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Editorial

Another busy month has come and gone and the snow (for those of us who have to deal with it) is all gone here. Hope you are all doing well with your modeling ventures.

This issue starts off with a discussion on drill bits by Donnie Driskell, followed up by Pat Majewski's continuing article series on the HMCSS *Victoria*. This issue Pat starts covering the armaments for the ship.

Next up is Makerspace, where Mike Shanks discusses CAD programs and their use in modeling.

In this issue we re-introduce you to "Shipwrecks of the World" where each month we'll cover a shipwreck somewhere in the world. Know of a good subject? Contact us and let us know.

From his vast archives Robert Hunt carries on with his series of articles on Deck Furniture, where he shows us common deck furniture that you seen in kits these days.

We round off this issue with The Modelers Workbench, The Book Nook and as always Gene's Nautical Trivia.

Like to submit content for possible inclusion in The MSB Journal? Contact us at msbj@modelshipbuilder.com. We can't promise we'll publish everything you send but we will certainly take a good look at it and try to fit it in somewhere.

Until next time

May your ANCHOR be tight,
your CORK be loose,
your RUM be spiced,
and your COMPASS be true.

Winston Scoville

The Ship Builders Machines - Drill Bits

A practical Guide

By Donald B. Driskell

If you have been in the ship building hobby for any length of time, it is clear that you have used drill bits for something. Or maybe not the hobby, but for every other use around the house for woodworking projects to trying to drill a hole in the wall to hang a picture.

Image taken by D. Driskell 04.16.2023

First things first, the so called 115 drill bit set for the unusual price of $29.99 (making that price up to make a point), is not going to last and not only that; just take a bit out of the box and roll it over a true flat surface. (it has a wobble to it !!). Or that shiny gold surface is just a cheap coating, plus other oddities. However, I will say this: If your intent is just to have a very crude set to do basic (non-hobby) around the house, then I guess these can be justified. Yes, back in the day, even I have to admit that I purchased such a 115-bit set for a few bucks. But, that was before I started working with a Lathe and a Mill. I quickly found that those bits were not what was needed for true Milling and accurate machinist

work (yes, even for the machining hobby). When it comes to machining – it is either going to work or it isn't. Unless you want to resort to JB liquid putty to cover your mistakes.

A true 115 drill bit set is going to cost a minimum of $400 to $600. And that depends on if you want Jobber bits or Machine Screw Bits (more on that later).

Case in point. I am not endorsing Little Machine Shop (even though I have bought several things from them), but a 115 Piece Jobber Length Cobalt Steel set is $599.95 and a 115 Piece Screw Machine Length HSS (High Speed Steel) is $379.95 as of this writing.

Yes, I know you do not have to have the 115 piece, but I am only using that as a reference because it will have just about every size you can think of.

Personally, I have the 29 Piece Screw Machine Length HSS from Little Machine Shop for $114.95 and they are probably the best set I have ever purchased. Set includes 1/16" - 1/2" by 64ths. Cuts through stainless steel like butter. (well, I guess I am exaggerating a little bit – again no pun intended).

And speaking of puns, I have a little "bit" of Terminology for you.

American National Standard B94.11M-1993 covers the relevant information relating to drill bits, including sizes, tolerances, nomenclature, and definitions. Below is a summary of some of the key terminology relating to drill bits.

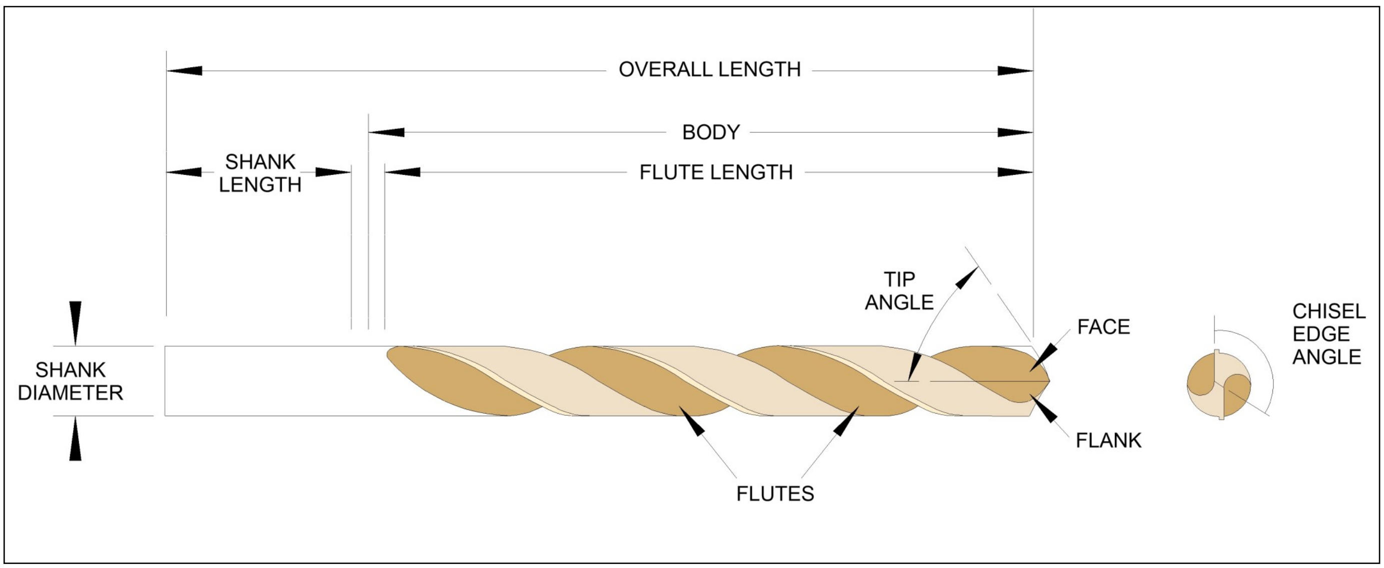
Axis – refers to a centerline running down the middle of the drill bit longitudinally from the point of the drill bit to the end of the body.

Back taper – is a reduction in the drill bit's diameter that occurs from the point of the drill bit to the end of the drill bit body. Most drill bits are machined with a small back taper to prevent the bit from binding in the workpiece when the drill bit becomes worn.

Body – refers to the portion of the drill bit that extends from the neck to the outer edges of the cutting lips and which contains the flutes.

Drill Diameter – the overall diameter of the drill bit measured at the point of the drill up to the margins.

Flutes – are the grooves that are formed in the drill bit which serve to allow the removal of chips from the hole being cut and to allow cutting fluid to reach the cutting lips of the bit. Flutes are usually helically shaped or straight cut.



CAD Drawing by D. Driskell 04.16.2023 however, conceptually derived from various resources from the internet internet. sources

Lips – the cutting surfaces of the drill bit. (not the kind you—well, you know)

Neck – a small section of the drill bit which has a reduced diameter that sites between the shank of the bit and the body. (we are still talking about drill bits here !!!)

Overall length – is the distance measured from the extreme end of the shank to the outer corners of the cutting lips. Note that this measurement excludes the conical shank end and the conical cutting point at the tip of the drill bit.

Point angle – the angle that is formed between the lips when a projection is made onto a planar surface that runs parallel to the axis of the drill bit and to the cutting lips.

Shank – the portion of the drill bit by which it is held in place and driven, i.e. the portion that does not contain flutes.

In a future article, while we are on the subject of Drill Bits, my plan is to discuss Taps and Dies. They go hand and hand. The right size (Diameter) of bit MUST be used to make threads (Taps). Conversely, a rod diameter MUST be the correct size for Dies. So, stick around for that article coming up.

Drill Bit Materials

Mostly, Drill bits for metal come in basically 4 different materials: Carbon Tool Steels, HSS (High Speed Steel), Black Oxide, Cobalt High Speed Steel, and Titanium Nitride (TiN).

To try and show a picture of each type of drill, coatings, would be quite an undertaking. However, we are just covering the basics here. When I was much younger, a bit was a bit. I had no idea of all the varieties and there purposes. I can't say I am an expert at drill bits, but perhaps this article will shed a little more light for all of us.

Drill Bit Tips (angle of the tip)

There are three commonly used angles in consumer drill bits: 90-degrees, 118-degrees, and 135-degrees. 90-degree bits are only used for soft materials such as plastic and aluminum, they get dull very fast. The right drill bit tip style is determined mainly by your work material. This is an important choice for a clean job without walking, slipping, a 118 degree bit has a sharper point which results in less walking and does not require a split tip like a 135 degree drill bit. 118 degrees makes a great hole and is considered by many to be a universal standard drill bit angle for the mass majority of your drilling needs. Only when drilling with a 118 degree bit in hard metal is a pilot hole recommended. This is an extra step while using a 118 degree drill bit, it will actually create a better finished hole.

A 135 degree drill bit needs to be split. A split point drill bit has two additional edges ground into the chisel edge, which make the entire point of the drill one long cutting edge. This reduces the amount of pressure. needed to make the drill cut. This 135 degree point is also self centering which means the drill starts cutting without the need of a pilot hole. is best suited for harder materials like stainless steel. A 135° drill is flatter than 118°, meaning more of its cutting edges engage with the material surface sooner in the drilling process.

Drill Bits for Metal and Wood

Metal Drill Bits

Jobber bits

Jobber drill bits are called jobber drill bits because they are designed for a specific purpose – to drill holes into various materials. They generally come in a range of sizes, styles and lengths, and are used to drill holes in materials such as wood, metal, plastic, masonry and other materials.

1) They are commonly used in drilling and tapping tasks, as well as in production drilling operations. They can be used in manual or machine-powered drills, and when set up correctly, can create precise, clean and consistent holes.
2) They are widely used in construction, manufacturing and aerospace industries, as well as in hobby and home improvement projects. The name 'jobber drill bit' comes from their use by jobbers, who are craftsmen and professionals who specialize in drilling holes in a variety of materials.
3) They are known for their good balance between strength and size. They feature a round, straight shank that provides greater clearance in the work piece and are ideal for portable drilling machines.

4) They provide faster drilling and longer overall drill life due to their ability to keep the cutting edges sharp while drilling. They are available in a range of sizes, from 0.5 mm up to 25 mm, and in high-speed steel, cobalt, and carbide types.

Mechanics Drill Bits

1) Are shorter than jobber-length and maintenance-length drill bits of the same size.
2) Mechanics drill bits have a longer length of 8-12 inches, and typically have a thicker diameter and less taper at the end with only one cutting edge.
3) They are most often used for larger-diameter and heavy-duty drilling applications.
4) In addition, mechanics drill bits have thicker shanks and flutes that that can resist wear and heat better than jobber length bits.

Machine Screw drill bits

These are my personal favorites for most all my work as they are short and study.

Screw-machine-length (or Screw Machine Length) drill bits.

1) Are shorter than jobber-length and maintenance-length drill bits of the same size.
2) Sometimes called stub-length drill bits, they provide more strength and rigidity and can drill straighter holes than longer drill bits.
3) Their short length also allows them to access tight spaces where longer drill bits cannot fit.

Drill bits for wood

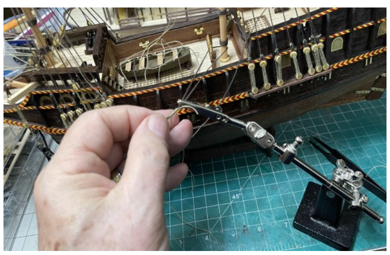
1) Are shorter than jobber-length and maintenance-length drill bits of the same size.
2) The key difference between a wood drill bit and a metal drill bit is the type of material the drill bit is made from.
3) Wood drill bits are typically made from high-speed steel, while metal drill bits are usually constructed from tungsten carbide or cobalt.
4) Additionally, wood drill bits are designed with a steep point angle, making them more effective when drilling into wooden materials, while metal drill bits usually have a more gradual angle which is better suited for drilling into harder, metal surfaces.
5) Wood drill bits generally come with a variety of finish options to choose from, such as titanium-nitride and black-oxide. Whereas metal drill bits are typically only available in a bright finish.
6) Additionally, the proper shank size for a wood drill bit is typically half the size of a metal drill bit due to the increased torque needed to drill through wood.
7) Finally, wood drill bits are designed with helical flutes which help remove debris and waste as it drills, while metal drill bits are usually feature straight flutes, which provide extra stability when drilling into harder surfaces.

The College of Model Shipbuilding

by Robert E. Hunt @ www.lauckstreetshipyard.com

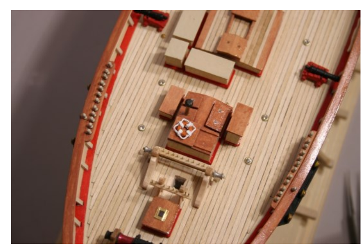
Hello, my name is Bob Hunt. I own a small business called Lauck Street Shipyard. I specialize in providing very detailed instruction on how to build model ships from kits or from scratch. Other subjects are also covered in detail as well, which are all part of my College of Model Ship Building

The college of Model Shipbuilding has courses for all levels of experience. For beginners, we have Prep School Courses. These are based on kits that are easier to plank, such as Artesania Latina kit, Bluenose II.



Our Freshman Courses are also a good place to start if you are a beginner. We have a number of these courses to choose from including our most recent Golden Hind, which is based on the Ocre kit. It also has an optional masting and rigging course.

Our Sophomore Courses are designed for modelers with some experience who want to advance their skills and Techniques. One of the most popular Sophomore Courses is the Pride of Baltimore which is based on the Model Shipways kit.



Our Junior Courses are for modelers with much more experience who want to start learning kit bashing and scratch building. These courses include the Mamoli kit Rattlesnake and the Panart kit HMS Victory.

I hope you'll check out my website today to see all of the course I offer. Just go to https://www.lauckstreetshipyard.com. We also have video Practicums, and other very detailed Practicums on special subjects as learning CAD, learning different planking techniques, and how to rig a model ship. I also provide a private support forum for those who purchase one of my courses. If you have any questions please send me an email at lauckstreet@gmail.com

HMCSS Victoria'

Armament

By Pat Majewski

This is the first of several articles in a series relating to the armament fitted in HMCSS *Victoria*. The content will not focus on the ship other than to use it as a vehicle to identify and discuss the ordnance fitted. It should also be remembered that the armament was provided in a period of rapid change and improvement in naval ordnance. While it is possible to find some imagery and sketches, a single comprehensive discussion has not found for these ordnance types.

The relevant information is drawn from several disparate sources, some contemporary or near contemporary, and other information from more modern sources. Hopefully, these articles will assist the reader identify and understand some of the ordnance deployed in this period.

This article will concentrate on the overall armament fit for the vessel and delve into some of the common gun furniture. Following articles will discuss the pivot guns and broadside guns and their carriages, in greater detail.

