drawn in at an angle. Consideration must also given to the gun crews who fired the guns. Seventeenth-century French naval regulations required a minimum spacing of six feet, six inches (2.114 m) between the guns on larger warships to provide room for the crews to service them.

The reconstructed breadth of the gunports was calculated to be eighteen inches (48.8 cm) square. This calculation was later confirmed by a single gunport lid found during the excavation of *La Belle*. The frames were erected on eighteen-inch (48.8 cm) centers, conveniently allowing the top timbers of two adjacent frames to be used to frame the sides of the ports.




Drawing: G. Grieco

Fig. 23. *Longitudinal profile of second* La Belle *model showing placement of three gunports on each side.*

Two possible configurations were formulated. The first configuration relied on Enriquez Barroto's description of the hull and assumed the use of eight gunports. Employed on the first model, this arrangement allowed the forward two pairs of guns to be secured inboard with the gunports closed, but the space available on deck between the aftermost pairs of ports was not sufficient for two guns to be positioned abreast. This suggests an eight port configuration using only six guns. With four guns in the forward four ports, the two aftermost guns could be used one per pair of ports and moved from side to side as necessary. The second configuration assumed that only six ports were present (fig. 23). In this arrangement, space would have been tight between the aftermost pair of guns. However, with a slight angling of the carriages, both guns could have been run in when the ports were closed.

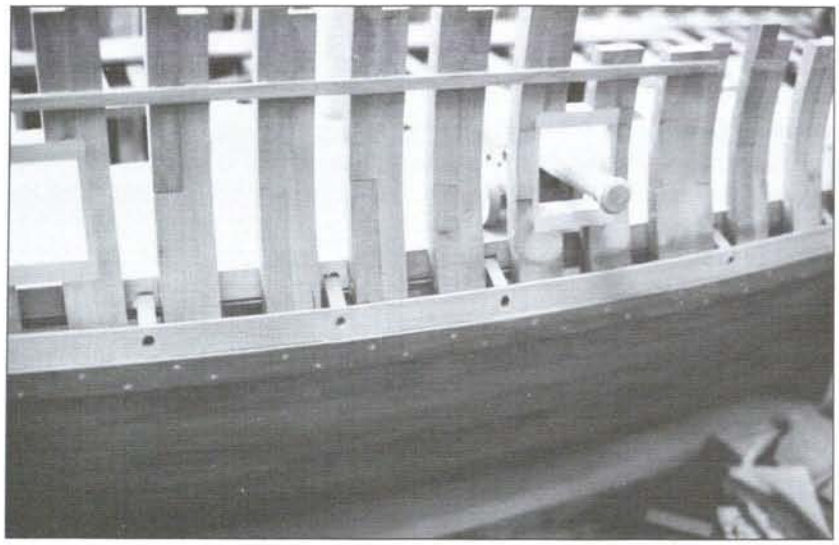


Photo: G. Grieco

Fig. 24. *Scuppers composed of bored wood blocks installed on the starboard side of the model.*

Once the locations of the ports were estimated, the top timbers at the port openings were cut to a height of eleven inches (29.8 cm) above the deck. A three inch (8.1 cm) thick lintel raised the sill to the required height of one foot, two inch (37.9 cm). A second timber of the same dimensions formed the upper edge of the gunport.

**Bulwarks**

Before the bulwarks were planked, several fittings were installed in the framing above the wales. Scuppers were needed on *La Belle* to allow water to drain from the deck. Typically, ships were equipped with several scuppers in the waist of the vessel and in the manger at the bow. By the early eighteenth century, lead scupper pipes were already in use aboard ships in the French and English navies. In the case of *La Belle*, however, no lead artifacts that resembled scuppers were found among the archaeological remains. It is possible that the lead linings were scavenged from the hull after its grounding, although it is equally possible that its scuppers were not lead lined. Bored elm blocks with leather linings were commonly used as scuppers during the fifteenth and sixteenth centuries. The practice was still in use aboard English vessels during the late seventeenth and early eighteenth centuries and may have been used on vessels of other nationalities as well. Considering the absence of evidence for metal linings, wooden scuppers appear to be the best solution. Contemporary drawing of small vessels depict five to seven scuppers in the waist and one at the bow for the manger. Because cutting a hole for the scuppers in one of the wales would have compromised the strength of the timber, contemporary drawings show the outlet of the scuppers in the strake between the two wales. Placing the deck clamp at the height of the lower wale, the angle from the top of the deck to the outlet of the scupper is close to forty-five degrees (fig. 24). For the reconstruction of *La Belle*, five two-inch (5.4 cm) scuppers were provided in the waist and one in the bow.

Photo: G. Grieco

Fig. 25. *Close-up photo of fairlead block for the main sheets and braces. Standing ends of the sheet and brace are spliced to the ring bolts below.*

While sailing, several lines of rigging must run through the sides of the hull. To assure the proper lead of the sheets and braces, three sets of fairlead blocks were set into the hull (fig. 25). Positioned between the second and third frames forward of midships, a

single sheave block on each side of the hull trimmed the fore sheets. Between the second and third frames aft of midships, a double sheave block is provided for the fore yard braces. Finally, a double sheave block for the main sheet and braces is set between the sixteenth and seventeenth frames aft.

After these elements were installed, the planking of the bulwarks was completed. The reconstructed midship section was used to define the dimensions of the planking. Externally, the planking was composed of parallel-sided planks that continued the curve of the wales up the side of the vessel. Contemporary drawings of small vessels and frigates indicate that the space between the upper wale and the molding below the waist rail typically consists of three strakes, with a single strake between the waist rail and the sheer rail, and another between the sheer rail and the drift rail. By dividing the space between the wale and the molding, it was determined that three nine-inch (24.4 cm) wide planks were required. Continuing up the sides of the stern, two additional nine-inch (24.4 cm) planks alternating with two three-inch (8.1 cm) moldings provided the height necessary for the quarterdeck. One additional plank in the bow provided the height needed for the forecastle deck. The reconstructed thickness of the planking in the upperworks was one inch (4.1 cm).

**Armament**

As mentioned earlier, the armament carried on *La Belle* included two types of ordnance: six iron carriage guns firing four-pound balls, and breech-loading iron swivel guns. Several artifacts relating to these guns have survived. Although no four-pounder long guns were recovered from the wreck, two four-pounders were among the guns excavated from the remains of Fort St. Louis on the Gulf Coast of Texas. Using scale drawings, models of the barrels were turned in brass at the scale of one to twelve, and then blackened to imitate the appearance of the original iron guns. Measurements from a single gun carriage recovered from the wreck were used to reconstruct the carriages for the model (fig. 26). Interesting features of the recovered carriage include the deep mounting holes for the trunnions and the flat capsquare locking the trunnion in place. It is more typical to have the trunnion resting in a semicircular notch half the depth of the trunnion, with the upper surface held in place by a capsquare forged with a corresponding semicircular contour. The reason for the position of the trunnions on the sides of the gun carriage on *La Belle* is unknown.

