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by ship modelers for ship modelers

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Editorial

Hello fellow modelers and model enthusiasts. Another month has come and gone and it's hard to believe but we're already half way through 2023. Time to start planning for your fall build. That is for those that don't build all year long and have to spend the summer getting things done around the home.

Here at the MSB Journal we're always looking for great content to bring to our fellow modelers. Have something you'd like to share? Contact us.

I hope you enjoy this issue, and I hope everyone has a great summer!

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 - Scales & Proportions

A practical Guide

By Donald B. Driskell

This article is about Scales and Proportions. There is a lot written on the subject, and while I am not an expert, I was able to at least find a wealth of information on a huge range of scales and what they are used for and even the manufactures that specify them.

Scale is the size of one object in relation to the other objects in a design or artwork. Proportion refers to the size of the parts of an object in relationship to other parts of the same object.

In an article after this one, I intend to demonstrate how to calculate scales and proportions, but for now, I gathered information on scales that are popular for all types of modeling.

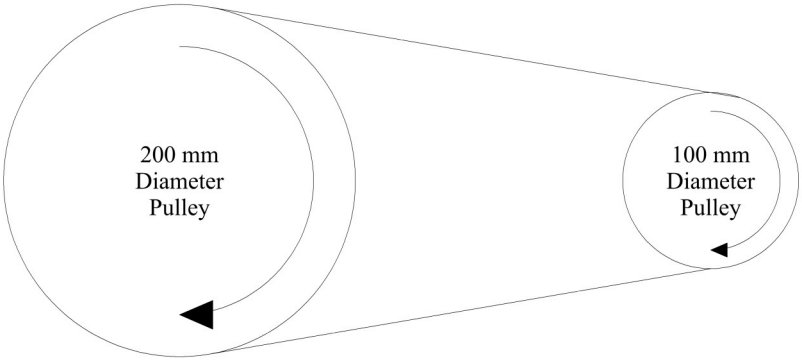
All of the following information was gathered from Wikipedia.

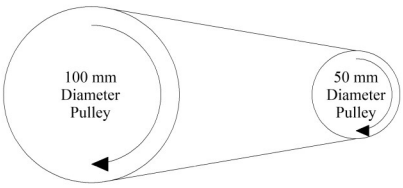
I have discovered however, that it seems that possibly, some manufactures say the scale of their model is a certain amount, whereas, according to some of my calculations some of those claims might be so. We will discover those claims in the next publication.

In the meantime, here is a prime example of proportion. Lets say that both of these pulleys are for a Motor on a Mill that turns the headstock. It is clear that both sets are different in "size", but the proportions are the same which will yield the same RPM. The larger setup is 1:2 whereas the smaller unit is still 1:2. In other words, the RATIO of both examples are the same.

200 / 100 = 2

100 / 50 = 2





Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:20000		0.015 mm	Sci-fi	Arii produced injection-molded kits in this scale of the very large Zentradi spacecraft from the science fiction anime series Macross.
1:4800		0.064 mm	Sci-fi	This scale has been used for fictional spacecraft for the board game Star Cruiser, originally from Citadel Miniatures. A small set of British and German WWII warships in this scale were produced by CnC for use in the North Cape tabletop game.
1:3900		0.078 mm	Sci-fi	Star Trek toys and miniatures are available in this scale.
1:3000		0.102 mm	Sci-fi Ship models	Science fiction miniatures produced in this scale by Brigade Models for the board game Starmada and an established scale for Naval wargaming in Britain, e.g., NavWar.
1:2500		0.122 mm	Sci-fi Wargaming (naval)	A European size for naval wargaming ship models. Also a popular scale for large fictional spacecraft used in gaming, (esp. Star Trek).
1:2400		0.127 mm	Wargaming (naval)	A British and American size for naval wargaming ship models. Some science fiction miniatures in this scale.
1:2000		0.152 mm	Wargaming (naval) Ship Models	Valiant Enterprises produces its "Fighting Sail" line of "sailing men o'war" and related subjects in this scale. Scale used in Japan for plastic naval models, waterline and full hull.
1:1400				Die cast ship models (e.g. by Siku),[1] Star Trek spaceships.
1:1250		0.244 mm	Ship models	The dominant European size for die-cast ship models, most comprehensive range.
1:1200	0.01	0.254 mm	Ship models	A British and American size for ship and harbour models. Airfix used to produce in this scale.
1:1000		0.305 mm		This is a scale used in Germany for pre-finished airliner models. Herpa and Hogan Wings produces several models in this scale. Bandai produces spacecraft models from Space Battleship Yamato 2199 Ares Games produces the Sails of Glory line in this scale. Common scale for architectural modelling.
1:800		0.381 mm	Ship models	This is a scale used for some aircraft carrier models. This scale is also used for some pre-finished die cast airliner models.
1:720		0.423 mm	Ship models	This was a standard size for ship models produced by Revell and Italeri but they have moved from it.
1:700		0.435 mm	Ship models	This is the scale that most manufacturer chose to produce the largest series of waterline plastic model ships and submarines. Full hull models are popular in that scale as well.
1:600		0.508 mm	Ship models	Popular for ships, especially liners and capital ships. This is the traditional scale for comparative drawings of ships, used by the Royal Navy as it is about one-tenth of a nautical mile to the foot. Warship models produced by Airfix. Schabak/Schuco also produces airliner models in this scale.