Background

HMCSS *Victoria* was designed to carry the same armament as contemporary Royal Navy (RN) gun despatch vessels, which at the time utilised large calibre pivot guns supplemented with 32-pounder broadside guns. The prevailing RN outlook and practices of the time are summarised by a few authors including:

E.H. Archibald in '*The Wooden Fighting Ship in the Royal Navy*':

> *Advances in gunnery and the coming of steam power might reduce the number of guns a ship carried to the point when she dropped a rate yet was a more powerful warship than before.*

David Brown, in '*Before the Ironclad*', page 68, agrees suggesting that ships of the period had the number of guns reduced, although the size of individual pieces increased.

Another useful insight is also provided by Brown on page 131:

> *Between the Battle of Waterloo and the start of the Crimean War there were a number of major changes and many minor improvements to the gunnery equipment and the training of gunners in the Royal Navy.*

Conway's History of the Ship Series '*The Line of Battle – The Sailing Warship 1650 – 1840*', page 153, provides the reasoning for the calibre of gun selected.

> *…Most navies found the 30-32pdr the best compromise between weight of fire and ease of handling, and a spectrum of sizes evolved, allowing 32pdrs to be carried even as main deck armament on the last sailing frigates and sloops.*

Frederick Robertson in '*The Evolution of Naval Armament*', Chapter 9, also writes:

> *The steamer was a stimulus to the development of the large ordnance worked on the pivot system. And this form of armament in turn influenced the form of the ship.*

Later he goes onto write the following which gives some understanding on the pivot and broadside combination:

> *Whereas with the paddlewheel the pivot gun was the chief means of offence, when the screw was introduced, the broadside was restored, and though the heavy pivot guns were retained (steam and the pivot gun had become associated ideas), yet by their comparatively limited numbers they became a subordinate element in the total armament.*

Historical Notes

Thomas Blomefield became Inspector of Artillery, in 1780 and between 1782 and 1785 his department carried out a general reproof of ordnance, by which he rejected nearly half of them. In 1787 Blomefield cast iron guns of his own designs which included three significant alterations to the Armstrong design:

- The breech was made more rounded, eliminating the prominent mouldings.
- The first reinforce was made almost cylindrical, the second reinforce was strongly tapered and the chase strengthened.
- A ring was added to the cascable which allowed free movement of the breech ropes, used to restrict the gun's recoil aboard ship. This free movement allowed the gun to be trained at an angle to the side of the ship and still have effective recoil restraint.

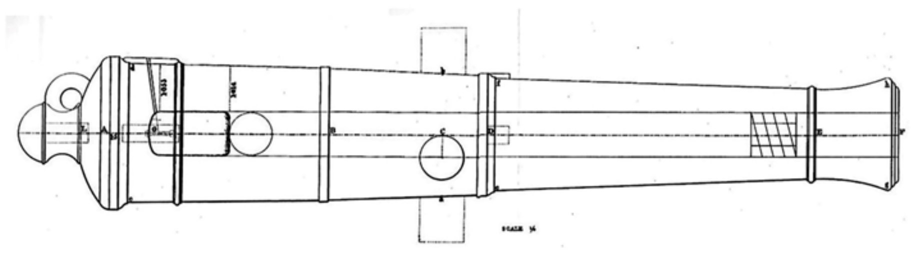


Figure 1 – 32 pounder 56 cwt Blomefield Pattern Gun
Crop of Illustration from 'Diagrams of Guns', Capt. Boxer, R.A., 1853 Plate X.

The Blomefield guns represented a marked improvement in design but did not solve the problem of being unnecessarily heavy for their calibre. However, the ordinance factory was able to marginally increase the bore size, up to the shell size, by reboring the heavier guns. An online article 'British Cannon Designs' provides additional detail.

According to '*A Treatise on the Construction and Manufacture of Ordnance in the British Service*', prepared in the Royal Gun Factory, 1877, Chapter 3, page 63, successive Inspector Generals of Artillery, including: General Sir W. Congreve, Sir A, Dickson, Lt.-General Millar, Mr. Monk, and Colonel Dundas, introduced further improvements to the Blomefield guns.

Gun designs appear not to have changed fundamentally until Lt.-General William Millar became Inspector of Artillery (1827-1838). The most notable of Millar's adaptions were the boring out of guns to increase calibre, the introduction of the Dispart sights and a revised Tangent sight.

The next major improvements to naval guns were not seen until the breech loading Armstrong gun of the late 1850s, and the larger Lancaster gun, both of which also introduced rifling.

A very useful paper, written by David McConnell, titled 'British Smooth-Bore Artillery: A Technical Study to Support Identification, Acquisition, Restoration, reproduction, and Interpretation of Artillery at National Historic

Parks in Canada', 1988, also proved invaluable in corroborating the contemporary evidence.

Victoria's Armament

The documents and correspondence relating to the building and arming of the *Victoria*, does not identify the gun patterns nor their associated carriages. Rather, a general requirement was specified. This required considerable investigative' analysis to be undertaken, piecing together elements of details provided in the primary evidence to identify the specific types of ordnance.

Commander Lockyer (build superintendent), had recommended, in his list of recommendations enclosed with his letter to Governor La Trobe:[1]

> *That she should be armed with two Pivot guns, one forward and one abaft, and four broadside guns, two of which at the very least should be fitted with field carriages.*[2]

The armament was subsequently modified to one 'Long Tom' (9' 6") 32-pounder 56-cwt pivot gun, and two quarterdeck carronades.

Note: The nominal weight of a gun (e.g. 56-cwt) referred to the weight of the barrel only.

The carronades were never fitted, and her eventual fit was outlined in a briefing note to the Secretary of State for the Colonies dated 5th June 1855.[3] This armament was probably adopted to conform with the current Admiralty practice of a full 32-pounder gun outfit as the minimum calibre. Note though, by this date some Royal Navy vessels were already using the larger 68-pounder calibre pivot guns forward.

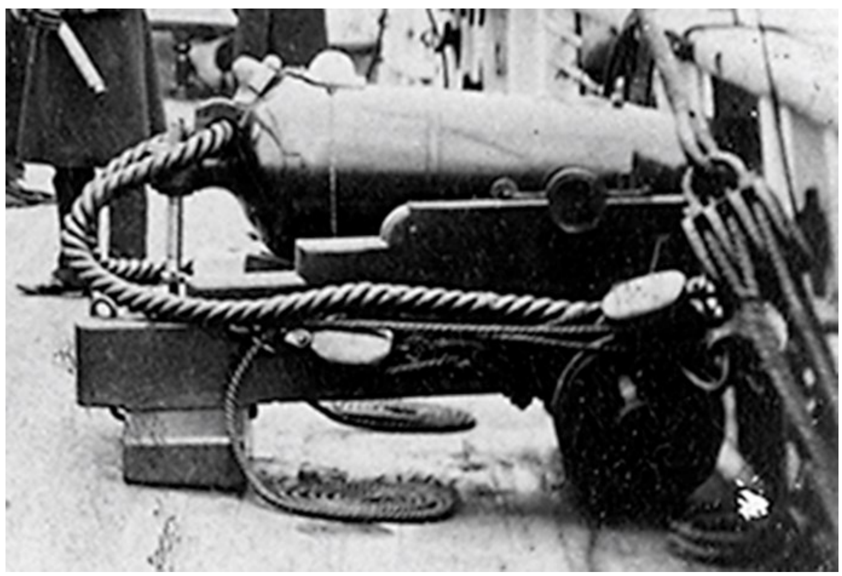


Figure 2 – Dundas Pattern Gun fitted in HMCSS Victoria

Crop from Image a14945 from State Library of Victoria –Accession Number H41413.

When delivered, *Victoria's* armament comprised a 32-pounder 56-cwt pivot gun fitted forward, and two 32-pounder 25-cwt broadside guns, which are assumed to be the aftermost pair (one either side) of the eventual fit. The vessel was also pierced for four additional 32-pdr 25cwt broadside guns which had been fitted prior to her deployment to the first Taranaki War (Māori Wars) in New Zealand in 1860.

According to the comprehensive information provided in Capt. Boxer's 'Diagrams of Guns', R.A., of 1853, the only 'long tom' 32-pounder 56 cwt gun in use with the RN at the time appears to be the Blomefield gun. However, the type/design of the carriage had to be established from oblique references in some correspondence, items identified in the annual stores surveys, and the types of pivot guns being used by the RN at the time.

Identification of the broadside guns proved a little easier as a clear picture of the gun and it's carriage was included in a photograph of some of the crew standing on the quarterdeck with the gun in the foreground. However, correlating the photograph with a known type was not straight forward, but eventually identified as a Dundas pattern gun with rear-chock carriage.

Gunlocks

HMCSS *Victoria* was built in the era when flintlocks had long superseded the 'match' and the more recent (1830) percussion gunlocks were the accepted method of firing naval guns. It should also be noted that gunlocks were fitted only to the broadside guns which used a 'friction' fuze (discussed later).

The firing of naval guns by hammer and percussion tube had been introduced in 1842.[4] Various methods were devised, but the most efficient and simple one was that invented by an American named Hidden. Colonel Dundas made some modifications and improvements of the hammer used in Hidden's design, and it was subsequently introduced into the RN.

A US Naval Ordnance Memoranda titled 'Percussion Locks and Primers', written by J.A.B. Dahlgren in 1853, pages 23-42, explains the differences between the Hidden and Dundas versions of the gunlock. It also includes considerable detail about the variations in the hammer, types of quill, percussion primers, and the best angle for fixing the locks in place.

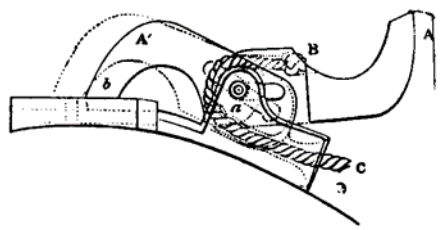


Figure 3 – Contemporary Illustration of a British Swan-neck Gunlock
'A Treatise on Naval Gunnery 4th edition', Douglas, 1855, page 404

The gunlock fitted to the Victoria's broadside guns was probably the Colonel Dundas version. This gunlock used a hammer, which was drawn back and away from the vent hole, to strike down on the priming tube. The mechanism was designed to prevent damage to the lock caused by the explosive discharge from the vent which had plagued earlier versions. A continuous firm pull on the lanyard was required to ensure that the hammer was cleared from vent hole at the instant of detonation.

Figure 4 – A Dundas Style Gunlock fitted to HMS *Warrior's* Broadside Guns
Author's Photographs (©2020)

Some confusion arose when investigating how the gunlock was fitted. An initial idea that it was fixed using the method (interpretation) shown on the Warrior's replica broadside guns (Figure 4) was quickly disregarded. No corresponding receiver holes for the connecting bolts could be seen in the breech casing in any of the many 32-

pounder 25 cwt Dundas pattern guns on display throughout Victoria (Australia). The arrangement used to mount the gunlocks on the Warrior's replica guns would also have weakened the thinner walls of the Dundas gun breech casing.

Further research identified that the gunlock was fitted through the sides of the vent hole reinforce as shown at Figure 5. It has been assumed, based on the evidence, that two bolts were passed through the bottom right-hand side of the gunlock body and then passed through the indicated holes of the vent reinforce (Figure 5). As the holes pass through the vent reinforce, it is also assumed the gunlock was secured with nuts on the left side (looking along the gun from the rear).

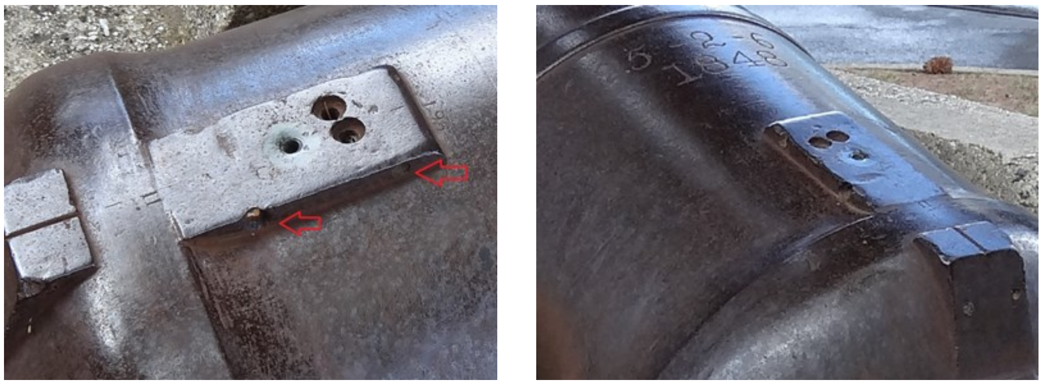


Figure 5 – Mounting Holes for the Dundas Gunlock

Photographs by, and used with the permission of, Keith Quinton.

Detonating Quill or Primers

There remains some ambiguity around the types of detonating quills used with each type of gun fitted in *Victoria*. The muster of Stores, and subsequent report of 17 December 1858, lists friction tubes being held by the Gunner. It is most likely that the Dundas (broadside) guns used the cruciform quill, while the pivot gun used the friction primer, and thus explaining why the latter was not fitted with a gunlock.

The primary evidence allows a determination (discussed in a later article) that Victoria's broadside guns were of the Dundas pattern and used the Dundas gunlock. These gunlocks typically used the cruciform detonation quill.

In his memoranda, cited earlier, Dahlgren explains that the percussion primers (quills) used with a gunlock, comprised a tube, which entered into the vent, that was charged with powder or some preparation of it. A fulminate preparation was used to detonate this small or priming charge, which in turn detonated the main charge in the gun.

The primers used by different navies differed in their composition and form; the nature of the fulminate, the contents of the stem or main tube, and the connection of the fulminate with the latter being the main points of differentiation. The detonating preparation preferred by the French and Americans was Howard's preparation of mercury, while the English used a chlorate of potash (potassium chlorate).

There were only two forms of primers in general naval use in the mid-19th century as illustrated at Figure 6. One had a wafer or flathead which contained the fulminate and was connected with the stem of the primer. The other was cruciform, or cross-headed in profile, in which the fulminate was enclosed within a small quill-barrel which was inserted crosswise through the upper end of the main tube.

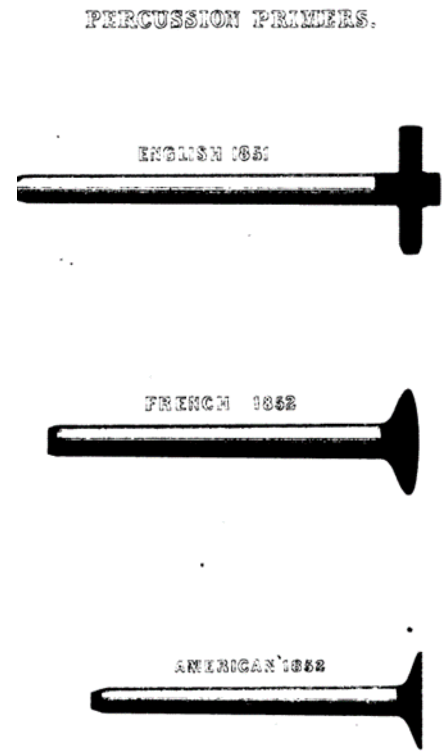


Figure 6 – Percussion Primers

Image from 'Naval Percussion Locks and Primers US Navy', J. Dahlgren, 1853, page 54.