A related artifact recovered from the hull consists of concretions containing a ring bolt and an associated hook bolt (fig. 27). Clearly intended for securing the gun tackle to the bulwarks, the conserved artifacts furnish several important pieces of data. Preserved by the corrosion products of the iron, a large section of the wood through which

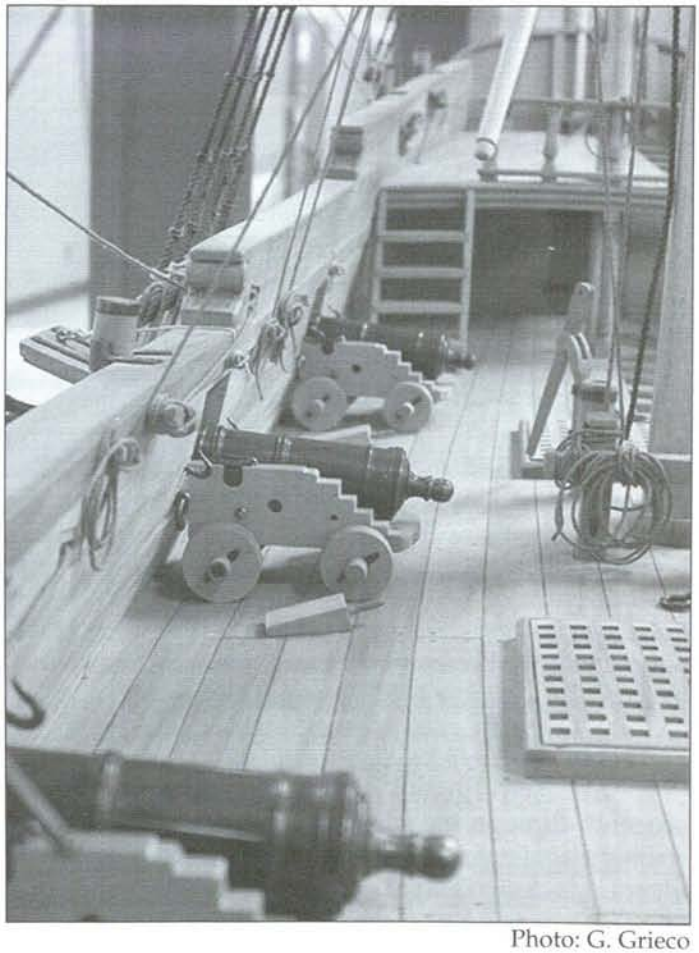
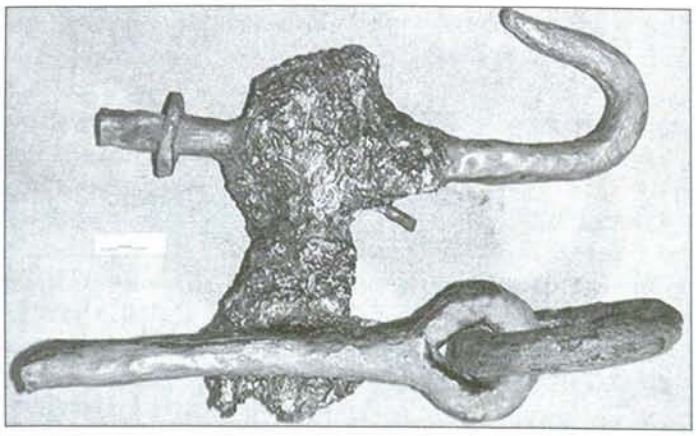


Photo: G. Grieco

Fig. 26. *View down the deck of* La Belle *showing the guns mounted in their carriages.*

Fig. 27. *Conserved hook and ring bolt still joined by a fragment of a frame timber. Courtesy of the Conservation Research Laboratory.*



the bolts were fastened has survived. Although the original thickness of the wood has diminished, a rove for the forelock of the hook-bolt has corroded into the position where it rested against the outer surface of the hull planking. Neither the rove nor forelock has survived on the ring bolt; however, the remains of the shank indicate that the bolt ran through timber approximately two inches (5.4 cm) thicker than the hook. This suggests that the hook pierced the outer hull planking while the ring bolt penetrated a wale. Superimposing a scale image of these artifacts over the bulwarks of the reconstructed midship section, the angle of the bolts and their lengths provides supporting evidence for the reconstruction (fig. 28).

Also found on the wreck was a loaded swivel gun attached to its post and mounting hardware (fig. 29). The conserved gun was 54.55 inches (1.478 m) long from the muzzle to the tip of the tiller (fig. 30). The muzzle had a bore of 3.42 inches (9.3 cm), close to the bore diameter of the four-pounder carriage guns. Although Baroto mentions that the swivel guns appeared to be capable of firing a four-pound ball, the breach of the barrel contained a two-inch ball and the chamber held a powder charge with a wooden plug. Primarily used as an anti-personnel weapon, the gun could also have fired a handful of small shot.

Iron swivel guns were used aboard vessels from the sixteenth through the eighteenth centuries. Examples of wrought iron, stave and hoop constructed weapons almost identical in design and dimensions to the one found on *La Belle* have been found on shipwrecks from as early as the sixteenth century. The post and mounting hardware still attached to the gun were more unusual finds. The swivel was set into a hole in the top of the five-inch (14.9 cm) diameter post. A two-inch (6.1 cm) wide iron band encircles the top of the post, and four inches (10.8 cm) down from the band a two-flanged iron strap that went around the

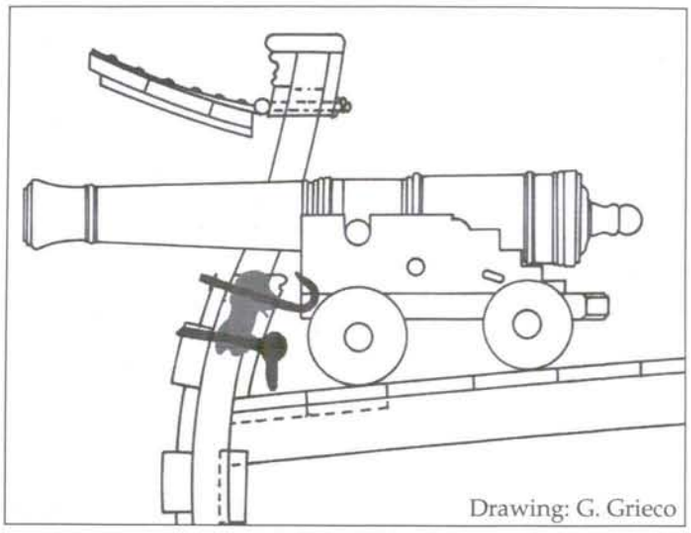



Fig. 28. *Drawing of the bulwarks of* La Belle *showing how the hook and ring bolt may have been oriented.*