Ratio	Inches per foot	Millimeters per foot	Common Use	Comments
1:570		0.535 mm	Ship models	This scale was used by Revell for some ship models because it was one-half the size of the standard scale for wargaming models used by the U.S. Army.
1:535	0.022	0.570 mm	Ship models	Scale used by Revell for USS Missouri ship. Sometimes called "box scale" because chosen to fit a box size.
1:500		0.610 mm	Architecture Ship Models Die-Cast Aircraft	This is a scale used by the military in World War II for ship models used for war games and naval recognition. Several Japanese companies such as Nichimo Co Ltd. and Fujimi Model produce plastic ship models in this scale. It is also used by European companies for pre-finished die-cast airliner models. Common scale for architectural modelling.
1:480		0.635 mm	Model railways (T)	T scale, using 3 mm gauge track to represent standard gauge railways.
1:450		0.677 mm	Model railways (T)	T scale, using 3 mm gauge track to represent 3 ft 6 in (1,067 mm) gauge railways. Hasegawa also produces plastic ship models in this scale.
1:432		0.706 mm		The scale used during World War II by the U.S. Navy for aircraft recognition.
1:426	0.028	0.715 mm		Scale used by Revell for USS Arizona, Pennsylvania, Norton Sound, and Pine Island ships. Sometimes called "box scale" because chosen to fit a box size.
1:400		0.762 mm	Die-cast aircraft Ship Models	A European size for ship and submarine models and die cast aircraft, e.g. Heller products. Most commonly used with aircraft models, specifically die-cast commercial airliners, which can be produced by popular manufacturers (including, but not limited to, Aeroclassics, Gemini Jets, Phoenix Model, JC Wings, and NG Model).
1:360	0.033"	0.8467 mm		The scale used in AD&D Battlesystem rules. Derived from the used of 10 yards to 1 inch. Works well with 5mm miniatures where a 6' man equals 5.08 mm
1:350		0.871 mm	Ship models	Though assumed to be a Japanese size for ship models, its origin lies in the UK, with the release of the 1:350 Javelin and Tribal Destroyer kit in December 1945 in the FROG Penguin range. These are typically full-hull models that are substantially more detailed than 1:700 waterline models.
1:300		1.016 mm	Wargaming (military)	A scale closely associated with 1:285 scale. The smallest scale commonly used for micro armor. "6 mm figure scale" for miniature wargaming.
1:288		1.058 mm		A scale for aircraft and rockets.

Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:270		1.129 mm		Used by Fantasy Flight Games' Star Wars: X-Wing Miniatures Game for their small and large ships.
1:250		1.219 mm		Used by Heller for model ships. 1:250 scale is commonly used with aircraft models - usually rather large and fairly pricey models - such as jumbo jet scale models.[7]
1:239		1.275 mm		Used by some model aircraft.
1:220		1.385 mm	Model railways (Z)	Same as Z gauge.
1:200	0.06″	1.524 mm	Architecture Ship Models Die-cast Aircraft	A scale used for high-end model aircraft and very detailed paper and plastic model ships. 9 mm figure scale. Many airlines distribute models in this scale for free as a means of advertising. Aeroplane model brands in this scale include Flight Miniatures, JC Wings 200, Wings of Glory, and others. Common scale for architectural modelling.
1:182.88		1.667 mm		A newer scale utilized in ancient, fantasy and sci-fi hobbyist miniature wargaming. Known as "10 mm figure scale" in wargaming circles.
1:160		1.905 mm	Model railways (N)	American and European model trains in N scale. Commonly used for mini armor. 10 mm to 12 mm figure scale for miniature wargaming.
1:152		2.005 mm		2mm scale / British N scale railway modeling.
1:150		2.032 mm	Model railways (Japanese N)	Used by Heller for model ships, and proposed by the Japanese to supersede 1:144 scale trains. Models which are commonly made in scale at 1:150 are commercial airliners - such as the Airbus A320, Boeing 777 all the way to the jumbo jets - the Airbus A380 & Boeing 747.
1:148		2.117 mm	Model railways (British N)	British N model railroad scale.
1:144	1⁄12″ (0.083″)	2.117 mm		W scale - Popular for ships, aircraft, rockets, spacecraft. Occasionally used with NASCAR cars. Also some Japanese N scale trains, as well as Japanese giant robot models (such as Gunpla) and toys. Dollhouse for a dollhouse scale for 1:12 dollhouses. Commonly used for mini armor. Used for 12 mm, and 12.5 mm figure scale miniature wargaming.
1:128	3⁄32″ (0.094″)	2.381 mm		A few rockets and some fit-in-the-box aircraft are made to this size.
1:120	0.1″	2.54 mm	Model railways (TT)	Derived from the scale of 1 inch equals 10 feet.TT model railroad scale. Used in AD&D Battlesystem Skirmishes rules. Works with 15 mm miniatures where a 6 foot man would equal 15.24 mm
1:110		2.771 mm		Used for some model ships, aircraft and diecast cars.
1:108		2.822 mm		An historic size for ships, also used for rockets and spacecraft. 15 mm figure scale for wargaming is considered interchangeable with this scale

Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:100		3.048 mm		Aircraft by Tamiya and Plasticart, military vehicles and ships by Zvezda. Kits of historic and modern spacecraft. Japanese aircraft, spacecraft, and giant robots (Gundam master range). Also referred to as "15 mm figure scale" for use with the mini armor & miniature figurine-based tabletop strategy/skirmish warfare games, Flames of War, Axis & Allies Miniatures, as well as The Face of Battle, and I Ain't Been Shot Mum!. Common scale for architectural modelling.
1:96	1⁄8″ (0.125″)	3.175 mm		An historic scale for ships, also used for spacecraft.
1:91.44		3.333 mm		A popular scale for World War II hobbyist miniature wargaming. Also known as "20 mm figure scale" in wargaming.
1:90		3.387 mm		A scale proposed by some European manufacturers (e.g. Wiking) to supersede HO scale.
1:87.1		3.5 mm	Model railways (HO/h0)	Exact HO scale (half O of 7 mm = 1 foot)
1:87		3.503 mm	Model railways (HO/h0)	Civilian and military vehicles. Often used to describe HO scale. Original nominal 25 mm figure scale; though a 6-foot human in 1:87 is closer to 20 mm.
1:82		3.717 mm		An intermediate scale (HO/OO) intended to apply to both HO and OO scale train sets. Also used for some military models
1:80		3.810 mm		HOj scale. Very close to wargaming 20 mm figure scale(20mm is actually 1:80.5).[10]
1:76.2		4 mm	Model railways (00)	UK model rail scale 4 mm scale (OO Scale, etc.).
1:76		4.011 mm	Model railways (00) Military Models	Military vehicles. Used with 4 mm to 1 foot models as well.
1:75		4.064 mm		Used by Heller for model ships. Also some Japanese aircraft kits from the 1960s.
1:73.152		4.167 mm		Common scale for hobbyist miniature wargaming and role playing games with science fiction or fantasy subjects, where it is referred to as "25mm" (for the real-world height of a 6-foot-tall scale figure). Examples include Striker, Gamma World and (especially) Dungeons & Dragons. There has been a "scale creep" over the years as manufacturers produce more-imposing figures, leading to a current designation of "28mm" for the larger pieces.
1:72	1⁄6″ (0.167″)	4.233 mm	Aircraft models	At 1 inch in this scale = 6 feet (man's height) in the real world. Aircraft, science fiction, space non fiction, figures, vehicles, and watercraft. Now the most prolific[11] small scale (i.e. less than 1:35) for plastic injection armoured fighting vehicle (AFV) models, and also plastic model figurines and scale model vehicles and aircraft by companies such as Airfix.
1:65		4.689 mm		Ships, die-cast cars. Similar to 1:64.

Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:64		4.763 mm		Ships, die-cast cars. Matchbox and Hot Wheels use this scale to describe their vehicles, although the actual scale of the individual models varies from 1:55 to beyond 1:100. Same as S Scale. Also called 3⁄16 in. scale. Known as 25 mm figure scale in wargaming circles.
1:60.96		5.000 mm		Common scale for pre-1970s hobbyist miniature wargaming figures. Some companies such as Privateer Press are producing new figures in this scale. Because 28 mm figure scale wargaming miniatures have crept in scale over the years, these new "30 mm figure scale" wargaming miniatures are similar in proportion to the current 28 mm figure scale wargaming miniatures. Force of Arms, Westwind and S&S models also use this scale for their range of resin and metal World War II and modern 28 mm figure scale vehicles.
1:60	0.2″	5.080 mm		Used by Dungeons & Dragons Miniatures. High-detail, Japanese giant robot model kits, primarily produced by Bandai, are of this scale. Some Japanese toy manufacturers also produce aircraft toys in this scale. Rare model rail scale from Germany.
1:56		5.442 mm		Another common scale for 28 mm figure scale wargaming vehicles - manufacturers in this scale include Wargames Factory, Die Waffenkammer/JTFM Enterprises, NZWM/Army Group North, Force
1:55		5.644 mm		Used by Siku for cars and trucks. Also used by Mattel for Disney's "Cars" toys.
1:50		6.096 mm		Many European die-cast construction vehicles and trucks. Some early Japanese aircraft kits are also of this scale, and it is the standard scale for hand-crafted wooden aircraft models in Japan. Common scale for architectural modelling.
1:48	1⁄4″ (0.25″)	6.350 mm	Aircraft models Dollhouse Military Models Wargaming	For dollhouse applications, 1:48 is commonly known as quarter scale (as it is one-quarter of the 1:12 "standard" dollhouse scale). Mainly military aircraft, but in 2005 Tamiya launched a new series of armored fighting vehicle (AFV) models in this scale. It is the American O scale. Architectural model scale corresponding to widely used architectural drawing scale in the U.S. Also the main Lego scale, known as minifig scale. The rather uncommon 40 mm figure scale wargames figures fit approximately into this scale.
1:45		6.773 mm		This is the scale which MOROP has defined for O scale, because it is half the size of the 1:22.5 Scale G-gauge model railways made by German manufacturers.
1:43.5		7.02 mm	Model railways (0)	Exact O scale of 7 mm = 1 foot.
1:43		7.088 mm	Die-cast cars	Still the most popular scale for die-cast cars worldwide, metric or otherwise. It originates from British O scale.
1:40	0.3″	7.620 mm		The very early models of the British Coronation Coach and a few other horse-drawn wagons were made in this scale. Cheap soft plastic soldier figures are also made to this scale; there are a few kits to make vehicles for them.
1:38.4	5/16"			Scale for RC model ships, usually produced by Dumas
1:36		8.467 mm		Popular scale for period ship plans — 1 inch = 3 feet.

Ratio	Inches per foot	Millimeters per foot	Common Use	Comments
1:35		8.709 mm	Military models	The most popular scale for military vehicles and figures. Used heavily in models of armoured vehicles. It was originally conceived by Tamiya for convenience of fitting motorised parts and batteries. Corresponds well with 54mm figures.
1:34		8.965 mm		A popular scale for collecting vintage and modern American truck models. Established by First Gear, Inc. in the early 1990s with growing popularity in Europe and Australia.
1:33		9.236 mm		The most common scale for paper model kits of aircraft.
1:32	3⁄8"	9.525 mm	Model railways (1) Aircraft Models Car Models Toy Soldiers	54 mm figure scale toy soldiers are supposed to use this scale as well. Same as Gauge 1, cars, common for slot cars. Commonly referred to as Stablemate size in model horses.
1:30.5		10 mm		Often quoted as the alternative to 1:32 scale.
1:30	0.4″	10.16 mm		Toy soldiers and military vehicles including King & Country and Figarti.
1:29		10.51 mm		American model trains running on 45 mm Gauge 1 track.
1:28		10.89 mm		Biplane fighters, "brass era" cars (Midori, Union, Revell of Germany), die-cast cars (Spec-cast, First Gear).
1:25		12.19 mm		Cars, figures. AMT (now combined with Ertl), Revell, and Jo-Han diecast cars. Chinese painted human figures in this scale are marketed for use with (but are slightly undersized for) G Scale train layouts, but are often used as passengers in 1:24 or 1:22.5 cars and trains. In Europe, this scale is preferred over 1:24. The Netherlands has whole toy villages in this scale. This scale is also standard in most theatre design models used to represent set designs before being built
1:24	1⁄2″ (0.5″)	12.70 mm	Plastic cars Aircraft Model Railways	Largest common scale for model aircraft, such as those produced by Airfix. Common scale for cars and figures. Some American dollhouse brands. Die-cast vehicles by Danbury and Franklin Mint. American G Scale trains by Delton Mfg. and Aristocraft Classics. Model horses ("Little Bit" size). Playmobil toys.
1:22.5		13.55 mm	Model railways (G)	G Scale trains made by German manufacturers.
1:21				Scale for model aircraft, usually produced by Dumas.
1:20	0.6″	15.24 mm		Cars, common for Formula One models.
1:19		16.04 mm		16mm scale Live steam model railways. This is also the scale for those[which?] "four-inch" adventure movie figurines.

Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:18	0.67″	16.93 mm		Cars made from kits, 1:18 scale diecast models, children's dollhouses, (very rarely) aircraft kits such as by MPM. The 3.75" G.I. Joe: A Real American Hero line of figures and vehicles is in this scale, although the figures are compatible with 1:16 vehicles rather than 1:18 cars. Action figures marketed as 3.75", 3¾", or 4" approximate this scale; this includes the original Star Wars action figures from Kenner, as well as the Fisher-Price Adventure People line which influenced the Star Wars figures and the Micronauts figures which preceded them. This is one of the most common scales of action
1:16	3⁄4" (0.75″)	19.05 mm	Military models	Live steam trains (non-ridable), Figures. Ertl's popular line of farm and construction machinery is produced in this size. RC Tanks produced by Tamiya, Heng Long, Matto, AsiaTam, WSN, Torro, Scale model kits by Trumpeter, Eduard, Kirin,
1:15	0.8″	20.32 mm		Used for some animal figures and automobile models. Fontanini produces 5 inch nativity scene figures at this scale.
1:14	0.8571428″	21.77 mm		Tamiya Tamiya 56301 RC 1:14 King Hauler, RC Tractor Trucks 1:14 Scale.
1:13.71		22.225 mm		Model railway scratchbuilders' scale at 7⁄8″ to a foot, commonly used with 45 mm gauge track to represent 2′ gauge prototypes.
1:13	59⁄64"	23.44 mm		Aurora "Monster Scenes" and "Prehistoric Scenes" Kits.
1:12	1″	25.40 mm	Plastic cars	Action figures, Model cars (static and R/C driven), Live steam trains (non-ridable), dollhouses for adult collectors, motorcycles, model horses ("Classic scale").
1:10		30.48 mm		Motorcycles, Radio-controlled cars (off-road buggies, stadium trucks), 7-inch Action Figures (Marvel Legends & DC Universe).
1:9	1.2″	33.87 mm		Motorcycles, Miniature park, Mego 8-inch [203.2 mm] dolls (World's Greatest Super Heroes), model horses (traditional scale).
1:8	1+1⁄2″ (1.5″)	38.10 mm		Cars, motorcycles, Live steam trains (ridable), Miniature park, IC radio-controlled cars, Japanese garage kit figures, Aurora Classic Monster Kits, (rarely) aircraft kits such as World War I fighters by Hasegawa
1:7		43.54 mm		Common scale utilized by Japanese companies for figures of anime characters, especially[citation needed] when the portrayed character is supposed to be young in age. The scale of a standard 4-stud × 2-stud Lego brick compared to the unit size of a standard house brick (9 × 4+1⁄

Ratio	Inches per foot	Millimeters per foot	Common use	Comments
1:6	2″	50.80 mm		EFRA regulation off-road radio-controlled buggies. Articulated 12-inch figures, such as G.I. Joe, and Dragon, children's fashion dolls like Barbie, Dollfie, static display figures (commonly of anime characters). Motorcycles, rail cannons, armored vehicles, military dioramas.
1:5		60.96 mm		Large scale radio-controlled cars
1:4.5				Sybarite (fashion doll)
1:4	3″	76.20 mm		Radio-controlled cars, ridable miniature railways, steamrollers, traction engines, plastic model engines, larger 18-inch [457 mm] collectible fashion dolls, pocketbike racing, Minibike, Mini chopper, Midget car racing, Quarter Midget racing
1:3	4″	101.60 mm		P scale - ridable narrow gage park railroads, steamrollers, traction engines, Ball-jointed dolls, Super Dollfie, Dollfie Dream
1:2.4	5″	127.00 mm		Park railroads, where 15 in (381 mm) minimum gauge models are based on 3 ft (914 mm) narrow gauge prototypes
1:2	6″	152.40 mm		"My Size" (3′) fashion dolls
1:1.8				Playhome, Playhouse
1:1.5				Playhome, Playhouse
1:1	12″	304.80 mm		Full scale, life-size. Some models of real and fictional weapons and of scientific or anatomical subjects in this scale.
>1:1				Larger than life-size. Some models of scientific or anatomical subjects in these scales.

HMCSS Victoria'

Pivot Gun Sweeps and Gun Ports

By Pat Majewski

This is a the third of several articles in a series relating to HMCSS *Victoria's* armament. This article will concentrate on the pivot gun ports as fitted in the vessel. This discussion is offered as while gunports are a common feature in vessels during the age of sail, during this era the types and fitting of some gunports were also changing rapidly.

Sweeps

General Sir Howard Douglas, in his book 'A Treatise on Naval Gunnery 1855', provides insight (extract lightly edited below) to assist in identifying which type of gun manoeuvring arrangement may have been used in the *Victoria*.

> *Extensive experiments were made in France in1850 on the important questions as to the description of carriage and mode of installing the bow and stern guns of steam-vessels of war, with a view to decide between the traversing and pivot slide, and the ordinary carriage with trucks, which may be shifted from port to port as occasion may require.*
>
> *.... In the British service, the two principles appear to be very happily combined by the following simple contrivance :—the slide is made to traverse on shifting centres, and to take up fighting points which are established on the deck correspondently with suitable points in the several ports which each gun thus mounted is intended to serve.*
>
> *A very ingenious contrivance, invented by Colonel Colqnhoun of the Carriage department, has been adopted for facilitating the operation of shifting the centres upon which the slides traverse, and for establishing in the deck housing points or centres upon which the guns are with great facility turned.*

Captain H. Garbett R.N.in his 'Naval Gunnery', of 1897, page 66, also informs that pivot-guns traversed on gun-metal racers secured to the deck.