Cruciform Quill

The cruciform, or cross, type of quill, is illustrated at the top of Figure 6 (English). David McConnell, page 369, citing Owen (1863), informs that the body of the tube was made from goosequill, was 2½ inches long, was cleared of pith, scraped clean and gauged to the vent hole size. Its small end was snipped off, and as near its large end as possible, a small hole was drilled through both sides. The tube was filled with composition and pierced as usual. A small pigeon quill or 'snipe', which had been pre-filled with composition, was then inserted into the hole and secured with fine silk.

The portion of the main tube above the snipe was filled with a small amount of gun powder to increase the flash, then the top sealed with shellac putty. The body of the tube was varnished black and the head and snipe were covered with a thicker red varnish; after 1857 the entire quill was varnished black.[5]

Friction Primer

There is no clear evidence to determine when the friction tube was formally introduced into RN service; however, it is generally accepted as being in the early 1860s. This does not preclude their earlier use as a transition period usually preceded any formal introduction of equipment in the RN.

The evidence suggests that the gunlock and cross-headed quill tube were eventually superseded with the 'friction tube' invented by Captain Boxer, R.A. Lieutenant Edward Simpson, U.S.N., in his 'Treatise on Ordnance and Naval Gunnery' 2nd edition of 1862, page 297, writes about the English Friction Primer:

> *The tube is a quill, but as the material has not sufficient strength or firmness to resist the force of the pull necessary to withdraw the friction wire, a loop of leather is attached to the quill which passes over a knob or projection cast on the gun just forward of the vent. The quill is destroyed by the combustion of the charge, and all accidents from the flying of the tube are obviated. The leather loop, however, is perishable, and does*

not last for any length of time, some other material will have to be substituted in its place. A solution of the problem is being attempted in that service, and it is said that it is also to be attempted in our service.

Figure 7 – English Friction Primer
'A Treatise on Ordnance and Naval Gunnery' 2nd edition, Edward Simpson, 1862, Figure 106, Plate 2

Gun Sights

Along with the rapid changes being experienced in gun technology, the science of sighting (pointing) the guns, was also advancing quickly in this era. In the mid-19th century, the Millar designed brass tangent sight, introduced about 1829, was still the accepted rear sight for the naval gun (see Figure 8 left). It remained so until the introduction of the Armstrong guns in the 1860s.

The fore sight was of the Dispart design, sometimes called a point-blank sight, and probably made to the Congreve design (see Figure 8 right). The term 'dispart' refers to the difference between the thickness of the metal at the mouth and at the breech of a piece of ordnance. This allowed the gunner to make allowance for the dispart in the gun, when taking aim.

They were usually made of gunmetal and securely fitted to the upper part of the barrel parallel to, or on the axis of the bore, usually centred above, or just abaft the trunnions. The top was filed to a sharp edge, its height being equal to the dispart at that part of the gun.

Figure 8 – Millar (L) and Dispart Sights (R) fitted to HMS *Warrior's* Broadside Guns
Author's Photographs (©2020).

According to Captain G. Garbett, R.N., 'Naval Gunnery', 1897, pages 22-24, the Millar's brass tangent sight was of hexagonal form, that fitted into a block of gunmetal, which was screwed on behind the base-ring. The sight could be used for up to five degrees of elevation. One face had the degrees marked on it, while the other faces were engraved with various ranges (in yards) corresponding to different charge and projectile combinations. There were three charges used for smooth-bore guns at that time, reduced, full, and distant.

Captain John H. Stevens, R.N. provides a very useful text on the sights fitted to naval guns in his essay 'Some Description of the Methods used in Pointing Guns at Sea', London, 1834. One comment is worthy of mention here:

> *The breech of a gun is evidently larger than the muzzle; therefore, if a gun were pointed at an object, by looking over the surface of the metal, the bore would not point at the object, but above it, … this source of error is avoided by fixing a piece of metal on the upper surface of the gun, at any convenient part, of such height, as will make the height there, exactly level with the base ring.*

According to the 'Treatise on the Construction and Manufacture of Ordnance in the British Service', 1877, Chapter 3, page 69:

> *Before the introduction of General Millar's sights, all cast iron guns were laid by means of a quarter-sight scale from 0° to 3° marked on the base ring on each side of the gun, starting from the horizontal line at zero. Such scales are now marked only on Land Service (LS) guns up to 32-pdr inclusive…. The sights now used with cast iron ordnance are Millar's sights. These consist of a fore or Dispart sight of gunmetal screwed on to the gun in rear of the trunnions, on what is termed the second reinforce, and of a half-round brass tangent scale sliding in a gun metal block, which is secured to the breech of the gun by two screws.*
>
> *Pieces of sheet lead are placed between the foresight and the gun metal block of hindsight and the gun to assist in adjusting the sight accurately, and also to prevent the heads of the screws being broke off. In order to clear the breech of the gun, the scale of the hindsight is at an angle of 76° and not perpendicular.*

Stevens explains further:

> *In order to fire at any required elevation with tangent sights, it is only necessary to fix the index at that elevation at which it is intended to discharge the gun, and to fire when, by means of the motion of the ship, or an adjustment of the [elevating device], when the two points of the sight and the object are in line.*

Pivot Gun Sights

The contemporary imagery of large pivot guns in this period, such as those in HMS *Snake*, HMS *Sidon* and HMS *Immortalite*, generally do not show a rear sight fitted. However, it is notable that Captain Boxer's drawing of the Dundas' 25-cwt gun shows a mounting block for these sights, whereas the drawing for the modified Blomefield pattern does not.

Figure **9 – Blomefield Pattern Gun with Dispart and Millar Sight**
From Harold A. Skaarup's Silverhawk Website – Photograph by Doug Knight

A similar gun to that used in *Victoria*, located on the ramparts of Fort Henry in Canada (24-pounder 50-cwt Blomefield pattern), is shown with a 'Millar sight' fitted behind and above the base ring, and a 'Dispart sight' on the reinforce just forward of the trunnions. It would be unusual for such a gun not to be fitted with a sight; as such it is assumed *Victoria's* pivot gun <u>was</u> fitted with sights.

The rear sight was probably the Millar's hexagonal tangent sight (Figure 8 left), which was an improvement on the square version of the same sight. This sight was fitted on the centreline axis of the gun at the top rear of the base ring (breech ogee) and held with two threaded bolts set into an iron block forged onto the gun.

According to Dundas, page 390, the tangent scales fitted to the 32-pounder 56-cwt are only graduated to 4°. When greater elevations were required, a wooden scale of the same form, graduated from 4° to 6½°, was substituted and for still greater elevations a longer scale graduated up to 10°.

A front or dispart sight is shown fitted in all of the imagery, therefore it is safe to assume these guns were fitted with such a sight. When used in conjunction with the Millar sight, the gunner could accurately point the bore of the gun at the target allowing for the required elevation of the gun (range).

Figure 10 – Sights as fitted to the Blomefield Gun in HMCSS Victoria

Render illustrated by, and used with permission of, Chris. Ramsay ©2022

Broadside Gun Sights

The rear sight fitted to the *Victoria's* broadside guns would probably have been the Millar's hexagonal tangent sight. This sight was fitted on the centreline axis of the gun at the rear top of the base ring (breech ogee) and secured with two threaded bolts. The holes for fitting the sight are clearly evident in the many Dundas 32-pdr 25cwt guns purchased for the Colony of Victoria.

The hexagonal calibrated rod, made of bronze, was too long to fit this gun unless a hole was provided in the breech rope ring to allow the rod to be lowered into it. Again, this recess is quite evident in photographs of the Dundas pattern guns (see Figure 11) displayed in parks and other historical venues around the State of Victoria.

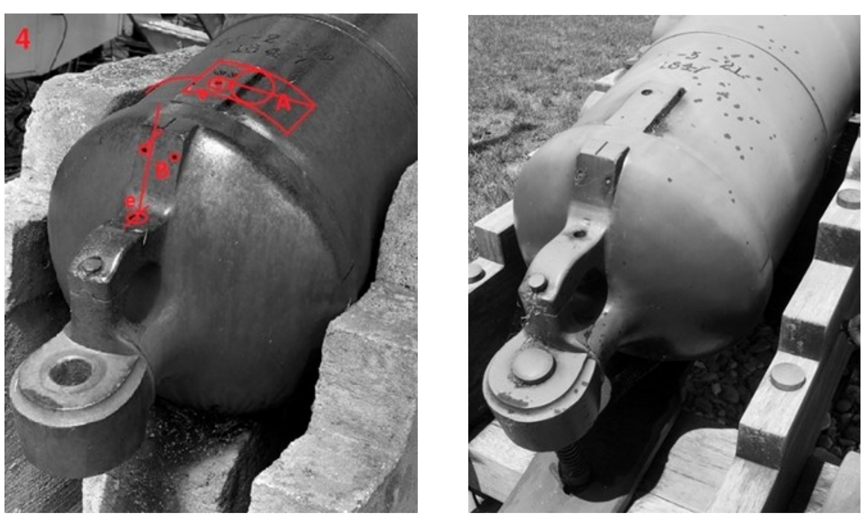


Figure 11 – Breech Ogee with Gun Sight and Gunlock Fitting Holes

Photographs by, and used with the permission of, ©Keith Quinton.

The forward sight was a dispart sight and probably of the same design as fitted to the pivot gun. However, the height, or dispart, would have been adjusted to allow for any difference in the thickness of the metal of the Dundas gun barrels.

GUN DIRECTOR

The gun director, used for aiming and controlling the broadside guns as a group, was introduced about 1850. The 'Director' was intended to provide concentrated broadside fire for broadsides from guns of equal calibre. However, as it was difficult to communicate the information to all broadside guns, this instrument did not see widespread use until the introduction of wired communication systems.

Garbett (1897), page 30, informs:

> *…the late Captain [Constance R] Moorsom, R.N., an officer of high scientific attainments, introduced an instrument called the "Director", which in these latter days has been brought to great perfection, and by means by which the guns bearing, heel, and distance were all determined, and the guns laid accordingly; it was generally fixed on the upper deck, over the centre main- deck gun, …*

Douglas (1860), page 454, provides a good description of this instrument and how to use it. Further mention of this device is made by Hearle in his 'The Seaman's Catechism and Instructor in Gunnery' (1868), page 46. Unfortunately, imagery of this device has not been found.

GUN CYPHERS

Contemporary documents suggest that cyphers on naval guns were being phased out during this period; however, sufficient evidence has been found to support the existence of a cypher on all of HMCSS *Victoria's* guns. This would have been a 'Queen Victoria' cypher as the guns were manufactured during her reign.

Close inspection of the photograph of a broadside gun on *Victoria's* after deck (Figure 12), reveals the raised surface of an embossed cypher. The embossed features are faintly visible when the photo is enlarged, and the contrast adjusted.

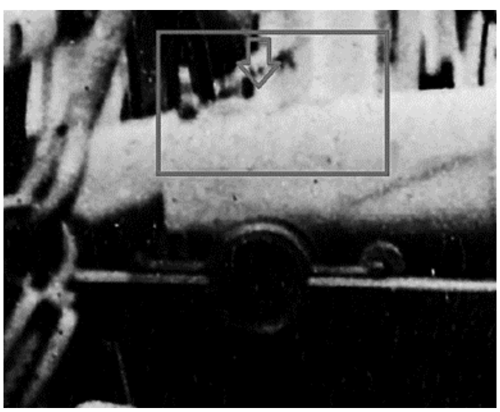


Figure 12 – *Victoria*'s Broadside Gun Showing Possible Embossed Cypher
Crop of Image a14945 from State Library of Victoria –Accession Number H41413.

Figure 13 – Queen Victoria Cypher on the Clunes Museum 32-pounder Gun
Author's Photograph (©2017).

As the pivot gun would also have been manufactured during Queen Victoria's reign, her cypher would have been embossed on the pivot gun also. An example of the cypher, as photographed on a 32-pounder 25-cwt gun, on loan from the Clunes Museum to 'SeaWorks', Williamstown, Victoria, is shown at Figure 13. This gun is claimed to be from HMCSS *Victoria*; however, what little provenance exists has yet to be validated.

PROTECTIVE COVERS/APRONS

When operating in areas where action may be expected without warning, the guns were sometimes kept loaded. This required precautions to be taken to prevent the powder in the barrel getting damp, and to prevent the gun being fired accidentally. The bore, vent, gunlock and sights also needed protection from the elements and accidental damage when the guns were not loaded.

The muzzle of the gun was sealed with a wood tampion, while the vent was protected with a shaped lead apron. The very early aprons were simple 8" by 10" rectangles of lead sheet placed over the vent hole; however, the introduction of gunlocks made this practice impractical. A new style of lead cover was introduced, which was shaped to fit over the gunlock and coarsely contoured to the gun barrel it was fitted to.

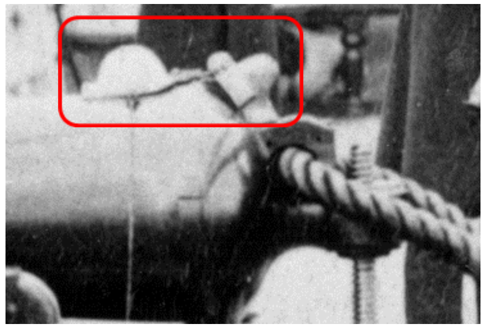


Figure 14 – *Victoria's* Broadside Gun with Protective Covers Fitted
Crop of Image a14945 from State Library of Victoria –Accession Number H41413.

Endnotes

1. PROV : VPRS 1189 : P0000 : Box/Unit 580 : A53/4698 : Letter Commander Lockyer to Lt.-Governor La Trobe : 16 April 1853.

2. CO309/16 R811 F395, 398, 399; 15.7.53 Colonial Secretary (Col Sec/Lockyer ibid, F383.

3. National Archives (Kew UK) : Colonial Office Records : CO 11/1 : page 190 : Briefing Note to the Secretary of State for the Colonies : 5 June 1855.

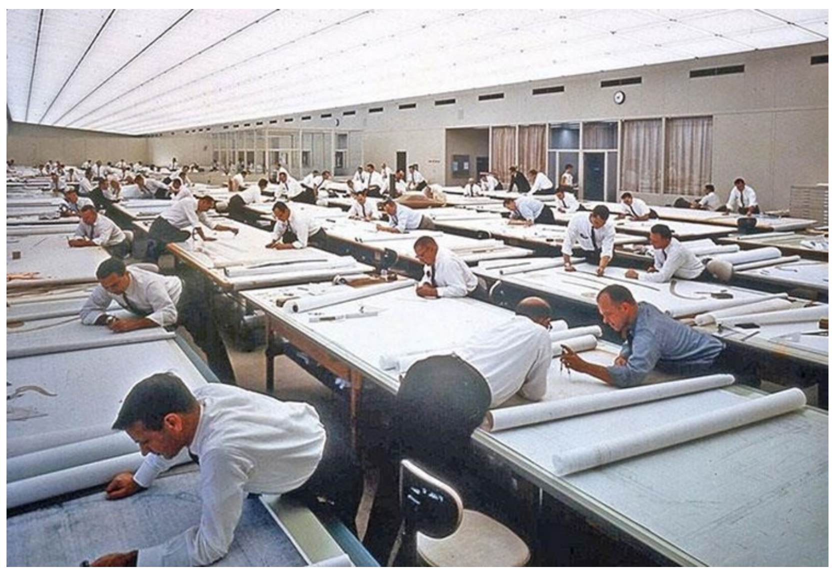
4. Shire Album Series, No. 186, Naval Cannon, by John Munday, page 29.