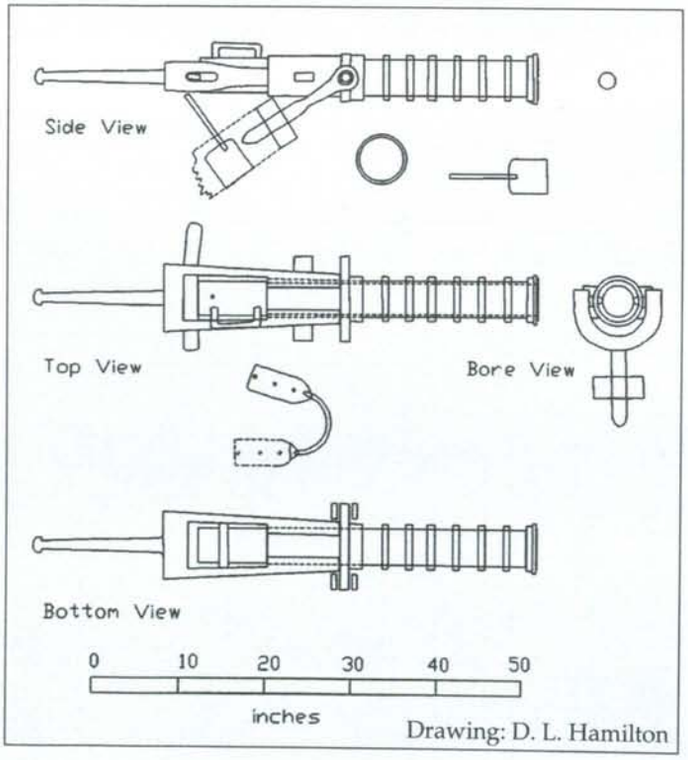
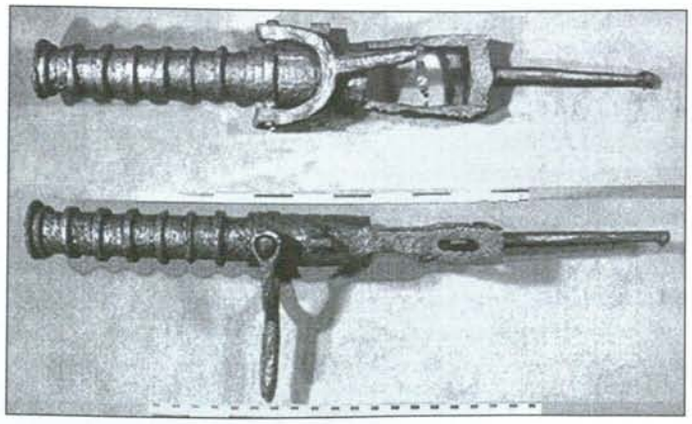
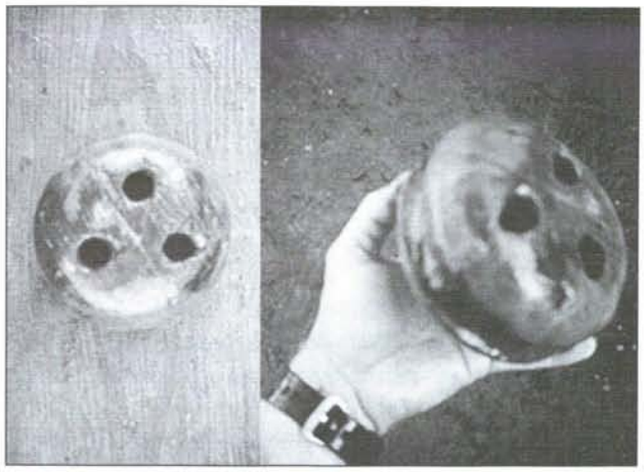



Fig. 29 (left). *The swivel gun recovered from the wreck of* La Belle.

Fig. 30 (below). *Photograph of the swivel gun after conservation. The breech chamber and wedge are not shown in this photo. Courtesy of the Conservation Research Laboratory.*





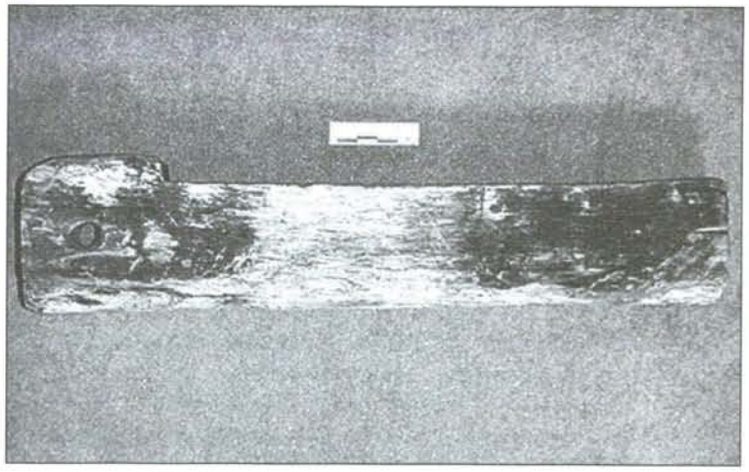


Fig. 31 (left). *One of the larger deadeyes from the wreck. Courtesy of the Texas Historical Commission.*

Fig. 32 (right). *Topmast fid after conservation. Patterns of wear and discoloration provided clues to the dimensions of the topmast and trestletrees. Courtesy of the Conservation Research Laboratory.*

front of the post and twisted ninety degrees to fix the post to the top of the caprail. Each flange had three holes down the center for the nails that attached it to the top of the caprail. Examination of many contemporary drawings and treatises did not reveal any images of a swivel post with this configuration.

**Rigging**

At the time the models were constructed, few artifacts from the rigging of *La Belle* had been identified and conserved. Therefore, the reconstruction has focused on the hull of the vessel as it would have looked as a bark or light frigate. The rig employed on the model is a generic rig representative of ships of this class during the late seventeenth century. Although the heel of the main mast was recovered, not enough of it has survived to determine its maximum diameter at the deck. Mast dimensions were estimated from the sizes of various deadeyes (fig. 31) recovered from the site. A single topmast fid (fig. 32) provided additional clues for the dimensions of one of the topmasts. Preliminary dimensions for the spars and rigging were taken from contemporary formulas and adapted according to the mechanical advantage necessary for the proper function of the component. Where the dimensions of rigging elements such as deadeyes and certain types of blocks were known, scale copies were constructed and implemented in the rig.