An example of a double pivot shifting centre gun, as fitted to HMS *Warrior* (1860), is shown at Figure 1.

Figure 1 – Pivot Gun fitted to HMS *Warrior*, 1860

Author's Photograph (©2020)

The 11' length of the naval medium pivot-gun slide allows the gun to be brought into battery over a wide engagement (weapon) arc on either side. J.D. Brandt in his 'Gunnery Catechism as Applied to Naval Ordinance' (1865), page 148, informs that the typical bow pivot gun sweep (firing arc) was 120°. Accordingly, the lengths of the deck sweeps, or racers, will have been sufficient to allow the gun, once pinned by the front flap in its fighting position, to be able to traverse through 120°.

In *Victoria*, the equipment arrangements of the forecastle will have allowed the 11' slide to be manoeuvred into several fighting positions. This would allow the gun to fire on both broadsides, and well forward but not as a true bow chaser.

The carriage design incorporated an after (central) inner pinion bracket (flap) and an outer flap (forward) to engage with a number of metal pinions mounted in the deck to allow the gun to be moved to the required fighting position. The actual number and locations of the fighting positions are difficult to establish with any confidence without written or visual evidence.

Some of the considerations that impacted the positioning of the pivot points and racers (sweeps) included the probable location of the gun ports, deck space restrictions, gun working space requirements, and minimising the number of shifts required to position the gun.

To gain an understanding of, and to use as a basis for, the sweep arrangement in *Victoria*, the sweep arrangements in similar contemporary vessels were referenced. Figure 2, which is an extract from a contemporary Naval Architecture book published by the renowned ship builder John Scott-Russell, is a sketch of a Steam-Screw Gun Boat of the era based on HMS *Esk* (1851) of the Highflyer Class. This class conforms closely to *Victoria*, and as such provided a good candidate for the sweep arrangement. In Scott-Russell's words:

> *The arrangements on the gun-deck show how a very sharp bow may perfectly well accommodate a long pivot-gun on a slide gun-carriage, so as to be both steady and effective; and it may be observed that arrangements are made at the stern by which the same gun may be transferred, and form a chase gun.*

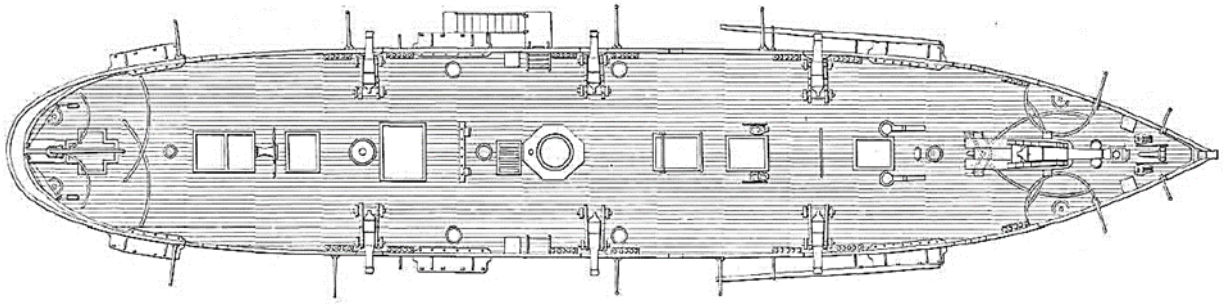


Figure 2 – Potential Sweep Arrangements in HMCSS *Victoria*
Extract from 'The Modern System of Modern Naval Architecture', J. Scott-Russell, 1864 Plate 84

The plate (Figure 2) showing the sweeps of HMS *Esk's* pivot guns, when rescaled to 1:72 and laid over the CAD drawing developed by the author, provides a sweep arrangement that, with a few minor adjustments could be used in *Victoria*. Some small differences in the radius of the sweep arcs were induced by the errors were possibly introduced during production of and further copying of the plate.

Noting the sweep arrangements shown in this plate accommodates only broadside firing, it has been assumed that a chase gun fighting position was not required. Accordingly, a similar position was not determined for *Victoria's* pivot gun.

There is no evidence to positively identify the location of the after pivot gun, other than a suggestion in Enclosure B of a Report on the Colony's Defences[1] by Captain F.B. Seymour R.N., Commanding Officer of HMS *Pelorus*, in November1859:

> *I think that if it is decided to place the five additional guns ordered from England on board of her during peace time it would be better that the aftermost gun should be mounted on a common carriage, as a shifting gun, and when not in use, be stowed amidships just abaft the funnel, and secured to span shackle-bolts let into the upper deck.*

Additionally, in his second letter to Hotham of 4 June 1855, Lockyer writes:

> *The Officers from Woolwich came at my request on the 15th of May and laid off the pivots for the Gun and arranged the ports.*

Lockyer was usually very precise in his reports, and the use of the singular 'gun' infers that the pivots and sweeps for the after gun were not laid off. Accordingly, it has been assumed that *Victoria* was never pierced for the after-pivot gun.