5. 'British Smooth-Bore Artillery: A Technical Study to Support Identification, Acquisition, Restoration, reproduction, and Interpretation of Artillery at National Historic Parks in Canada', David McConnell, 1988, ISBN No: 0-660-12750-4.

Makerspace

By Mike Shanks

Whether you build models from kits or scratch, the development of scale models via computer has become a mainstream standard. Computer Aided Design (CAD) software emerged as a tool which revolutionized the engineering field by allowing designers and draftsmen to collaborate as never before to create 2D and 3D drawings. Like many fields, the use of computers vastly increased engineering capabilities across industries to include architecture, construction, automotive, electrical, video games and film making. CAD software made its way into the scale model building arena as a natural fit considering the key output of CAD is scale drawings and computer rendered models. This month's Makerspace column will review the history of CAD, explore the features of CAD tools and look at some of the more popular products used in model building.



Drafting Technicians at work.

Some of us are old enough to remember a time before computers. A time when those 8th grade drafting classes taught us how the thickness of a pencil line mattered or how 1 degree off on an angle could ruin the design of a mechanical device. My dad worked as an Electrical Estimator and I still remember his big, tilted drafting table where he would spend hours hand drawing electrical blueprints, making measurements and manually calculating the linear footage of wiring needed for a building project. It is hard to believe an aircraft like the Lockheed SR-71 and the Apollo moon rockets were all designed, engineered, and drawn on paper using pencils, straight edge, and compass with calculations made by slide rule. Large engineering companies would employ armies of drafting technicians to meticulously draw and redraw detailed designs for objects as simple as a machine screw or as complex as a spacecraft. Drafting and mechanical drawing were common coursework in primary schools and colleges around the world. Industrialization and factory fabrication required blueprints of precise designs. Blueprints required skilled draftsmen to draw them. Draftsmen needed design engineers to provide them requirements. One stray pencil mark or a slight deviation on a curve could mean a flawed product with expensive consequences. Human error was common throughout the process where attention to detail and precision met pencil with paper. The manually intensive process of drafting also meant a very long design cycle for complex projects. The concept of rapid prototyping did not yet exist.

In 1981, IBM introduced the first Personal Computer (PC), and things began to change. The idea of drawing on a computer was one of the first applications developed. AutoDesk released its original version of AutoCAD in December 1982 offering engineers the ability to create drawings on a computer far more accurately than could be attained on paper. History has shown as technology advances some occupations disappear or merge with others. This happened with the traditional drafting technician. CAD software allowed the designer, engineer, and draftsman to become the same person. Fewer people were needed, collaboration was streamlined, human error was vastly decreased, and design lifecycle improved. Drawings could more easily be altered on a computer and productivity increased. As more CAD software tools were developed, engineers began creating databases of drawings, objects, materials, dimensions, tolerances and fabrication processes. This led to the use of computers to control the actual production of parts also known as Computer Aided Manufacturing (CAM). The huge floorspace previously taken up by drafting tables and blueprints was replaced by CAD engineers using PCs in air-conditioned office buildings. Eventually the speed at which an idea could become a reality developed into processes known as rapid prototyping – the fast fabrication of a physical part, model or assembly using CAD.

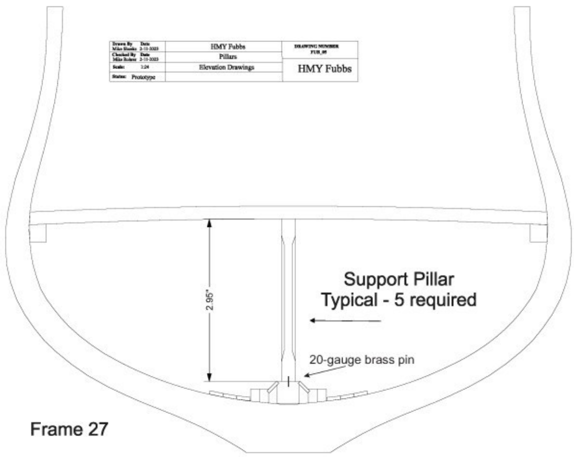
The use of CAD for scale model building followed similarly to other industries but for the most part stayed proprietary to kit companies, architects, and professional model makers. This was mostly due to the costs involved. Early PCs were very expensive as was CAD software. Since CAD software leveraged both the computational power of a computer as well as dedicated graphics hardware, designers tended to need the most powerful (and expensive) PCs available. These costs combined with the steep learning curve kept CAD away from mainstream model builders and hobbyists for a long time. Over the past 10 years, the power of personal computers has increased dramatically while the cost has similarly decreased. On the software side, the market is now flooded with CAD products ranging from free to very expensive. While buying a powerful PC is easy, deciding what CAD software to use and learning how to apply it to model building can be daunting.

Drawing on a computer or graphic arts in general can be defined via two types: vector and raster.

A **vector** drawing is comprised of discreet points connected by closed lines in the forms of lines, rectangles, triangles, circles, etc. Commonly referred to as line drawings these are what you mostly see when looking at model kit plans and archival ship drawings. Vector drawings can be 2 dimensional or 3 dimensional and are always used for engineering design purposes. They have very specific dimensions, angles, arcs, and diameters. Where symmetrical, vector drawings will have the exact same attributes on both sides of the centerline. Vector drawings are what the classic draftsmen did with pencil and paper. They are what I think of as “techie” type drawings. A 2-inch vector line drawn with CAD software would be exactly 2.00” long. Not approximately – exactly!

Raster drawings on the other hand are comprised of many small dots or pixels of varying shades and colors blended to render into an image. This is the more artistic type of drawing. The type you see with bitmap images, computer gaming graphics, paintings, digitized photos and animation. Raster drawings may or may not have symmetry or discreet dimensional attributes. They are typically created freehand versus using lines connected by points. Raster drawings are what true “artists” create. For model ship building, examples of raster art would be drawings of figureheads, sculptures, carvings, painted friezes, and other decors. Like vector drawings, raster drawings can be either 2D or 3D. For most people, raster drawing is probably more difficult than vector drawing. Raster drawing is much more subjective and trends more towards organic shapes found in nature versus geometric constructs.

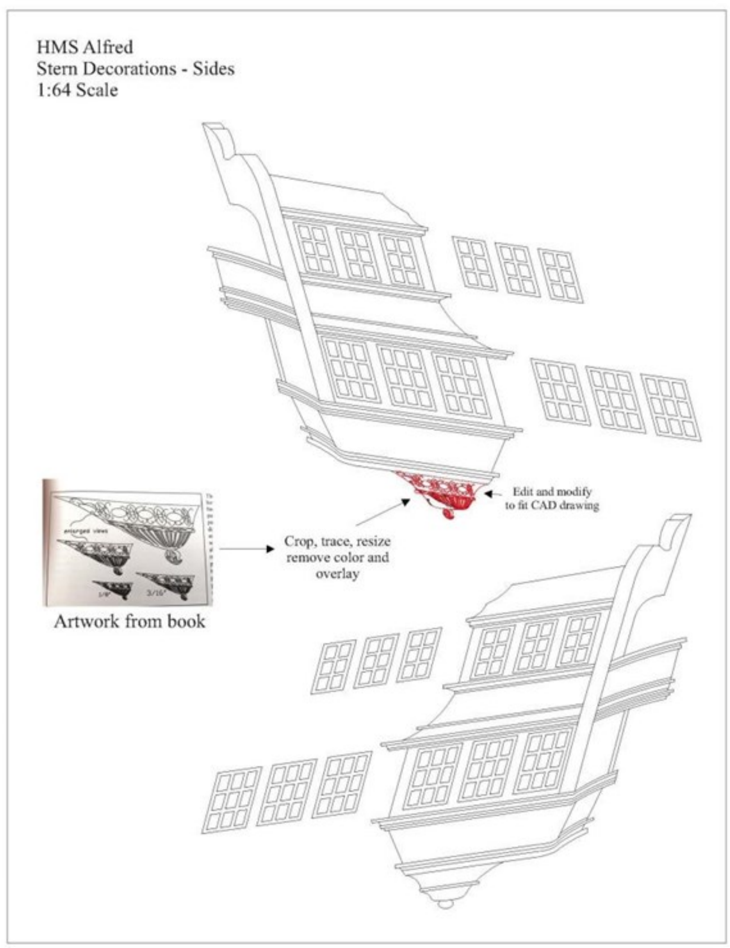
Another way to think of the two types of drawings would be that vector is more left-brained or analytical whereas raster is more right-brained artistic/creative.



Ex: Vector Drawing

x: Raster Drawing

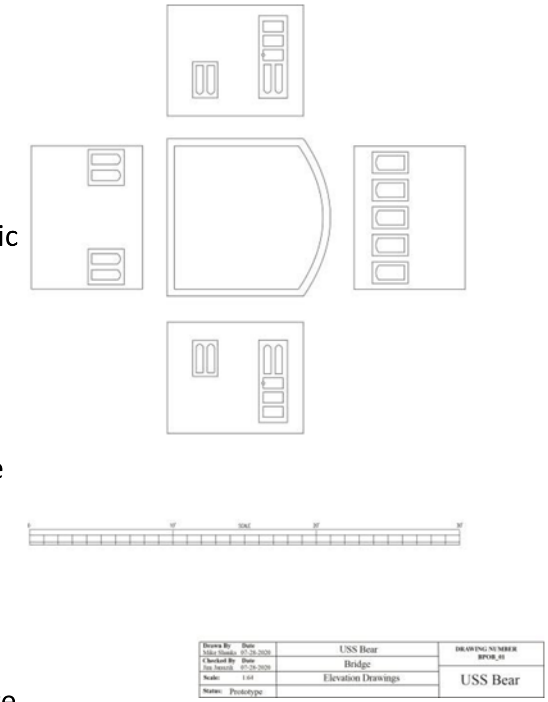
Using CAD software to create vector drawings is the most common form we would use for model ship design but not exclusively. Although beyond the scope of this article, it needs to be noted that raster artwork may be used as the basis for creating vector drawings such as in the example below.



Here we have taken a digital photo from a book (raster image) and used CAD software to crop, trace, and scale the décor we want to model. The resulting drawing is then converted to vector graphics that can be used later to create CAM toolpaths for laser cutting, 3D printing, or CNC.

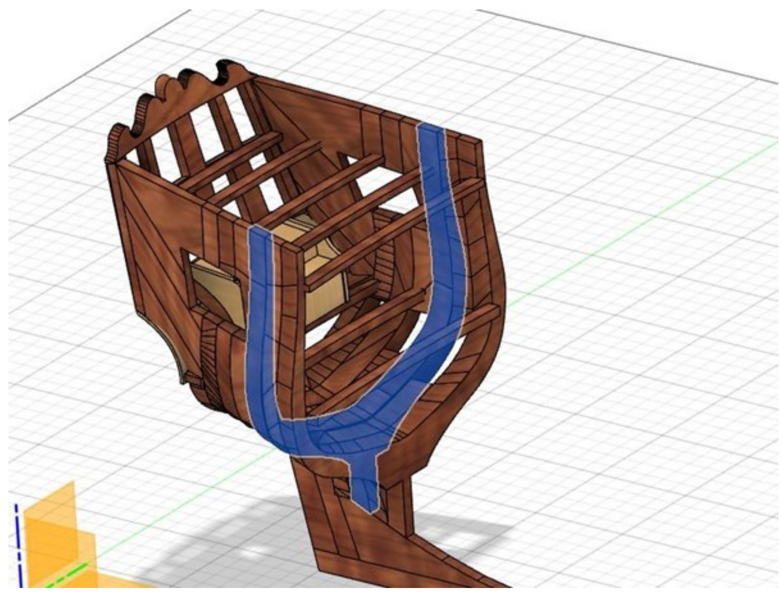
We know model ships require plans to build them. Plans are comprised of drawings. Model ship plan drawings are typically vector type. Traditionally, the drawings of model ships and their parts were done in 2 dimensions via elevations of a side, top, bottom, front, rear views as needed. The drawings would be annotated with a scale, ruler, and other attribute information as shown below.

In recent years we have seen more CAD drawings of an isometric nature that depicts the object in a more 3-dimensional view. Maris Stella is a good example of a model kit company that provides a lot of isometric drawings of its models. These types of drawings give the builder a better idea of how parts fit together and a better visual depiction of the orientation of parts on the model. Of course, isometric or 3D drawings are more difficult to create and require more specialized CAD software than what basic 2D drawing programs offer.



Typical CAD elevation drawing

When it comes to selecting CAD software, the sky is the limit. There really is no single product that can perform every function that may be needed for model building. It is best to think of CAD software as a toolkit. More than one tool may be needed in your kit. CAD software can be free, cheap, or expensive. With that comes capability from basic, to adequate, to professional. Ease of use should also be a selection criterion especially if you are new to CAD. Basic CAD software can be learned in a couple hours where more advanced packages can take days, require video tutorials, reading books or even attending formal training. While all drawing software share similar functionality here are some other key considerations to think about before diving in.



Typical 3D isometric CAD drawing

File support – there are many different file formats used for CAD work to include: dwg, dxf (AutoCAD), ai, pdf (Adobe), obj, stl (3D), crv (Aspire), cdr (Corel), jpeg, bmp, tif (Bitmap), eps (postscript). Look at the types of files you plan to work with, the sources of files you might download from the internet, file types used by 3rd party providers, file formats used by friends and collaborators you share with. See what file types the CAD software supports and what export functionality it has to convert files from one type to another. This becomes important when you are using multiple CAD programs in your toolkit or sharing files from different sources.

CAM integration – Computer controlled fabrication equipment such as 3D printers, CNC machines and lasers use rudimentary machine code languages to function. They usually come with their own CAM software for creating toolpaths or in the case of 3D printing slicing files. Some CAD packages include built in native CAM support for certain hardware. This can be useful and reduce the number of software packages you will need in your CAD toolkit.

Computer requirements – CAD software has steep PC requirements. Next to gaming perhaps the steepest of all hardware requirements is CAD software. It is a very CPU intensive application due to the massive number of mathematical computations it must continuously do and update. It is graphics hardware heavy due to the visual nature of it being a drawing program. Most CAD users have large format high resolution displays which require a dedicated graphics processing unit (GPU). If you start creating drawings for a model ship project, you will quickly discover how many files you will generate that require disk storage. Drawing files, 3D object files, reference photos, clipart, toolpath files, and various versions of each. Even if you obtain a free version of CAD software you will still need a high-end, modern PC with an updated operating system.