**Conclusions**

The primary question of this study was "What is a *barque longue* and what can *La Belle* tell us about this type of vessel?" Existing descriptions of the *barque longue* were heavily influenced by its long history as a small, undecked vessel. Every contemporary source describing a *barque longue* depicts a ship with only two masts. The problem lies in the fact that *La Belle* is too developed to fit the accepted definition of a *barque longue* but too small to fit the definition of a frigate. With this in mind the problem becomes, "which type of vessel is more similar structurally?"

If *La Belle* was a *barque longue*, its remains indicate that the development of the vessel type has been underestimated. Eyewitness accounts of the vessel, as well as the archaeological remains, provide a great deal of evidence that this ship fit the description of a sloop or frigate in every aspect except size.

Construction of the models was remarkably straightforward, a good indication that many of the assumptions made during the reconstruction of the upperworks and rig were plausible. Enough evidence exists to establish a high degree of confidence that the final configuration of the hull is realistic. Although the rig is based on only a few surviving artifacts, the results are appropriate in both size and arrangement. This reconstruction supports the argument that the *barque longue* evolved into a much more substantial vessel than previously assumed and that there was little to distinguish this type from the sloops and light frigates of the French Navy.

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# The First Season of the Dominican Republic Survey Project: A Preliminary Survey of the Southern Coast

**Katie M. Custer and Sara G. Hoskins**

The island of Hispaniola (fig. 1), currently comprising the two nations of Haiti and the Dominican Republic, has played a significant role in the history of European seafaring in the Caribbean. Columbus landed on the northern shores of the island during his first voyage to the New World and named it Hispaniola after Spain. He reported back to Spain that it was the "fairest land under the sun" and built a settlement there out of the shipwrecked remains of the *Santa Maria*. Santo Domingo (fig. 2), founded four years later by Columbus' brother Bartolomew, quickly surpassed the earlier settlement to become the island's principal port. The island was the main center for Spain's exploits in the first part of the sixteenth century, with Santo Domingo serving as the administrative center for the New World. It was here that ships arrived carrying goods from Europe to sustain newly founded colonies, and from here the treasures of the New World were brought back to the European mainland. Spain's interests quickly moved away from Hispaniola as gold and silver were found in abundance on the mainland of Central and South America. Santo Domingo became a target for rival powers and pirates throughout the remainder of the sixteenth and into the seventeenth century. A struggle for control of the island between Spain, France, and England ensued while Dutch pirates also tried to claim a foothold.

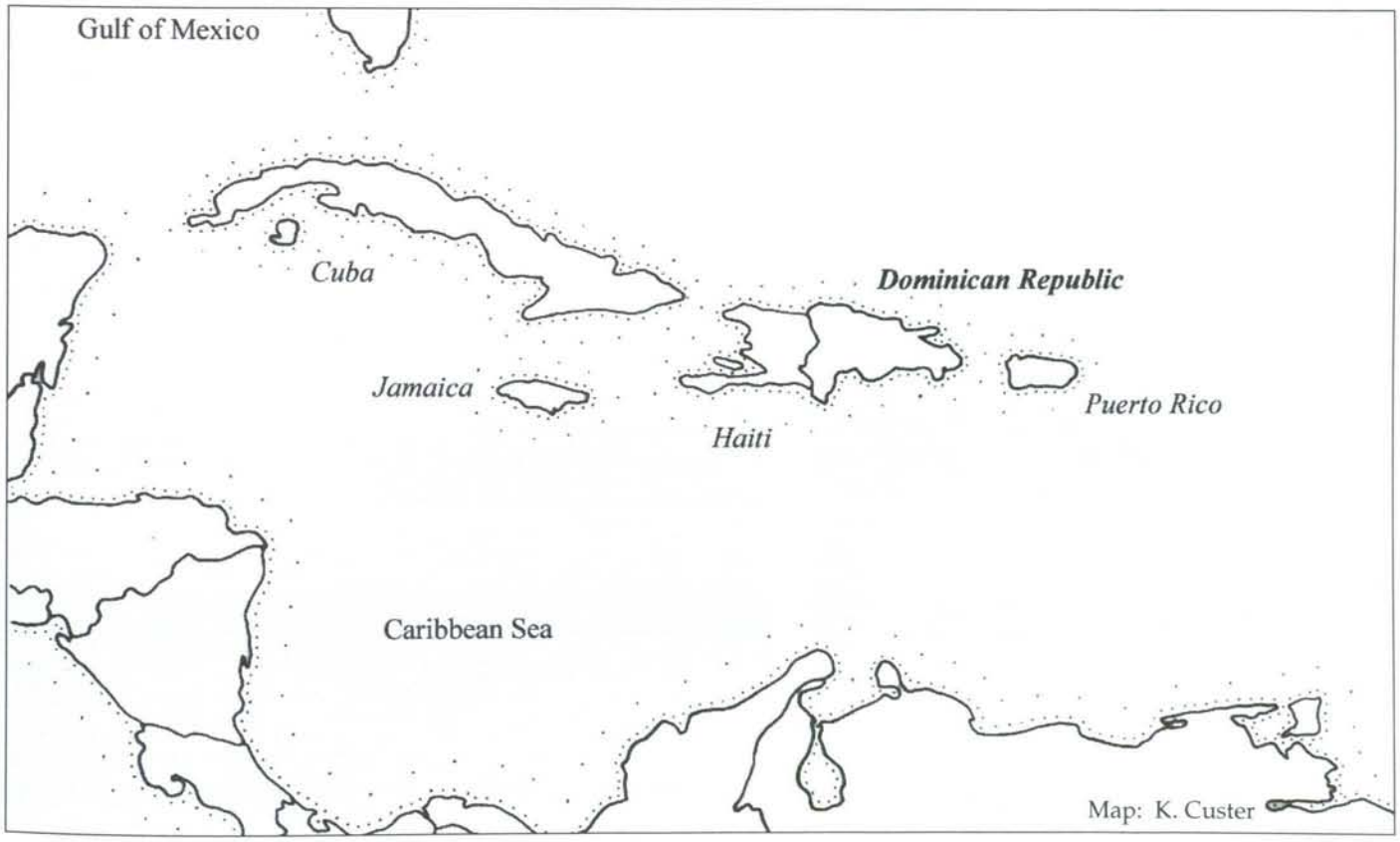



Fig. 1. *The Dominican Republic, on the island of Hispaniola, occupies a key position in the Caribbean region.*

The frequency of shipping traffic in the first decades of colonization, the later military conflicts, and seasonal hurricanes that tore across the island, demolishing both city and ship, combined to create a veritable nest of shipwrecks awaiting discovery. The northern shore of the Dominican Republic has claimed its share of fame for hiding the lost ships of Columbus. Archaeological and salvage teams have spent years trying to unravel the mysteries of these legendary ships on the northern coast while the southern coast has been practically ignored. Cities on the southern coast were completely destroyed several times by hurricanes, leaving a long list of known shipwrecks there. Several fleets of caravels and *naus* were lost in these waters in the sixteenth century along with many other ships of different sizes and nationalities.