GUNPORTS

An area of some contention is the location and type of gunports cut into the forward bulwarks to allow the pivot gun to fire in broadside. The presence of multiple gun ports is confirmed in a letter, dated 8th September 1856, written by Commander Norman informing the Chief Secretary of Victoria about a minor collision, in which a merchant schooner, the *James Gibson*[2], specifically:

> *.. the schooner in getting under weigh at 5.15 am yesterday, made a stern board into the stbd bow of this vessel carrying away our cathead, two gunports, and other damage …*

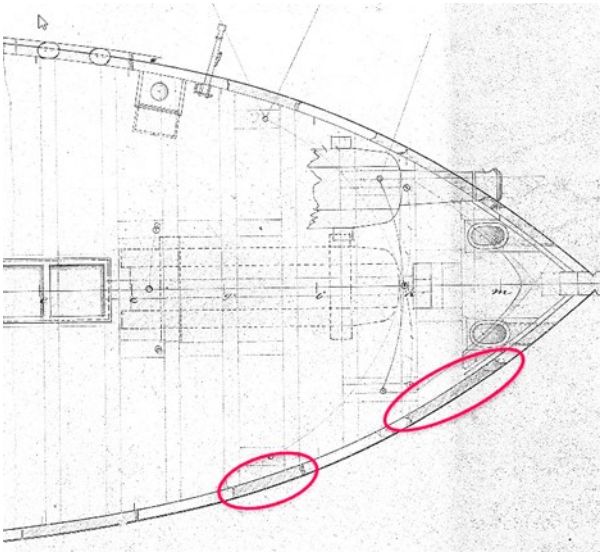


Figure 3 – Gunports for HMS Alacrity (Vigilant Class)
Crop from 'Plan of the Upperdeck as fitted 1855' – NMM Collection ADR/0031.

The main considerations in determining the position of the gunports are the available space to manoeuvre the gun without interfering with other equipment, and the positioning and size of other bulwark openings and fittings. The gunport positions shown in the plans for contemporary gun despatch vessels were considered, including their locations in the Highflyer, Arrow and Vigilant classes.

Peake (1851), page 60, writes:

> *The depression and elevation considered effective in the Royal Navy of England is 7° of depression, and 9° of elevation, the quadrant being 90 of such degrees, or that portion of a circle which denotes a range of angle from the horizontal or level portion to that of the perpendicular, or what more familiarly termed plumb.*

The Arrow class port arrangements were discarded as these vessels carried their guns in different locations. The general arrangement plan for HMS *Vigilant* shows two gun ports each side, one being for firing in broadside, the other for firing over the bow.

As discussed earlier, John Scott-Russell's sketch of the upper deck arrangements in HMS *Esk* (Figure 2), shows the position of a single gunport either side for broadside firing. This is the most likely position and configuration of the sweeps that would allow the working of the pivot gun, ground tackle and other equipment without interference with each other. However, this assessment does not fully reconcile with Captain Norman's reference to two ports, unless he was also referring to an access port to the cathead.

Having laid out the sweeps, the above factors infer that either a single wide gun port, probably comprising two lift out panels, were located just forward of the catheads. The alternate fit is for two ports, one either side of

the cathead. It is unlikely a further port, dedicated to firing over the bow, will have been provided due to the restrictions imposed by the narrow bow and location of the deck equipment.

The type and sizes of these openings may have taken several forms, including fold down (inwards or outwards) hinged panels, removable sections of the bulwark (see Figure 4), or as hinged doors or gates.

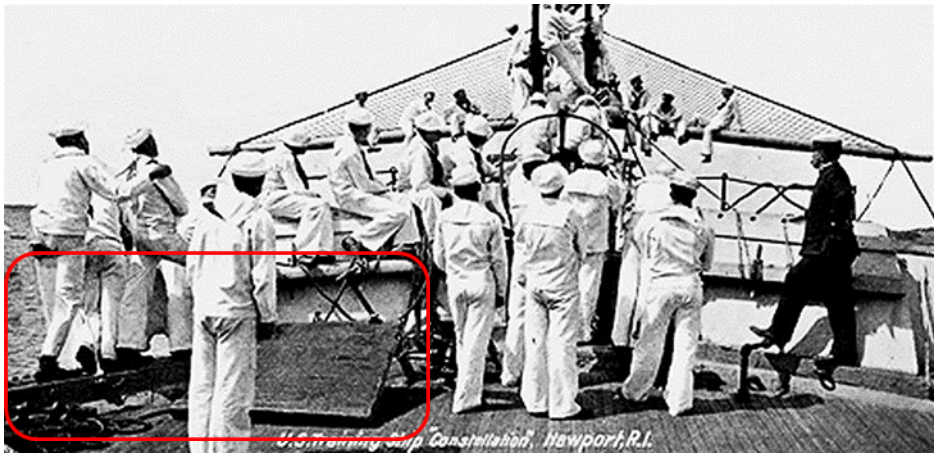


Figure 4 – Lift-out Gun Port Panel USS *Constellation* (1854)
Photograph *c.1907* from Jerry Todd (Model Ship World) from his research into USS Constellation.

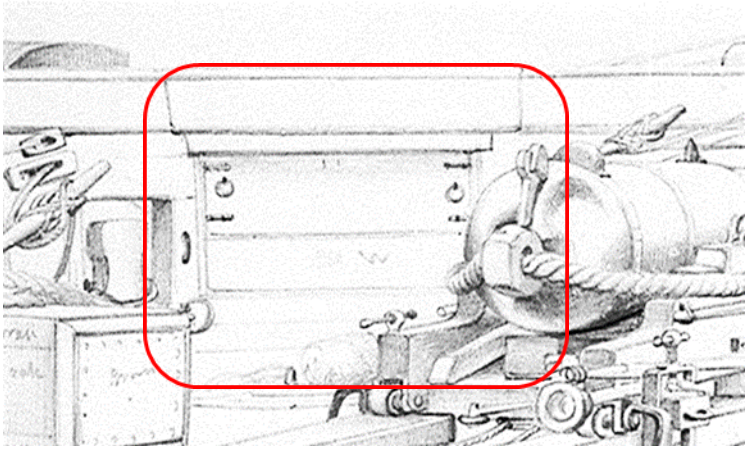


***Figure 5 – Lift-out Gun Port Panel HMS Immortalite* (1859)**
Crop of NMM Collections Image by Edward William Cooke, 1861 - ID PAE6162.