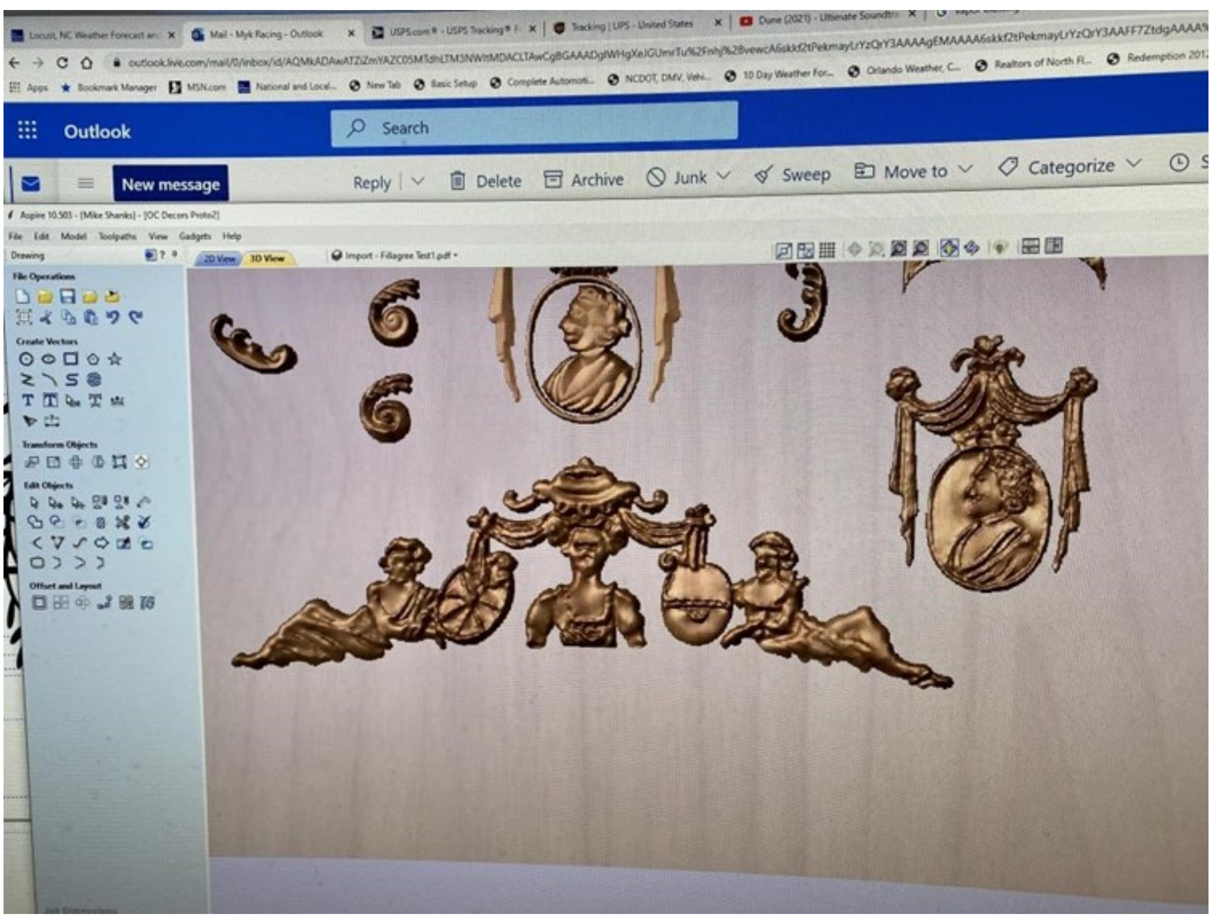
2D, 3D, or both – What types of drawings do you intend to make? If you are only going to do basic vector elevation drawings for ship models you can probably be successful with one of the free or less expensive products out there. If you want to create 3D drawings to render isometric visualizations or files for 3D printing you may require an additional program or a more expensive CAD package that supports both 2D and 3D drawing. Also consider your own skill level. If you are just starting out with CAD and have no prior drafting experience, you might want to just stick with 2D for a year or more before venturing into the 3D world which is much more complex to learn than 2D.

Raster support – Do you want to import bitmap images or photographs into your CAD drawings? If so, you will need a CAD program that supports raster images. Some packages do this better than others. Raster is really nice to have if you do laser etching as it allows you to etch artwork directly onto wooden model parts. The other very powerful feature to look for is Tracing. This is the ability to import a bitmap image and then automatically trace the bitmap and convert that tracing into vector line art. This would allow you to take a photograph of an object, import that photo into CAD, trace the object, convert the tracing to vector and then either create a toolpath to CNC a model or create a 3D file for 3D printing.

Clipart – Some CAD packages come with pre-made clipart files of many common shapes, objects, architectural structures, fillagree, wreaths, badges, etc. that can all be used as part of your design.

Product Support – The best CAD software is continuously updated and improved. The more expensive packages also come with extensive training support to include online video tutorials and books. *(continued next page)*

Here we take a photo (raster image) and import it into CAD



We use CAD to Trace and convert the image to vector graphics

Then we create a CNC toolpath to carve scale replicas of the parts in boxwood

I do not have the knowledge to list every CAD software package out there. There are so many choices, it is mind boggling. A lot of it comes down to personal preference, your skills with a computer, and how much money you want to spend. CAD at the professional level is an occupation on its own and can

easily consume one's free time as a dedicated hobby. You could get so deep into CAD that you never have time to build a physical model. With that said, here are some of the software packages I am familiar with that are used by myself and others I have collaborated with.

AutoCAD – A member of a family of products from AutoDesk. Probably the most comprehensive and expensive line up of CAD tools you can obtain. Used by engineers, architects, and other professionals worldwide. It might be a bit of overkill just for drawing scale model ships. AutoCAD has a very steep learning curve but there is also a ton of training material available. The product features extensive add-on support to include CAM, clipart, file translation and more. Subscription or purchase based. Expensive.

Fusion 360 – Also by Autodesk, is their standalone 3D CAD application. This product is also expensive but can be used free for hobby and educational, non-commercial use. It is fully cloud based and is easy to download. It has quickly become the community standard for creation of 3D drawings. It also does full 3D rendering, documentation annotation, and parts assembly animation. It can directly create files compatible for 3D printing.

Vectric Aspire – Vectric is another family of CAD products. Supporting both 2D and 3D drawing Aspire is very comprehensive and expensive. It has a top-notch online tutorial training facility and a world class clipart library that includes many 3D objects that can be adapted for ship model building. It also has built in CAM functionality with native toolpath support for ShopBot CNC machines and others. It can also import, create, and export both obj and stl files for 3D printing.

Corel DrawX64 – Corel Draw is more of your classic type of drawing program that has continuously been upgraded through the years. It is in the medium price range and much easier to learn than the previously mentioned packages. Although it only supports 2D drawing it has a very powerful bitmap tracing function and handles raster images with ease. It is a very good product for laser etching/cutting. It can import just about every file type you can imagine. It can also natively generate PDF documents from drawings.

Mudbox – This is another tool from AutoDesk that allows 3D sculpting and painting. It is good for creating statues, figureheads, and 3D carvings.

ActCAD – A full 2D and 3D CAD program with a large worldwide installed base. Similar in functionality to AutoCAD but much cheaper and includes a perpetual use license.

Paint 3D – If you have a current Microsoft Windows PC, you already have a drawing program installed. Paint 3D has both 2D and 3D functionality. It has enough capability to get your feet wet enough to decide if you want to dive deeper into the world of CAD. You may not even know it was on your PC. Only a click away. Try it.

We are scale model ship builders. So why all this talk about CAD drawing and computer software? Technology has advanced to where tools such as 3D printers, lasers, and CNC machines have reached consumer affordability. Just like bandsaws, lathes, and milling machines did decades earlier computercontrolled tools have become mainstream today. We need to feed these high-tech tools with drawings created on a computer. Now scratch builders can draw and design a cannon once and then 3D print it hundreds of times. Or create a sculpted model in the computer and then CNC that same model many times versus carving it by hand. Ultimately, productivity increases along with model fidelity. We are working on a small scale so the more detail we can achieve the better the model will appear. CAD software opens that door to new creative ways of building models. While not for everyone, it does move the hobby as a whole forward. I see that as a good thing - Sail on!

barque Ella Moore

Ella Moore was a Canadian barque that enjoyed a long career sailing the North Atlantic and survived many storms and even a grounding in 1892 before being scrapped in 1907.

Construction

Ella Moore was built in Halls Harbour, Nova Scotia, Canada, for the D.B. & C.F. Eaton of Cornwallis company. She was completed 1867 and was at the time one of the largest vessels built in Halls Harbour. The ship was 41.5 metres (136 ft 2 in) long, had a beam of 9.2 metres (30 ft 2 in), and had a depth of 4.5 metres (14 ft 9 in). She was assessed at 391 GRT and had three masts.

Career

Ella Moore enjoyed a long career on the North Atlantic, where she survived a number of severe storms that lightly damaged her. She also made some fast passages, including a voyage in 1881 from Eatonville, Nova Scotia, to Belfast, Ireland, and back with a cargo of lumber which she made in only two months.

Ella Moore ran aground on rocks near Canso, Nova Scotia with a cargo of railroad ties. Despite her precarious position, she was refloated, repaired, and returned to service later that year.

Final disposition

Ella Moore was scrapped in 1907. She had sailed the North Atlantic for 40 years before her retirement.

Ella Moore run aground

Deck Furniture on Model Ships - Part II

By Robert Hunt

In this issue we'll carry on with our Deck Furniture on Model Ships article. Here in Part II we'll look at Pumps, Steering Mechanisms, Stoves, bits, racks and rails.

Pumps

There are two types of pumps that might be found in a model ship kit. Most ships had what is called the ***elm tree pump***. These were usually installed in pairs on the main deck. Photo 1 shows one of the pumps for the Model Shipways kit, *Armed Virginia Sloop.*

Photo 1

These pumps were usually octagonal in shape, hollow in the center, had metal bands around the circumference that held the pieces of elm together, and a handle with a rod attached that had a leather disk on the end used to pump water out of the hold of the ship.

Making an elm tree pump from scratch is fairly simple. Most kits start with a dowel or a thicker square piece of stripwood. The wood piece is cut to length first. Your kit plans should show in the profile view how tall the pump is.

After cutting the wood to length, it is shaped into an octagonal shape throughout the full length. This is fairly easy when using a square strip of wood. Simply trim off the four corners to form the shape. A round dowel must be shaped into a square shaped top to bottom first. Next, the four corners can be trimmed off to form the octagonal shape.

After the shaping is done, a hole is drilled through the center, end-to-end. Then, the handle support is made from stripwood or may be a cutout part in the kit. The handle itself is also shaped from stripwood and attached to the handle support with a piece of wire. The last step is to add the metal bands. These are usually made from strips of black construction paper. *(continued next page)*

Some kits come with a cast metal pump that simply has to be painted. Often a spout is fashioned from a small piece of stripwood cut and glued to one side of the pump. Photo 2 shows the pumps in the Amati kit, HMS Pegasus. Notice the spouts made from a small white colored dowel.

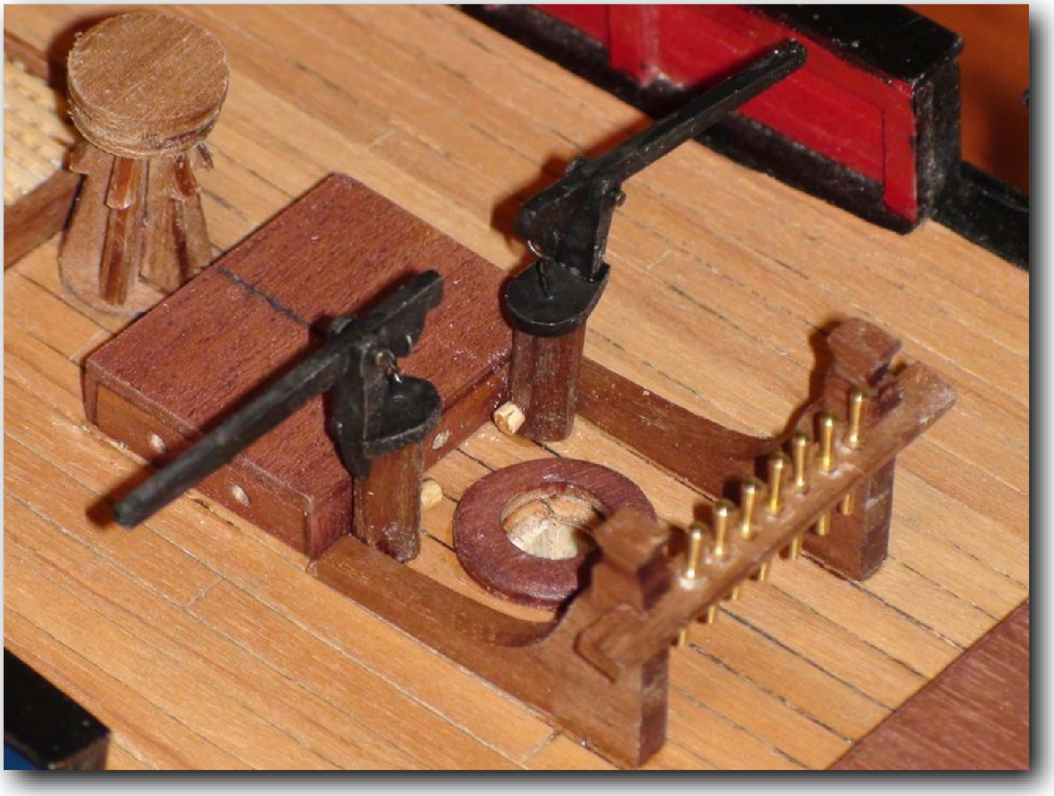


Photo 2

These pumps have a wooden base with cast metal tops that include the handle holder and handle. A piece of wire is attached to the handle which then passes through a hole in the metal top.

Photo 3 shows yet another pump from the Artesania Latina kit, Swift. This pump was all metal which needed to be painted before it was installed on the deck.

Photo 3

The second kind of pump found on larger ships was the chain pump. This pump was also installed on the main deck of larger ships. Photo 4 shows such a pump on the Amati kit, HMS Pegasus. This pump sits between two large bitts. It has two wheels that the chains passed over. The wheels were covered with a wooden housing.