Caravels and *naus* were the primary ships of discovery for the Iberian Peninsula. They took Columbus to the New World and da Gama to India, forever changing world history. However, little is known about these ships outside of literary references to their attributed sailing qualities and widespread use. Work is currently underway by one of the authors to collect iconographic evidence of these vessels. The only remaining task is to find the physical remains of the ships. The hull of a caravel or *nau* could provide invaluable information on Iberian ship construction that has to date been elusive.

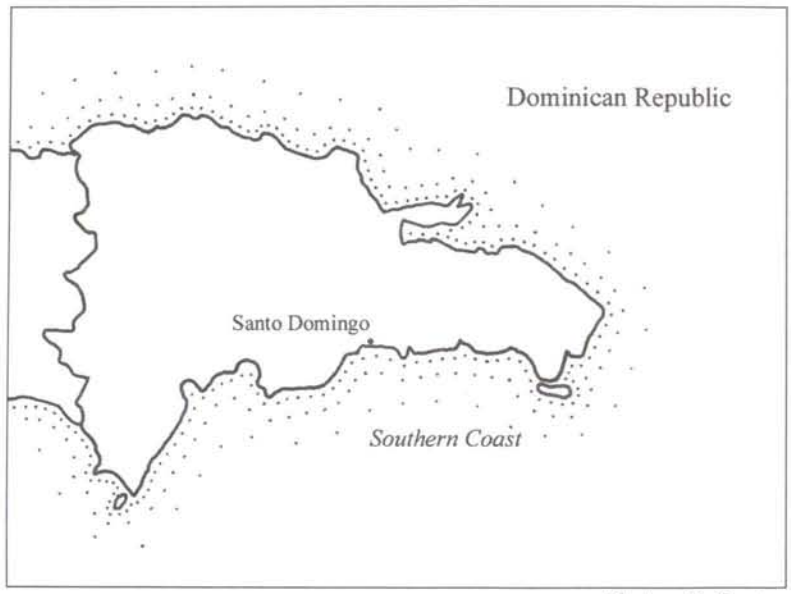



Photo: K. Custer

Fig. 2. *The general survey area on the Dominican Republic south coast.*

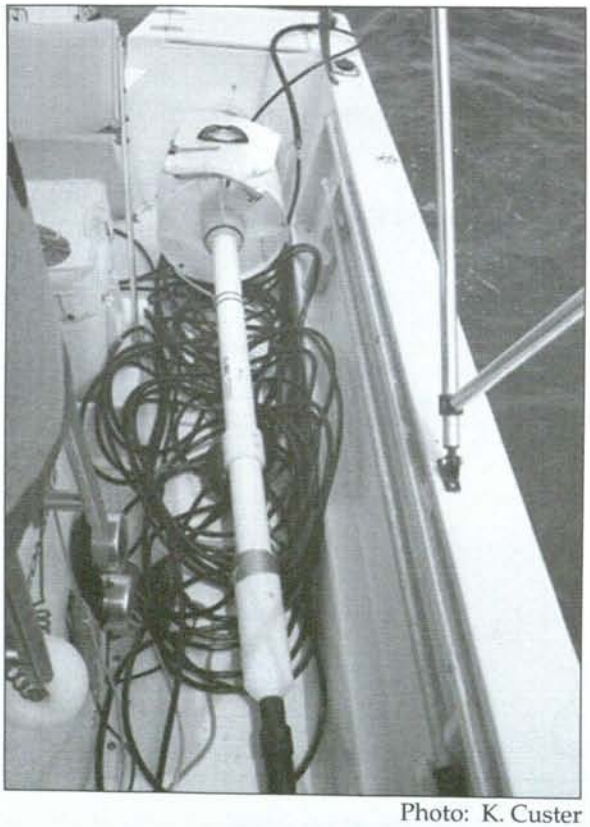


Photo: K. Custer

Fig. 3. *The magnetometer used in the survey.*

The potential for shipwrecks of the sixteenth and seventeenth centuries in this area of the island is astounding. The sheer number of lost ships and known wrecks of caravels and *naus* lends credibility to archaeological study. A remote-sensing and visual survey of the southern coastline is being carried out by a team of graduate students in the Nautical Archaeology program at Texas A&M University. The objective of the survey is the creation of a preliminary database of wrecks in the area with the specific intention of finding sixteenth and seventeenth century Iberian ships, the most prevalent of which are caravels and *naus*, in hopes of filling in the gaps of Caribbean maritime history.

With generous help from RPM Nautical Foundation, the support of the Institute of Nautical Archaeology, and the permission of the Officina Nacional de Patrimonio Cultural Subaquatico, the team was able to run the first field season of the Dominican Republic Survey Project from June 3 to June 28, 2003. The goals of this preliminary season were to obtain local information of shipwrecks in the area, gain working knowledge of the physical environment, launch the survey, and assess the practicality of the equipment and methods used. On all accounts, this season was a success.

The survey was conducted using a Geometrics 881 Cesium magnetometer (fig. 3), which was towed from the stern of a six

meter fiberglass fishing boat. The software, Maglog Lite, used in conjunction with a Global Positioning System (GPS) unit, recorded the data acquired by the magnetometer along with the latitude and longitude. When iron was detected, the reading was marked and saved as a "hit" on the laptop (fig. 4). The locations of the hits were transferred to the GPS unit, which was then used to navigate back to the site for visual survey and identification of the hit.

In order to identify the targets, we utilized underwater search patterns, and added Erika Laanela to our team to assist with the diving. We began the search using handheld metal detectors (fig. 5), but we found that simple visual inspection was sufficient for identifying the targets. This method worked extremely well, and we were able to identify every target that we dove on. Unfortunately, none of these turned out to be historic finds, but there was only time to dive on a handful of the logged hits.