Peake (1867), pages 282-286, provides a description and table of specifications for a 32-pounder 56-cwt gun's fixed gunport. Of particular interest in his description is the statement: "Centre of metal to be from 3' to 3' 4" above the deck. … Height of the lower cill from deck level, 2' 4". Additionally, he specifies the size of a port, for use with this gun, to be 3' 6" wide by 2' 11" high.

However, as *Victoria's* bulwarks were just under 2' 9" (33") high, cutting a standard gunport will not have been practical, whereas an opening of the same width, with the cill placed 2' 4" above deck level, will have been better suited. The pivot gun design developed and drawn by the author (see previous article), has the centre of metal, assumed to be the bore axis when at zero degrees elevation, to be 3' 1" above deck level.

Allowing for some error in developing the probable carriage design, it is possible that the pivot gun could have been fired over the roughtree rails at higher elevations. However, for lower elevations, some form of opening will have been required. Additionally, having no opening may have exposed the lightly built bulwarks to significant blast damage when firing over the rails.

Lockyer, in his letter to Lt.-Governor La Trobe, of 22 June 1853[3], offered some improvements to the Specification, including, at Enclosure 2, item 1, a suggestion that:

> *The Bulwarks instead of being fixed to the top, must in certain parts be fitted to ship and unship, to allow the Pivot Guns to work.*

If this suggestion was accepted, this would infer that some form of lift out, rather than top hinged gunport panel was fitted.

One option is offered by Douglas (1855), page 207, in discussing gunports, suggests that ports 4' wide in which the upper portion of the bulwark, including the roughtree rail, could be removed. With this option, the gunport openings are formed as fully removeable panels which will have been stowed away when clearing for action. This type also conforms with Lockyer's recommendations.

Douglass, page 207, goes onto explain, that, in 1855:

> *…The Embrasures admitted of the guns being trained three points [33.75°] forward, and as many aft; but the ports are at present very much enlarged, in order to increase the sector of fire, and the height of the Bulwarks is lowered...*

No conclusive judgement can be made about the type and number of openings based on the available visual evidence as these openings are not visible in the imagery. It is possible that the ports were pierced either side of the cathead and fitted between the major roughtree timbers as shown at Figure 6. However, as discussed earlier it is more likely Victoria was pierced for a single lift out gunport on each side.

Figure 6 – Dual Pivot Gunport Arrangement
Crop of a photograph (public Domain) of the Russian Frigate *General Admiral*, 1858.

The lift out panels will probably have been only half-the depth of the bulwark height, and the firing arc slightly restricted aft due to the cathead and rigging whiskers. These panels were probably secured with several horizontal pin and barrel receiver mechanisms, as shown for HMS Immortalite earlier, to secure them on both sides, and the lower section may also have had spigots engaging in the cill for additional strength.

The bulwark in the bows was probably of solid construction (full thickness) rather than built as roughtree timbers with external planking only. This is based on a requirement listed in the first (of two) Specification developed by Victoria's Chief Harbour Master Ferguson for a steam vessel. It is likely Lang carried this requirement across into his final Specification as a more solid reinforcement of the bulwarks would be necessary in this part of the bows.

Endnotes

VPARL 1859-60 No34 : Defences of the Colony : Report of Captain F.B. Seymour RN, 10 Nov 1859
VPRS 1189 : P0 : Unit 690 : W56/7638 : Letter Norman to Chief Secretary 8 Sept. 1856
VPRS 1189 : P0 : Unit 580 : V A53/6121 : Letter Lockyer to La Trobe, 22 June 1853

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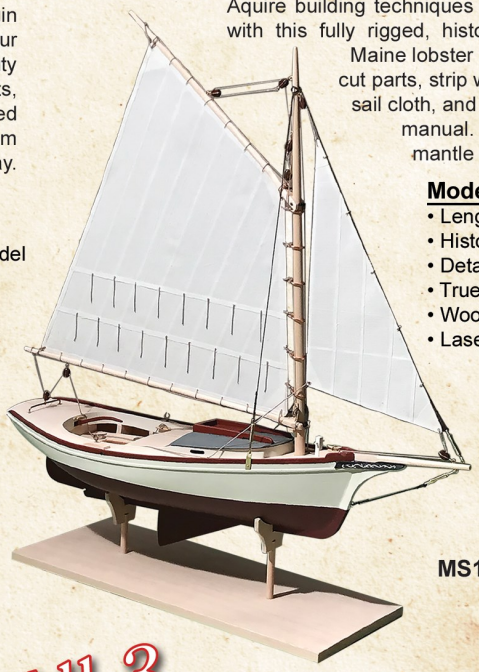

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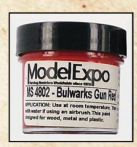

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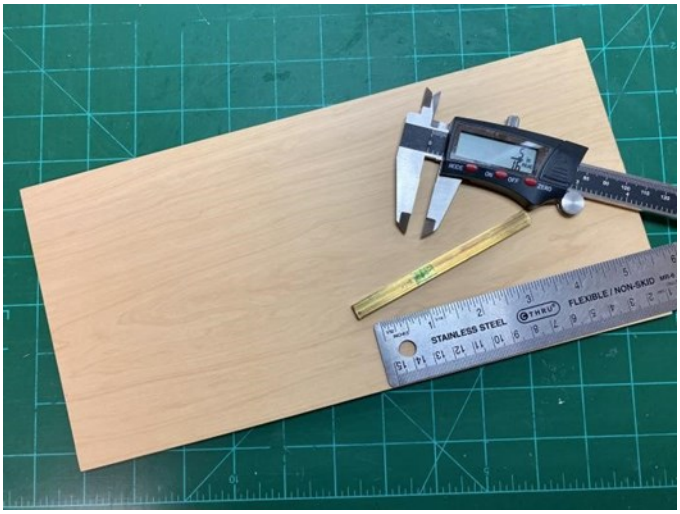
Makerspace

By Mike Shanks

When a model builder makes the decision to scratch build, they will quickly realize the need for dimensioned wood sized to meet the needs of their project. While milled wood can be purchased in many sizes it is often difficult to find exactly what you might need and is typically rather expensive, especially considering the high costs for shipping these days. Cutting your own lumber down to scale model sizes is not difficult but it does require a couple of additional tools and some practice. Let's look at a few shop tools and some methods for getting wooden billets ready for that next batch of scratch made parts.