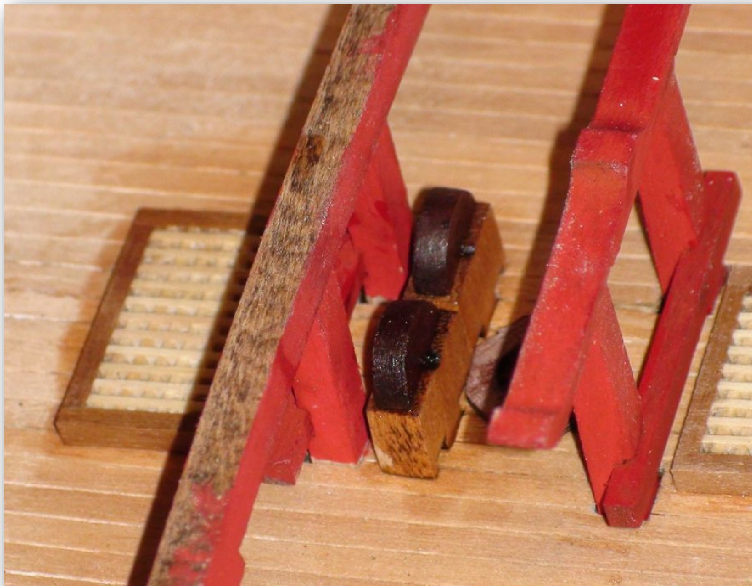


Photo 4

Photo 5 shows a more detailed version that I designed and included in my HMS Kingfisher kit. It featured photoetched parts as well as other brass parts and bolts to create a scale replica of the chain mechanism inside the pump.

It is doubtful that any kit on the market today will have such details, but I wanted to show you these pumps so that you would have a better understanding of how they were actually constructed and what they would have looked like.

The chain wheel had iron rods that passed through them which were attached to a large pair of bitts. These large rods had smaller bent rods, which served as handles that men could push to turn the chain wheels. The chains which wrapped around the wheels would then turn and pump water up from the hold of the ship.

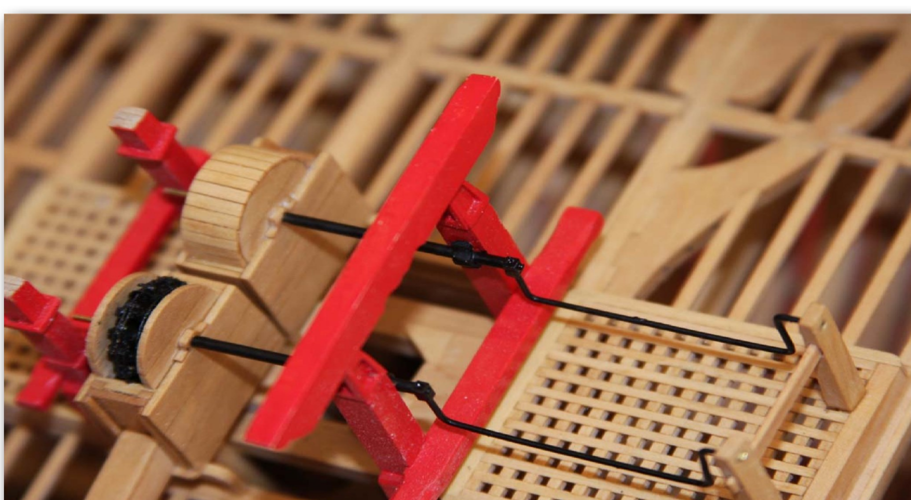


Photo 5

Photo 6 shows a detailed drawing of how these chain pumps were made.

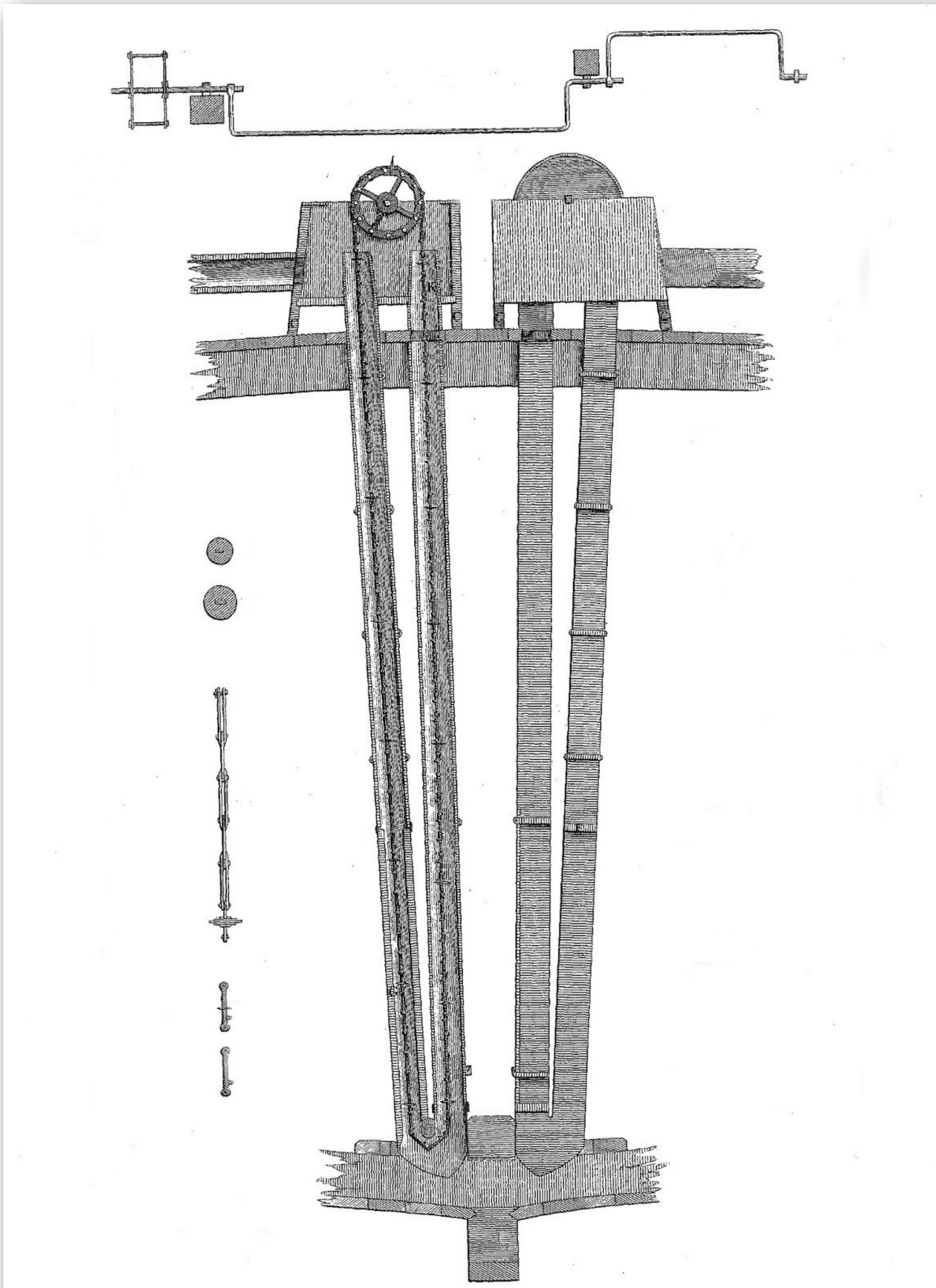


Photo 6

Only kits of very large ships will have chain pumps and most will not show any of the interior details. These pumps had wooden tubes that extended outward to the sides of the ship where the water would pass through large scuppers in the bulwarks. Photo 7 shows this tube on my HMS Kingfisher kit.

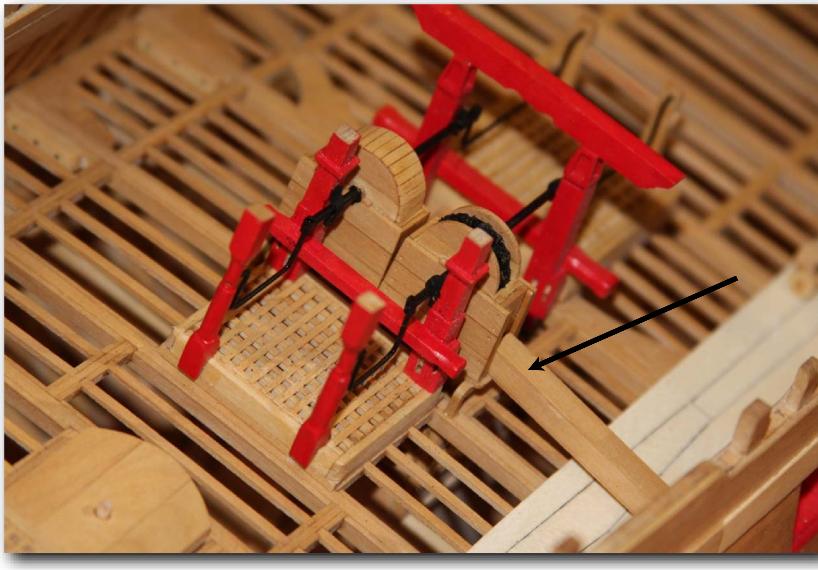


Photo 7

Even the Amati kit, HMS Vanguard, a 74 gun British warship did not include these pumps because their location on the main deck was in an area that was not easily visible. If you are building a large warship such as the HMS Victory or HMS Bellona, your kit might include these pumps but they will be simplified versions of the actual pumps I included in my HMS Kingfisher kit. Follow your kits plans instructions for assembly of the more simplified versions.

Photo 8 shows the chain pumps and elm tree pumps on the Caldercraft kit, HMS Surprise.

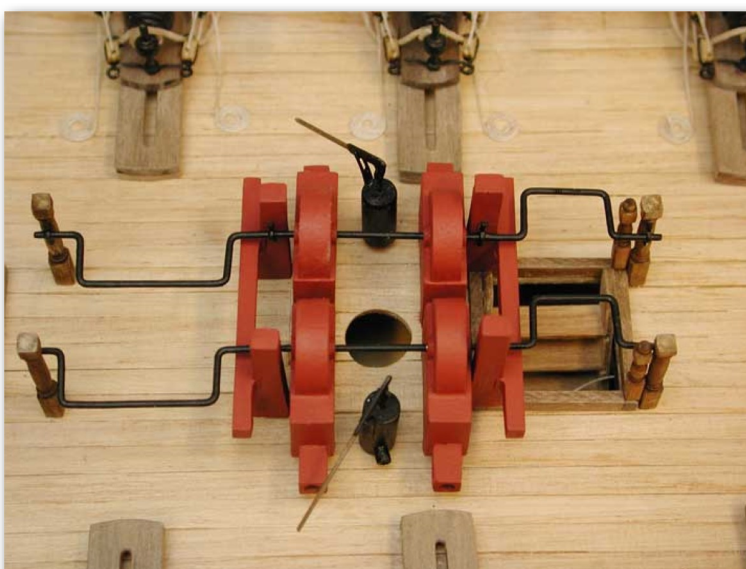


Photo 8

The wooden tubes on these pumps do not extend all the way to the side of the ship, but water pumped out of the hold would still flow to the outside edges of the deck and exit through scuppers.

Steering Mechanisms

All ships had a rudder for steering the ship. Small ships used a tiller attached to the rudder that was pushed or pulled by one individual to turn the rudder and thus steer the ship. Photo 9 shows a simple tiller on the Artesania Latina kit, Swift. The tiller had a hole drilled through one end which was installed over the upper end of

Photo 9

the rudder.

Larger ships required a ship's wheel to steer the ship. The ship's wheel was mounted to a drum which had rope wound around it. Special mounts held the wheel in place on the deck of the ship.

The wound rope extended out to the sides of the ship passing through pulleys mounted to the deck. From those pulleys the rope traveled to the aft end of the deck passing through another set of pulleys before being attached

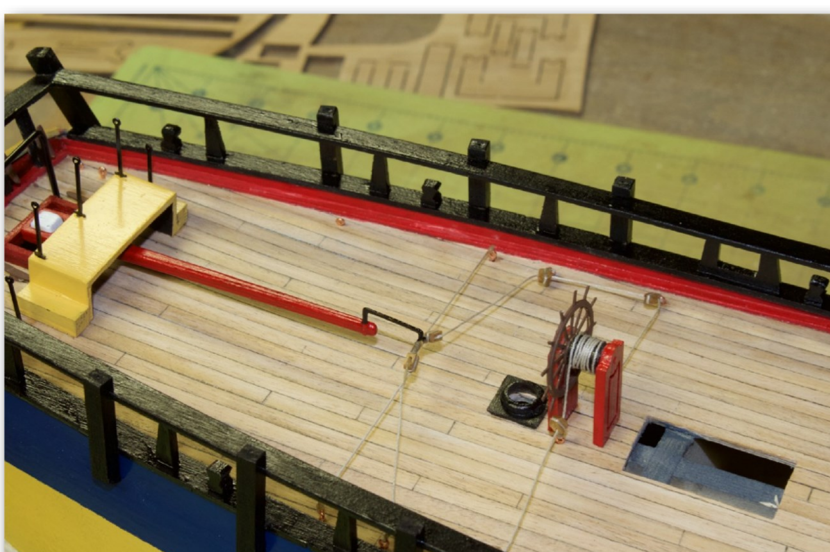


Photo 10

to a tiller that was mounted to the rudder. When the wheel was turned, the rope moved and pulled on the tiller turning the rudder right or left depending on which direction the wheel was turned.

Photo 10 on the previous page shows such a setup on the Caldercraft kit, HM Bark Endeavour.

Kits with a ship's wheel generally will have a photo etched brass wheel due to the scale of the model. The drum will be made from a dowel and the special mounts that hold the drum and wheel will be cutout parts. The pulleys will be attached to eyebolts installed in the deck.

Below, Photo 11 shows a double ship's wheel that came in the Amati kit, HMS Vanguard. The photo etched wheels were painted brown to simulate wood. The mounting parts were laser cutout parts, and the drum was made from several disk-shaped cutout parts stacked together to form a dowel. A hole through the center of these disk-shaped parts was used to pass a brass rod through, which was then inserted into a corresponding hole in the wheel mounts.

Photo 11

Smaller, less expensive kits might include a pre-assembled wooden ship's wheel or a cast metal wheel, like the one shown in Photo 12. This is the Model Shipways kit, Pride of Baltimore.

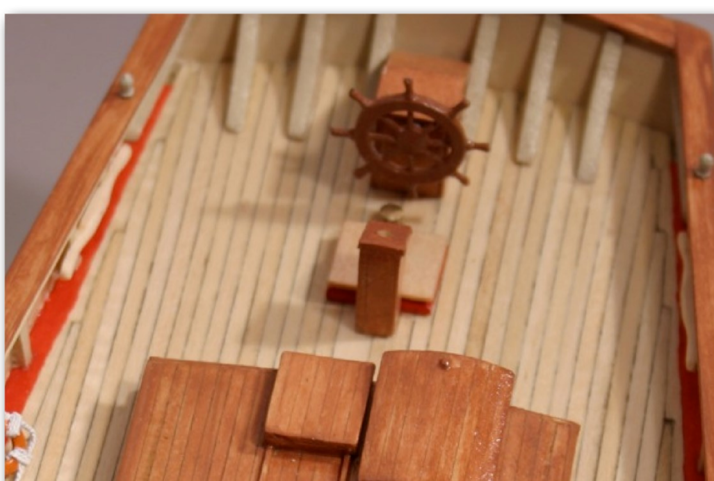


Photo 12

This wheel has no rigging because the shaft of the wheel disappears inside the wheel house that it is attached to.