Photo: K. Custer

Fig. 4. *A laptop computer was used to record data obtained during the survey.*

At the completion of this season, it became clear that adjustments to our equipment setup would be necessary to run a more efficient survey in the coming seasons. The use of the small vessel limited our time at sea and our ability to run parallel, evenly spaced lanes. We were operating during the beginning of hurricane season, which usually has stable weather conditions. This year, however, the island was pounded by several storm systems (fig. 6). This led to seas with up to three meter swells and strong winds, conditions that make it difficult to keep a steady course in a small boat. The survey was limited to the hours between five a.m., just before the sun rose, and two p.m., when the seas became too rough for the captain to safely navigate.

Photo: K. Custer

Fig. 5. *Handheld metal detectors were used initially, but proved largely unnecessary.*

Another change that will be made for the following seasons is the inclusion of a side-scan sonar. It was originally believed that the sea floor sloped too greatly and was covered by too many coral blooms (fig. 7) for the effective use of such equipment. After this season, however, it was determined that the area of seafloor that we are concentrating on is relatively flat with only scattered coral and a sandy bottom. These conditions are ideal for the combined use of side-scan sonar and a magnetometer.

The information gathered from this season's work provides us with promising prospects for the coming years. We have established an archaeological presence on the southern coast and a positive relationship with the Dominican government, and we look forward to the coming seasons of work there.

Fig. 6. *Stormy skies warned of sea conditions that would hamper the survey.*

Photo: K. Custer

*Acknowledgements:* We would like to thank the following institutions and persons: the board and staff of the Institute of Nautical Archaeology and RPM Nautical Foundation, the staff of the Officina Nacional de Patrimonio Cultural Subaquatico and Acquario Nacional de Republic Dominicana, Dr. Jerome Hall, Dr. Donny L. Hamilton, Dr. Kevin Crisman, Francisco Escoto, Francis Soto, Enrique Pugibet, Erika Laanela, Gustavo Garcia, and everyone who took a chance and believed in two graduate students with a great idea.

**Suggested Readings**

Arciniegas, German.
1946 *Caribbean: Sea of the New World*. New York: Alfred A. Knopf.

Morison, Samuel E.
1942 *Admiral of the Ocean Sea: A Life of Christopher Columbus*. New York: The American Past: Book of the Month Club, Inc.

Smith, Roger C.
1993 *Vanguard of Empire: Ships of exploration in the Age of Columbus*. Oxford and New York: Oxford University Press.

Photo: K. Custer

Fig. 7. *Coral blooms and other undersea life made a pretty picture, but complicated the search for shipwrecks.*

# Just Released

*Sea Power in the Medieval Mediterranean:*
*The Catalan-Aragonese Fleet in the War of the Sicilian Vespers*
by Lawrence V. Mott

Gainesville: University Press of Florida
ISBN: 0–8130–2662–8, 384 pp, 16 b&w figures, 5 maps, 2 tables, appendix, notes, bibliography, index. Cloth. Price: $59.95.

There are remarkably few books devoted to naval warfare during the Middle Ages. To some extent, this is due to a prevailing attitude among historians that the relatively small medieval states did not have sufficient resources to build significant fleets. If so, sea power cannot have been as important during these centuries as it had been for ancient empires and was to be for modern nation-states. In *Sea Power in the Medieval Mediterranean*, Texas A&M Nautical Archaeology Program graduate Lawrence V. Mott provides facts that should dispel this attitude.

Between 1282 and 1302, the royal families of France and Aragon fought what is now called the War of the Sicilian Vespers. In 1263, the Papacy had ended a long conflict with the Hohenstauffen Holy Roman emperors by granting their territories in southern Italy—the Kingdom of Sicily—to the French prince Charles of Anjou, brother of King Louis IX. Charles and his tax collectors became extremely unpopular. On March 29, 1282, Angevin soldiers molested a group of women on their way to evening prayers (vespers) in Palermo. The ensuing riot developed into a revolution that expelled the surviving occupiers from the island. Recognizing that they could not withstand the French alone, the Sicilians offered their crown to King Peter III of Aragon. For the next twenty years, there were two Kings of Sicily, one French and the other Aragonese, with the border between their respective territories in constant flux. Although the war technically ended as a draw, the peace treaty gave Aragon—and its successor, Spain—effective commercial and strategic control of the western Mediterranean basin for centuries. By diverting European attention westward, the war also contributed to the final fall of Christian Palestine in 1291 and to the Byzantine reconquest of the remnants of the Latin Empire.

The most significant fact about the War of the Sicilian Vespers is that it was predominantly a naval war, with both large fleet actions and amphibious assaults. There are a number of contemporary accounts of the war, and many of the account books of the Aragonese admiral, Roger of Lauria, have been preserved in the Valencia Cathedral archives. It is thus possible to reconstruct the logistical and economic infrastructure that supported a major medieval fleet. Roger's opponents almost always outnumbered his forces, but he was able to take successful advantage of superior personnel, material, and tactics. Lawrence Mott shows us how.

Nautical archaeologists will want to pay particular attention to Chapter 9, which describes the ships that comprised the Aragonese fleet. In one critical battle of the war, fought in Grand Harbor, Malta, on June 10, 1283, the Aragonese were outnumbered two to one. Nevertheless, there were approximately four thousand French deaths (including almost half the able-bodied male population of Marseille) against fewer than one hundred Aragonese casualties. This was partly due to superior training, but seems mostly due to differences in ship design philosophy. The standard Mediterranean galley, based on Byzantine models, represented a compromise between speed and capacity. It had 108 oars and a low freeboard. In contrast, the fleet Roger of Lauria commanded was largely composed of 120-oared vessels, which were substantially slower, but could support fore- and stern-castles to shelter the soldiers who shot arrows and hurled projectiles into an opposing ship to neutralize its complement before boarding. Three centuries later, the evolution of this philosophy led to the great unhandy galleons of the Spanish Armada.

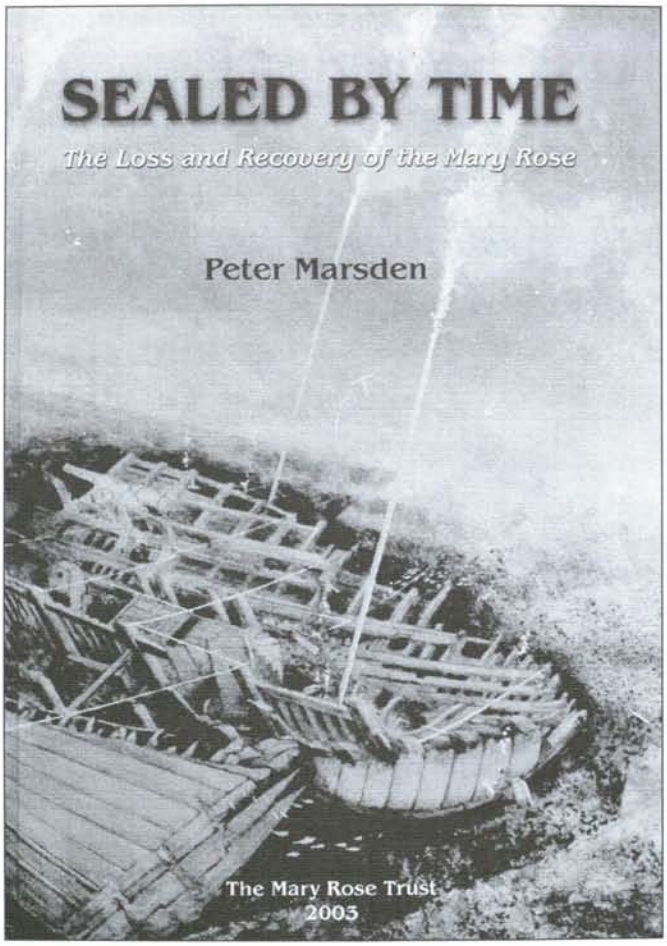
The real core of *Sea Power in the Medieval Mediterranean*, however, are the chapters describing the evolution of the office of admiral during the Middle Ages. An admiral was not only, nor even primarily, a sea commander, but was responsible for procuring ships, crews, and supplies for the fleet. The Valencia documents provide a detailed look at one particularly successful admiral, but the author gathers information from many available sources to describe how medieval fleets were administered. The book explains how these navies were funded, manned, and operated.

In the end, the reader is convinced that sea power was much more significant in medieval history than historians have often been willing to admit. The theories of Alfred Thayer Mahan therefore apply to this era as well as to ancient and modern times. Control of the seas was a deciding factor in the War of the Sicilian Vespers and in the rise of Aragon to a position of dominance in the Western Mediterranean. Isabella of Castille's husband Ferdinand, Aragon's last king, projected this dominance into the New World as the co-sponsor of Columbus.

# Review

By Filipe Castro

*Sealed by Time, The Loss and Recovery of the Mary Rose*
Peter Marsden




Trowbridge: Cromwell Press: The Mary Rose Trust, 2003
ISBN: 0-9544029-0-1, 194 pp, 140 illustrations (including b&w photos maps and drewings, 22 color plates, appendix, index.

This long-awaited book is the first of a series of five volumes on the history and archaeology of *Mary Rose*, an English warship built between 1510 and 1512, and lost on July 19, 1545, off Portsmouth, during an engagement with the French fleet of Admiral D'Annebault.

Built in the early years and lost in the last years of King Henry VIII's reign (1509–1547) *Mary Rose* was a large warship with three decks, large fore and stern castles, gun ports on the main and upper decks, and four masts. There is a drawing of *Mary Rose*, dating from 1546, in the Anthony Roll. Formulas to calculate tonnage may have changed in England through its lifetime; its capacity was estimated at 500 tons in 1512, and increased gradually to eight hundred tons in 1545.

Refitted in 1527 and 1528, *Mary Rose* was an old but probably very able ship by the time of its loss, which seems to have resulted more from misfortune than mishandling by its captain or crew. Caught by a sudden strong gale, the ship listed dangerously to starboard, letting water in through the orlop deck gun ports, which caused its rapid sinking and the loss of most of its crew. Only a handful of men survived. As a possible human error, several sources mention too heavy a load of artillery on its decks as the main cause for the rapid listing that led to *Mary Rose's* sinking.

Salvage attempts followed almost immediately, but little was recovered from the shipwreck site until 1836 and 1840, when the Dean brothers salvaged four bronze guns, nineteen parts of iron guns, and a section of the mast. The ship remains were found in 1836 when a group of five fishermen hired a diver named Henry Habbinett to disentangle their net from a seabed obstruction. Soon after, John Dean was called to the site and raised a bronze gun with an inscription referring to King Henry VIII. That same year and again four years later, John Dean and his brother Charles raised the remaining artifacts.

It was not until 1966, when Alexander McKee found the site, that *Mary Rose* would become the center of a major archaeology project that changed the way the British looked at their submerged cultural heritage and eventually led to the enactment of the Shipwreck Protection Act of 1973. Mr. McKee's team found the first hull timbers in 1971 and six years later a trench was dug into the sediment revealing the ship's hull, which, we know now, was preserved along thirty percent of its extension.

From 1972 to 1982 the archaeological excavation was carried out to the highest standards. In 1982 the hull was raised and moved into the Historic Dockyard at Portsmouth, where the *Mary Rose* museum was to be built.

The excavation of *Mary Rose* uncovered close to twenty-six thousand artifacts, including a notable collection of guns, human remains of at least 179 individuals, and above all a significant portion of the ship's hull. *Mary Rose*'s hull remains are the archive of an incredible amount of precious information about the ship's design and construction, and their study will undoubtedly yield great discoveries about English shipbuilding in the fifteenth and sixteenth centuries.

There is incredibly little information on how English ships were built in the period, with almost no clues in the written sources about the way they were designed and assembled. The few other shipwreck sites from this period—such as the Hamble River shipwreck thought to be the 1420 *Grace Dieu*, and the Woolwich ship thought to be the *Sovereign* from 1487—are far from being fully studied and published.

As an introduction to the archaeology of *Mary Rose*, this volume is excellent. Along its 194 pages of very organized, well illustrated, and clearly written text, the reader is guided through the incredible story of this ship, from its construction, possibly at Portsmouth, to its final arrival at the *Mary Rose* Museum in the Historic Dockyard of Portsmouth. Following the description of the 493 years of life of the ship, this pleasant book is also a repository of all the known names associated to it, and their roles in *Mary Rose*'s fate.

The first of fifteen short chapters describes the story of the ship, its construction, sailing abilities, refitting operations, and life at sea or on ordinary, ending with the circumstances of its loss, illustrated by transcriptions of the known accounts of the events surrounding its sinking. The following two chapters describe the discovery of *Mary Rose* in the nineteenth century, and salvage of a small collection of artifacts, and the re-discovery of the site and hull remains in the twentieth century, as well as the actions that led to its eventual archaeological excavation.

Chapter four explains clearly and concisely the strategies adopted in the excavation and recording of the archaeological context, and is followed by the epic of *Mary Rose*'s raising, an extraordinary story that was followed on television by millions of people worldwide. Chapter six tells the story of the creation of the Mary Rose Trust and the struggle to raise funds to carry on such a project without state support. Chapters seven and eight cover the monitoring of the site after the raising of the hull, and are followed by a post-excavation study of the stratigraphy of the site and interpretation of the site formation process.