Photo 13 shows the ship's wheel in my *HMS Kingfisher* kit. This wheel was made entirely of wood. The spokes were hand carved individually. The mounting parts used contrasting woods of holly and Swiss pear wood. The scale of most kits is too small to fully detail the wheel. As you can see in the photo above, this wheel is not much larger than an American quarter.

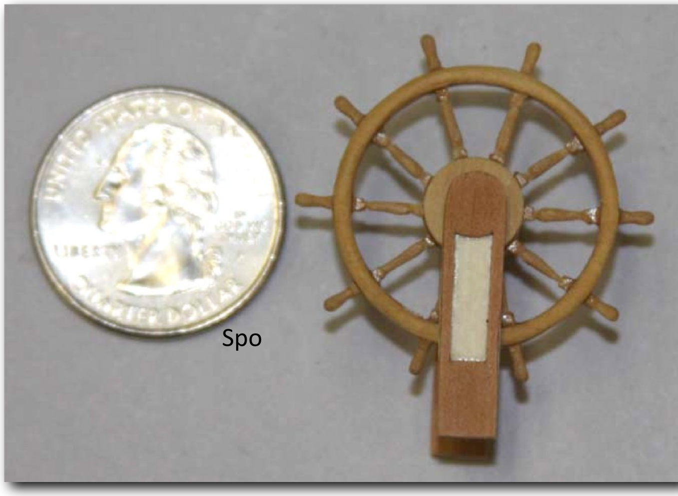


Photo 13

Most ship kits will include a simplified version of the wheel. It might be a single part like the one in Photo 35, or it might include a wheel and some cutout parts for the spindle and mounts. They are easy to assemble and your kit plans will show you what parts in the kit are used to make the assembly.

Ship's Stove

Many kits of larger ships such as the Amati kit, *HMS Vanguard* and Model Shipways kit, *USF Confederacy* include a ***ship's stove***. The ship's stove would have been made of heavy iron. The stove in a kit might be made of wood or wood covered with brass parts like the *HMS Vanguard* stove shown in Photo 14.

Photo 14

This photo shows the stove's individual brass parts before it was painted. Some styrene tubing was used for vent pipes and the base of the smoke stack was made of cutout parts included in the kit.

Photo 15 shows this stove after it was painted and mounted to the deck.

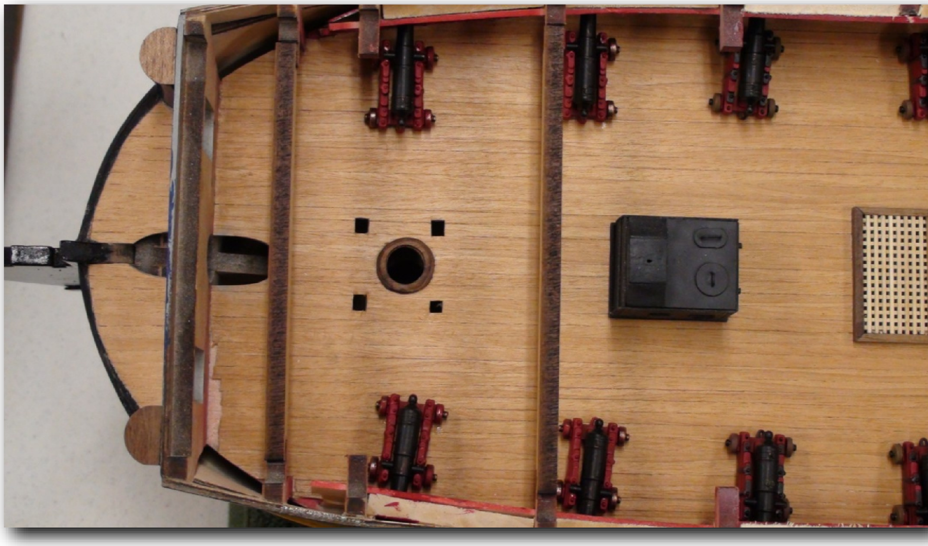


Photo 15

Very few kits will include the ship's stove, either because it can't be seen or due to the small scale of the ship. Those who wish to do a bit of kit bashing by making a stove from scratch should contact me. I drew a nicely detailed stove in 3D which I can have 3D printed in different scales. The default scale is 1/4".

Photo 16 shows the 3D printed stove which includes a separate brick base. The various details on the sides, top and inside are included in the printed stove. All that is needed is to paint the parts and install a chimney.

Photo 16

Bitts, Racks, and Rails

Every kit has various ***riding bitts, belaying pin racks, and caprails*** across the tops of the bulwarks. In this section, I will cover many of the examples you can expect to find in your kit and how to make them.

Photo 17 shows what is typically referred to as a riding bitt. This one appears on the Model Shipways kit, *Armed Virginia Sloop.*

Photo 17

Often these simple bitts were used just forward of a hatch, where the anchor cable would pass through some holes in the hatch to the deck below. The bitts kept the heavy anchor rope off of the deck, so that some of the water could drain off.

Bitts consists of two posts and a heavy cross piece timber. The posts would have notches cut in them as would the cross piece timber so that the two would fit together. I like to drill a hole in the bottom of each post and super glue a cutoff brass nail into the hole to give the bitts additional strength when attached to the deck.

Photo 18 shows a set of bitts ready to be attached to the deck.

Photo 18

Often, there would be sheaves in the post that rigging lines would pass through. The tops of the post might be left un-carved, so these rigging lines could be tied off. Due to the scale of some models, the sheaves are sometimes simulated by drilling a hole through the post or leaving a gap.

Photo 19 shows an example of this. These bitts are from my HMS Kingfisher kit.

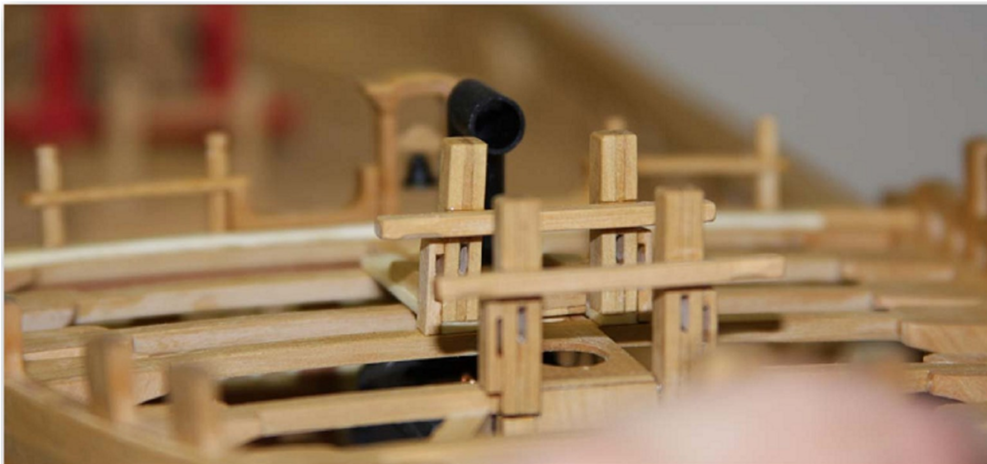


Photo 19

The posts for these bitts are made from three layers of wood. By leaving gaps in the middle layers, rigging line can pass through the slots formed by the gaps, and be tied off to the tops of the bitts.

Another type of bitts commonly found on model ships is called the bowsprit bitts. As the name implies, these bitts are at the bow of the ship and usually have a mortise in them where a tenon on the end of the bowsprit is fitted. Photo 20 shows an example of this on my scratch built model of the Hannah.

Photo 20

Sometimes the bitts will have additional support pieces attached to the posts as shown in Photo 21. These support pieces will usually be cut out parts in the kit.

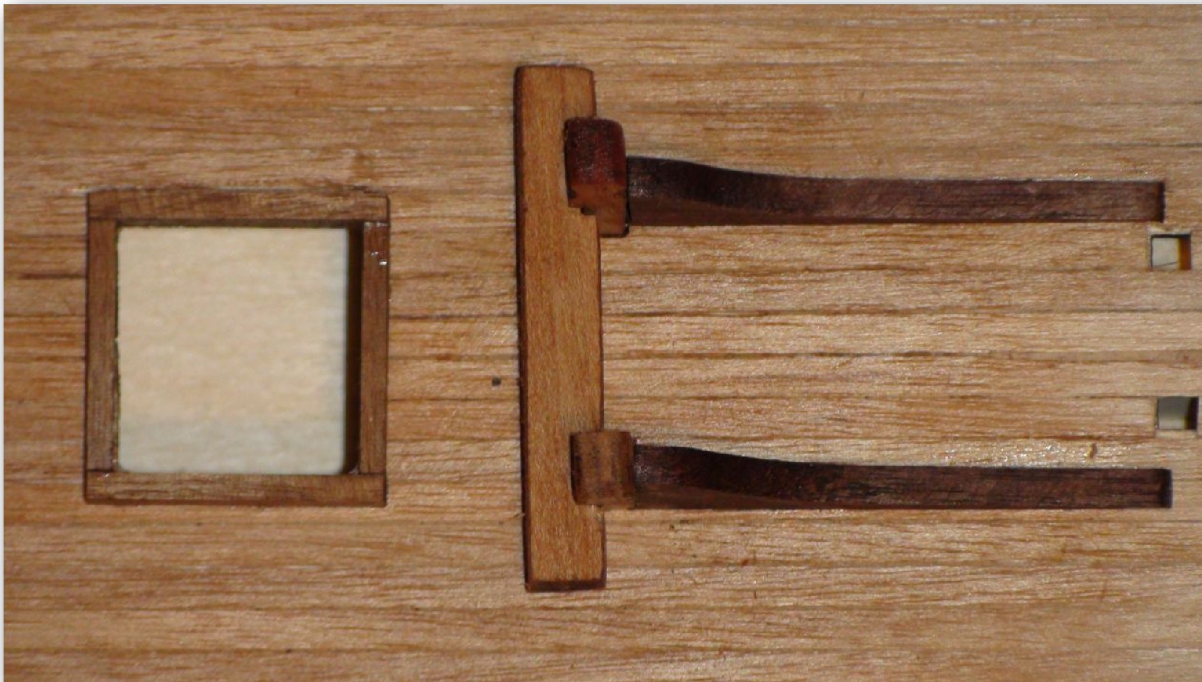


Photo 21

Some bitts will have a special top piece connecting the two posts as shown in Photo 22. This top piece will often be a cut out part as shown in this photo.

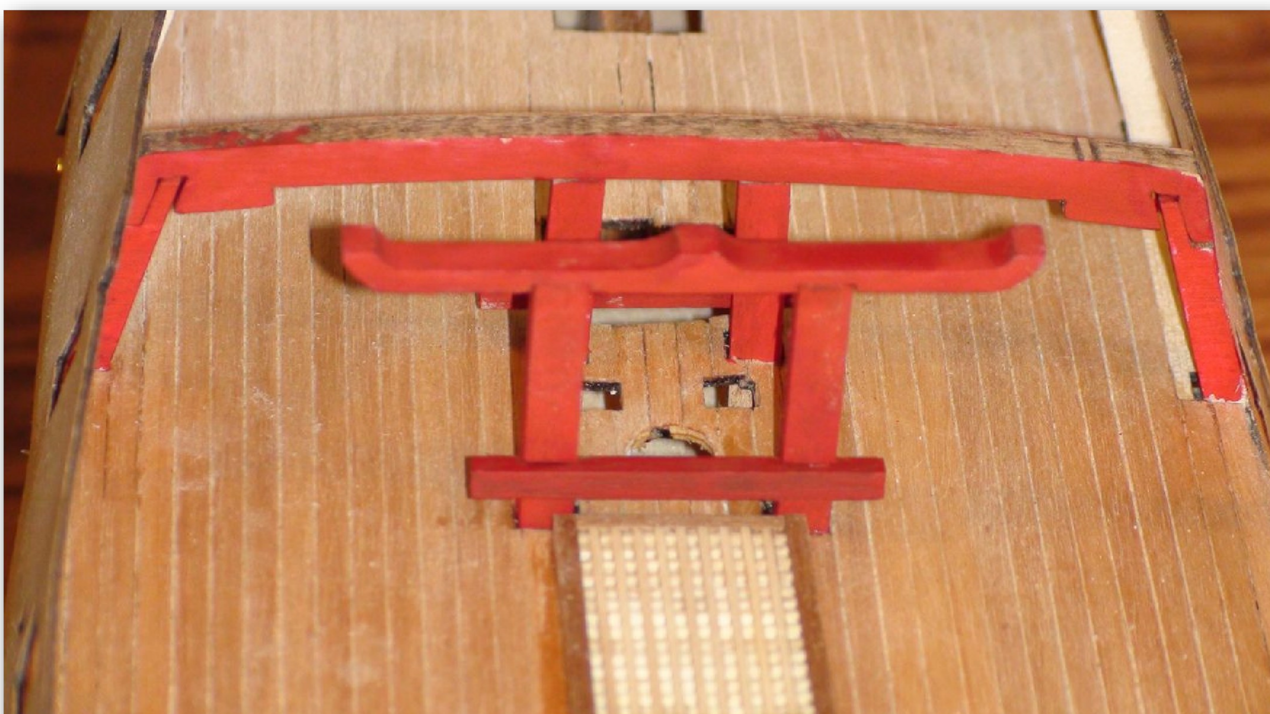


Photo 22

Photo 23 shows a set of bitts that is a laser cutout part and includes the post and the top piece. This set of bitts was used on the Model Shipways kit, Fair American.

Photo 23

The four parts protruding on each side of each post were used to tie rigging line from the masts. The cleats on the fore side of the post were also used for this purpose.

There are various types of racks found in kits. Usually a kit will include one or more belaying pin racks like the one shown in Photo 24.

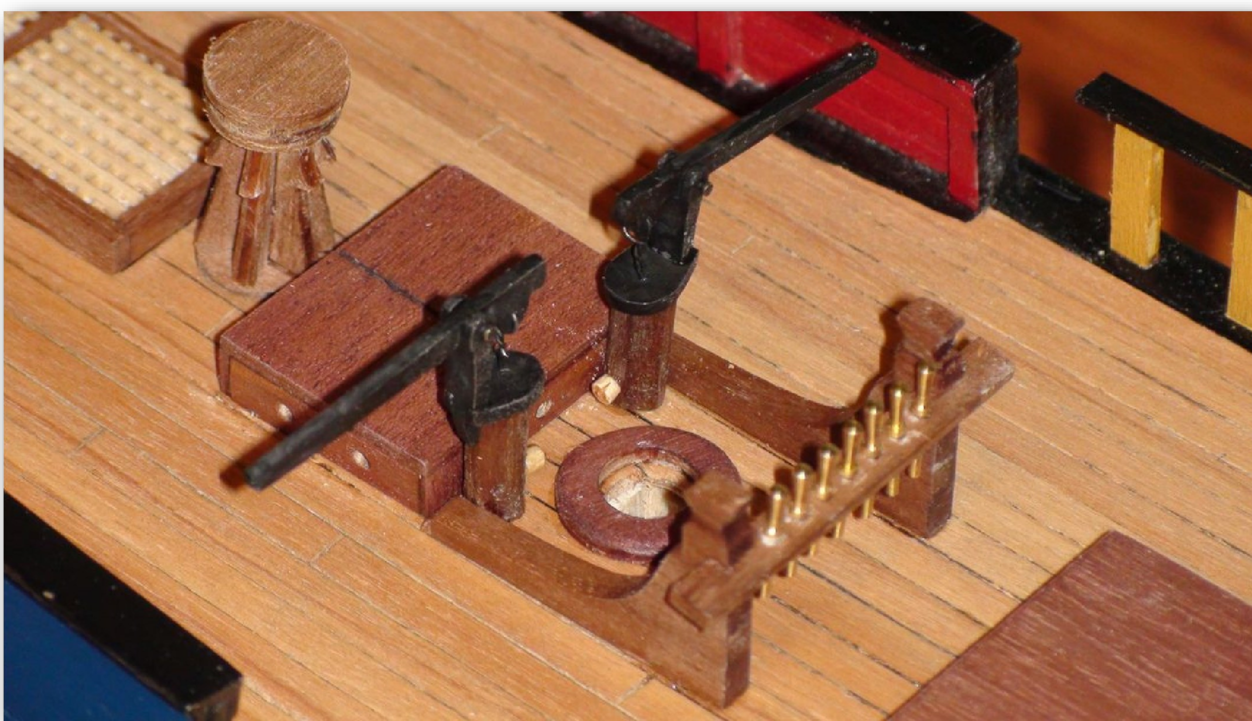


Photo 24

The primary difference in a belaying pin rack is that there were a series of holes drilled through the cross piece where belaying pins could be inserted. Belaying pins were used to tie off rigging from the masts.

I've often seen belaying pin racks on ship models that would not have had these pins, because the usage of the belaying pin did not come into existence until the early 1800's. Artesania Latina's kit, Mayflower is a good example of this as seen in Photo 25. Historically speaking, the Mayflower would not have had belaying pins because this ship was built in the early 1600's. Instead, timberheads would have been attached to the caprail so that rigging lines could be tied off. Cleats might also be used. Check your kits plans to see what kind of belaying mechanisms were used.

Photo 25

As you can see, this Mayflower kit had a set of bitts with a belaying pin rack as well as racks attached to the bulwarks of the ship. You might want to look at alternative methods of tying off rigging lines if your kit shows belaying pin racks and the actual ship was built before the early 1800's. Most ships used timberheads or kevels instead of belaying pin racks for tying off rigging lines before belaying pin racks came into usage. I will discuss these items shortly.

All of these racks and bitts are constructed in a similar fashion. Your kit plans can be used to measure the height of the posts and the width of the cross pieces. The tops of the post are often carved to provide a more secure connection of rigging lines as shown in Photo 26. A black arrow points to the carved top. Your kit plans will show the shape, and measurements can be taken to determine the height and cutting points.

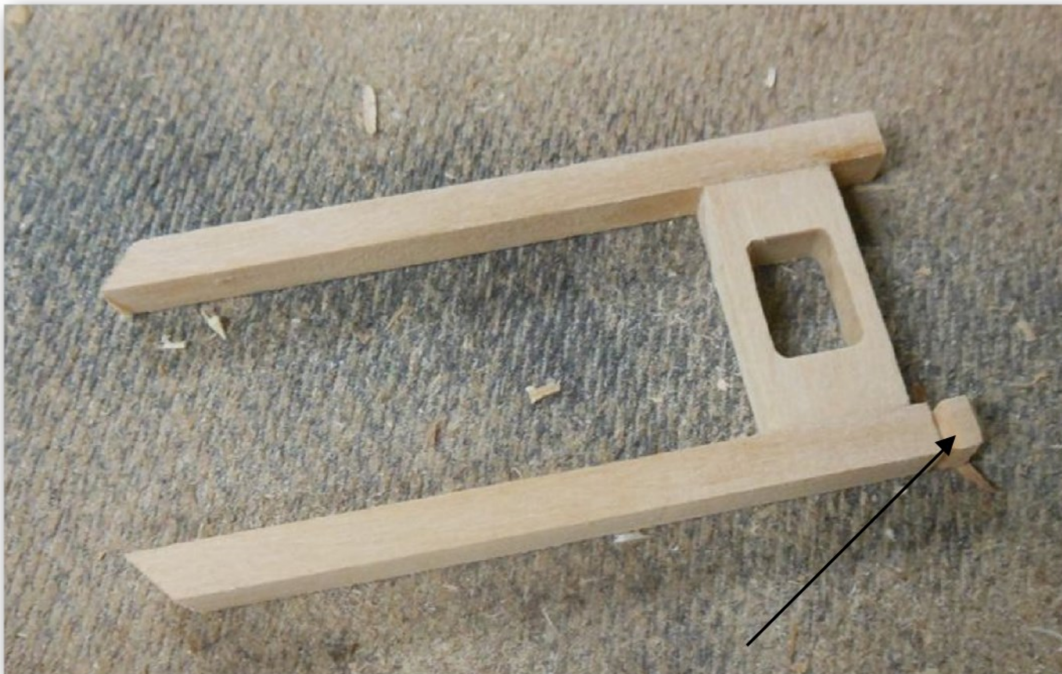


Photo 26

Some kits will include cutout rails if the bulwarks is curved. The rails in the Caldercraft kit, HM Bark Endeavour is an example of such kit as seen in Photo 27.

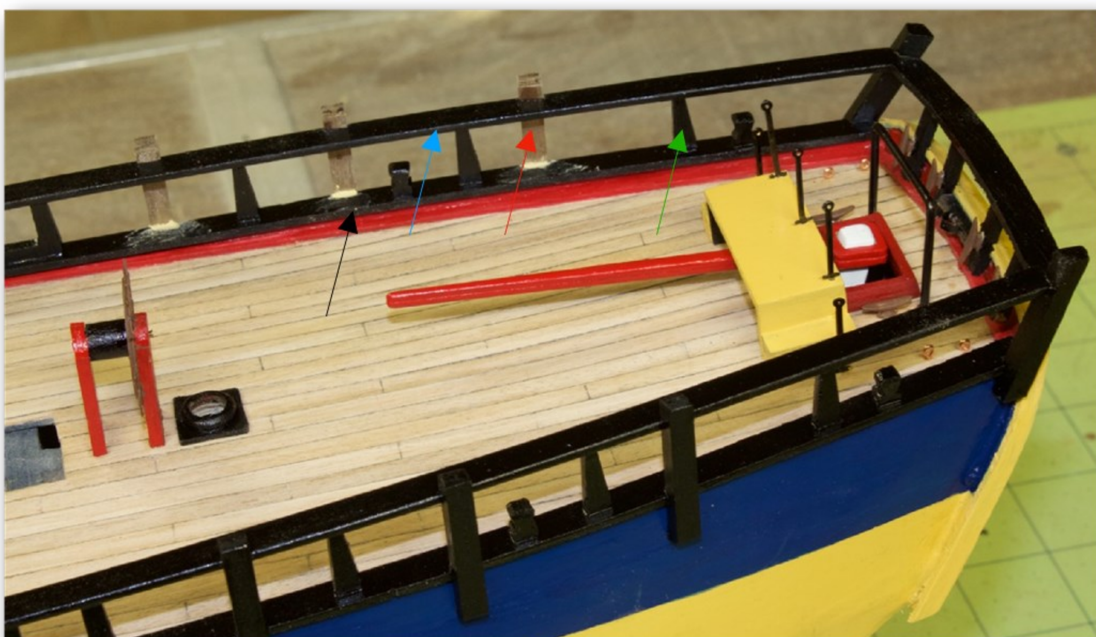


Photo 27

The black arrow in this photo points to the main rail. The blue arrow points to another type of rail more commonly referred to as the toprail. Some kits will have this extra rail to provide additional support to swivel cannon mounts, such as the ones shown by the red arrows. On this particular model, cutout stanchions supported the toprail, indicated by the green arrows.

On large warships such as the HMS Pegasus and HMS Vanguard, there are usually a number of rails that appear at the end of the forecastle deck, quarterdeck and poop deck. These rails might have had belaying pins in them as well as other features such as a ship's bell or banisters that lead down steps. Photo 28 shows a rail with a large wooden piece.

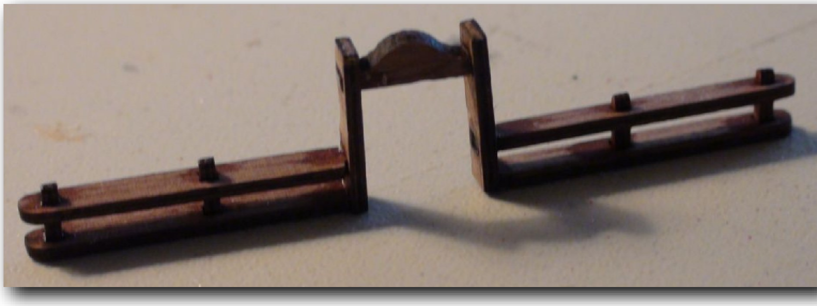


Photo 28

This particular rail consisted of cutout parts for the bottom and top rails and stripwood for the rail supporting posts. Photo 29 shows another rail. This rail has 90 degree extensions on each side which will serve as bannisters for a small platform off of the quarterdeck.

Photo 29

This rail was also made from cutout parts with stripwood stanchions. These rails are easy to make and are always shown on the kit's plans.

Photo 30 shows the rails with the bannisters after they were installed on the Amati kit, HMS Pegasus.

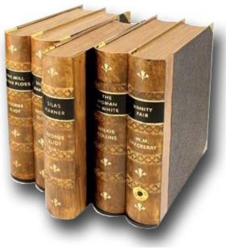
As you can see, the bannisters are supported by a turned wooden stanchion that was provided in the kit. This particular rail also had a toprail that was supported by several more turned wooden stanchions. This is very typical of a British warship.

Photo 30

The Modelers Work Bench

Files

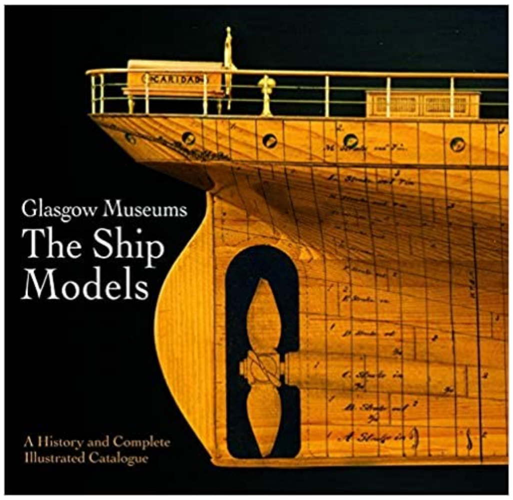
From start to finish in building your model it never hurts to have a good selection of files and rasps of all sizes and shapes close at hand. They come in handy in everything from rough shaping to fine detailing of parts and assemblies.



The Book Nook

Books of interest for the Model Ship Builder

New & Old



Glasgow Museums The Ship Models

A History and Complete Illustrated Catalog

By: Emily Malcolm

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This publication will is the first full catalog of Glasgow Museums' internationally important collection of ship models.

Almost all of the 676 models, which range from elegant cruise liners to humble Clyde puffers, and from simple half-hull design models to magnificent display models, were produced by Clyde shipyards or Glasgow-based ship owners. It is the representation of models from such a distinct geographical area, together with the quality of the models, which makes this collection so exceptional. As well as general chapters about the collection, each of the 676 models have a description and color photograph.

Some of the most famous ships launched on the Clyde are represented, such as RMS Queen Elizabeth and HMS Hood, as well models of historically significant vessels such as the first European passenger steamer Comet and the world's first commercial turbine-powered vessel King Edward.

A stunning collection of photographs complements newly researched and in-depth chapters. The book will give readers worldwide a chance to see images of the models, a sense of the breadth and importance of the collection and a deepened understanding of the whole history of the ship.

Genes Nautical Trivia

Well known or influential Nautical People

S	N	P	N	H	E	S	B	H	D	H	N	M	N
U	A	T	E	C	S	K	L	R	V	S	N	A	O
M	U	L	L	A	N	E	A	A	U	G	A	G	T
O	B	A	S	E	K	E	N	R	D	N	M	E	E
R	N	M	O	T	B	I	O	O	D	E	E	L	L
G	W	A	N	K	W	L	U	C	J	H	D	L	K
A	J	G	C	R	S	Z	I	H	I	C	N	A	C
N	W	A	A	B	C	M	G	G	O	L	I	N	A
Y	L	D	B	O	J	I	I	L	H	W	L	N	H
B	R	O	O	K	E	T	U	T	B	P	A	E	S
M	H	K	T	L	Q	M	S	C	H	E	E	R	J
S	T	T	A	W	B	Q	G	H	V	K	I	D	D
V	P	R	H	U	M	P	H	R	E	Y	S	Z	X
N	O	S	S	C	I	R	E	D	E	A	R	F	S

BLACKBEARD	BLIGH	BROOKE
BRUNEL	CABOT	CHENG
COLUMBUS	COOK	DAGAMA
DARWIN	DRAKE	ERICSSON
HOWARD	HUMPHREYS	JELLICOE
JONES	KIDD	LANG
LINDEMANN	MAGELLAN	MORGAN
MULLAN	NELSON	RAEDER
RALEIGH	SCHEER	SHACKLETON
SLADE	SMITH	TEACH
WATTS		

Genes Nautical Trivia

Vincent Van Gogh

Each letter in the phrase has been replaced by a number
Solve this quote by Vincent Van Gogh

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

20 12 8 / 24 7 1 12 8 19 15 8 16 / 25 16 14 13 / 20 12 18 20 / 20 12 8 / 1 8

7 1 / 10 18 16 22 8 19 14 4 1 / 18 16 10 / 20 12 8 / 1 20 14 19 15

20 8 19 19 7 21 26 8 / 21 4 20 / 20 12 8 17 / 12 18 5 8 / 16 8 5 8 19

24 14 4 16 10 / 20 12 8 1 8 / 10 18 16 22 8 19 1 / 1 4 24 24 7 3 7 8 16

19 8 18 1 14 16 / 24 14 19 / 19 8 15 18 7 16 7 16 22 / 18 1 12 14 19 8

Genes Nautical Trivia

Answers

Vincent Van Gogh

"The fishermen know that the sea is dangerous and the storm terrible but they have never found these dangers sufficient reason for remaining ashore"

This is the code used to encode the quotation made by Vincent Van Gogh

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
18	21	3	10	8	24	22	12	7	9	25	26	15	16	14	6	2	19	1	20	4	5	13	11	17	23