Chapters ten, eleven and twelve deal with the identification of the ship and a preliminary description of its hull remains and contents. Special sections on the human remains and artillery give us a first taste of the contents of volumes four and five of this publication. Chapter thirteen reevaluates the circumstances of the loss of *Mary Rose* and challenges the traditional version blaming mishandling of the ship by its crew during the turning to fire its port guns at the French opponents. In fact, most of the starboard guns found on *Mary Rose* were still loaded, making it implausible that the ship was attempting to turn without having closed the orlop deck gun ports. It is more likely that the ship was just caught by a sudden and very strong gust of wind, heeled, made water through the starboard side gun ports, and sunk.

Chapters fourteen and fifteen deal with the historical significance of this shipwreck, the impact of this project for nautical archaeology as a discipline in the United Kingdom, and the way in which it was perceived by the public and the government. Avoiding strong statements and criticism of governments and politics, the author explains how important the *Mary Rose* project was in showing the public that the objectives of nautical archaeology are not different from those of other branches of archaeology. Since shipwrecks are an important part of any country's cultural heritage, they deserved to be protected, studied, and enjoyed by both scholars and the general public.

It is known how the *Mary Rose* project led to the enactment of the first legislation protecting shipwrecks as part of the British cultural heritage. But as the author points out, the importance of this project is much wider: by making the archaeology of *Mary Rose* its first priority, the Mary Rose Trust—a fully private organization—has sent a clear statement about the importance of nautical archaeology over treasure hunting.

There are other famous shipwreck projects whose stories endure in the public memory, in which artifacts whose conservation is not worth their value at auction were discarded, hulls were not properly recorded, and artifact collections scattered at auction. The Mary Rose project aimed at understanding the past rather than making a profit. In our time, when projects formerly announced as treasure-hunting ventures are now referred to under euphemistic designations such as "commercial archaeology," these five books make an eloquent distinction between archaeology and treasure hunting.

We can hardly wait for the next four volumes of this series. The second volume is expected in 2006, will be edited again by Peter Marsden, and is dedicated to the study of the ship's hull. The third volume will be edited by Alexzandra Hildred and will treat the weapon collection. Its publication is scheduled for 2004. Also expected in 2004 is volume four of this series, edited by Julie Gardiner, dealing with the matters of life and death aboard *Mary Rose*. The fifth and last volume will be edited by Mark Jones and is expected soon. Its subject is the conservation of the ship's hull and its almost twenty-six thousand artifacts.

A must in any nautical library, these five volumes are among a series of long awaited publications on the most important shipwrecks excavated by archaeologists in the twentieth century. This first decade of the twenty-first century looks very exciting for nautical archaeologists: following the wonderful publications of the Danish Viking Museum, this series on the archaeology of the *Mary Rose* is expected to be soon joined by the full publications of the fourth century BCE Kyrenia ship, the eleventh century CE Serçe Limanı ship, the sixteenth century Basque galleon excavated in Newfoundland by Parcs Canada, the ten excavations of the sunken city of Port Royal in Jamaica, and the archaeology of the Swedish ship *Vasa*.

INA members should note the enclosed David R. Brown brochure on the series, as they can receive a 20% discount. For further details, see http://ina.tamu.edu/oxbow.htm.

# Looking Back
# Looking Forward

**Donny L. Hamilton**

**INA President**

The Archaeological Committee of the Institute of Nautical Archaeology (INA) meets annually to review the year's excavation projects and surveys and to approve excavations and surveys for the next year. For 2003, it reviewed the Oklahoma steamboat, Pabuç Burnu, Bulgarian Black Sea, and Pipe Wreck excavations. In addition, the results of the surveys conducted in Turkey, Italy, Cyprus, Morocco, and the Dominican Republic were evaluated. Progress reports on the Serçe Limanı shipwreck in Turkey, Mombasa Wreck in Kenya, the Denbigh Project in Texas, and the Casis do Sodre Project in Portugal were scrutinized. We were very pleased with the accomplishments of 2003! However, we are not content with resting on our laurels and we have ambitious goals for 2004.

In the Old World, a number of interesting projects were proposed. Dr. George Bass completed the excavation of the late sixth-century BCE wreck at Pabuç Burnu in Turkey in 2003 and we decided to devote the survey in Turkey 2003 toward identifying the site to be selected as the next excavation project in Turkey. Two possible sites, the sixth-century BCE Archaic site at Kekova and the fifth-century BCE Classical shipwreck at Aslan Burnu, will be investigated further. In addition, a survey will be conducted in the Arab Adasi area where the famous Demeter bronze bust was raised in 1952. Survey projects in the United Arab Emirates, Italy, Greece, and Cyprus were approved. On-going post-excavation work will continue on the 1300 BCE Bronze Age wreck at Uluburun, the *Kadirga* galley in Istanbul, Turkey, the sixteenth-century Portuguese wreck in Mombasa, Kenya, and the eleventh-century CE wreck at Serçe Limanı, Turkey.

We had hoped to undertake a new excavation of an early 1500s Spanish shipwreck in Panama. However, negotiations to secure permission were not successful. We continue to look for a significant shipwreck to excavate in the New World. Closer to home, we continue to be very excited about INA's participation with the Oklahoma Historical Society on the early nineteenth-century river boat in the Red River in Oklahoma. Dr. Kevin Crisman will be taking a team of Texas A&M University students to start the second of a planned three year project on the river boat. Dr. Jerome Hall will continue his excavation on the seventeenth-century Pipe Wreck at Monte Christi in the Dominican Republic. In addition, the second year of a survey in the Dominican Republic is planned. Post-excavation research, conservation, and report writing continues on the Civil War blockade runner, the *Denbigh* near Galveston, Texas. Finally we will be supporting a Nautical Archaeology Program student to assist in the recording the 1281 CE Chinese junk wrecks found recently in Japan.

It has been a number of years since we have upgraded our diving gear and we cannot put it off any longer. New diving equipment is needed for both our Old World and New World projects. Several years back, with a generous gift from the Institute for Aegean Prehistory, we were able to purchase our own submersible, *Carolyn*. This has proved to be a valuable survey vehicle. Now we would like to make it even more versatile by installing on it a sub-bottom profiler, a side-scan sonar, and a computer to operate both pieces of equipment. Also the addition of lights and a remote controlled video camera would be useful.

It is obvious that we have ambitious plans. This is where members' support is so vital.

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### *Subject Index*



### *Reviews and "Just Released"*

# INSTITUTE OF NAUTICAL ARCHAEOLOGY