With few exceptions our source for model building lumber is usually kiln dried hardwoods of a variety of species. The methods used for sizing the lumber are the same but harder woods will require us to go slower when cutting resulting in the process taking longer. Most lumber you will find locally is going to be builder's grade wood more suitable for construction than model building. That being said, you can find both maple and cherry boards in big box hardware stores that can be useful for model building. Your best quality hardwood lumber is more likely to come from specialty dealers and wood worker supply shops. The larger the form factor the better pricing you will get. Most boards come in thickness's of ¾" - 2" and of varying lengths and widths. Where possible, I like to work with billets about 2 feet long and 6" wide by whatever thickness is needed. A portable circular saw comes in handy for chopping long lengths of lumber down to manageable sizes to get us started.



Some basic measuring tools will be needed as we work with the wood. Calipers can give us an accurate thickness reading when used on multiple places around the perimeter of the board. You can also purchase brass or steel measuring gauges for quick cutting tool

setup or billet sizing. The type of parts you are making and the fabrication method being used determines how accurate your milling needs to be. For technical CNC work, I typically mill my billets to 2 decimal places (0.01”). But for non-critical parts I may measure to the whole inch or centimeter. The important thing is to be consistent with your work.

Before taking the rough lumber down to model thickness both sides need to be inspected for warpage and defects. Defects in the lumber that only appear on one side can sometimes be removed as the material is reduced to its final thickness. Likewise, minor warpage can also be eliminated if the board is thick enough to be reduced beyond the warpage variance. Grain direction should also be noted at this point for future consideration of how the model parts will be oriented in the billet. Wood grain typically runs length wise but not always.

Our next task will be to resaw the board down to a thickness that leaves enough material to allow for finish sanding of both sides. We can accomplish this by using either a bandsaw or a planer. The bandsaw might be a little quicker than using a planer, is less wasteful and probably more versatile for different situations. Bandsaws are serious tools and should not be operated unless you are very familiar with what you are doing and are using proper safety protocols. I typically set my fence to the final milled width plus about 1/8”. The taller the fence you have the better. You may need to surface sand the side of your lumber that rides on the fence prior to this operation to ensure the lumber runs square. I also add a bit of extra distance to account for the kerf or thickness of the actual sawblade itself. Lumber should be cut lengthwise, with the grain, using push sticks. Run them through slowly and smoothly. The harder the wood, the slower the feed. Make sure the lumber maintains continuous pressure against the fence as it slides through the saw. I have found adding a light coat of spray vegetable cooking oil (I.e., Pam) to the bandsaw blade with a rag makes for smoother cuts with less noise. If you find the blade does not track straight or the lumber requires excessive pressure to cut it may be time to replace the blade or do some other maintenance on the bandsaw. Be sure to release the tension on your bandsaw blade after each cutting session.

Handle you bandsaw with respect.

Another tool for reducing lumber down in thickness is the planer. Whether your planer uses straight blades or helical index blades the concept is the same. Boards of lumber are fed through the tool as it shears away entire layers of wood from the surface. Good planers can remove a lot of material in a short period of time and might even leave the surface smooth enough to not require finish sanding. However, most planers

cannot create finished billets any thinner than 1/8”. Actually ¼" - ½" is more reasonable. Planers are also very loud and unlike a bandsaw we can only achieve a single board of a specific size from one piece of lumber. For example, we could take a 1” board down to a ¼" board with a planer. Whereas with a bandsaw, we could easily get two ¼" boards from a single 1” piece of lumber. I will choose the planer over the bandsaw in situations where I want to reduce a large number of boards from say ¾" down to ½". In a case like this it would be faster and more efficient to use the planer.

Hearing protection is a good idea when running a planer

Finishing on the thickness sander

Once we have the board within 1/8” of its final thickness it is time to finish it off on the thickness sander. The thickness sander spins a drum wrapped in sanding paper. The drum is lowered in finely adjusted increments allowing the material to achieve a smooth finish and arrive at a specifically measured thickness. Material can be manually fed through a thickness sander or some models like the one shown below can have a powered belt feed.

Cutting of the lumber via bandsaw or planer typically leaves blade marks or other imperfections in the wood surface. The thickness sander will remove these artifacts while also reducing the billet to its final thickness. Material should be repeatedly fed through the machine by alternating directions and flipping sides to ensure we end up with a billet that is both smooth and flat. Thickness sanders are very precise tools – this one removes 1/64” per quarter turn of the adjuster.

Bandsaws, planers, and thickness sanders all produce a lot of sawdust. Good dust extraction methods via vacuums and dedicated tools should also be considered when milling lumber.

I usually batch up my wood milling work as needed for project specific purposes. After you have cut down a few boards you will find repeating the same process over and over will yield consistent results.

1/2" milled Cherry

Those of you with a wood working background probably have these tools in your shop already. Some of you have these tools but in a smaller hobby sized version. A few of you might be considering a CNC machine in the future or are contemplating scratch building. If you find your passion for model ship building, taking you beyond retail kits, having the tools and ability to size your own wood billets will be essential for success. Hopefully this very brief introduction has given you some insight and a few things to think about as you make your way forward in our great hobby. It is not difficult – it just takes a few additional tools and some practice. Sail on!

Deck Furniture on Model Ships - Part IV

By Robert Hunt

If you're building a period warship, chances are you will have multiple cannons and/or carronades to make and rig. Some kits use dummy cannons on decks that cannot be openly seen. A dummy cannon is one that has no carriage. Only the barrel is used, and dummy barrels are actually only partial barrels.

Some kits include blocks and rope for rigging the cannons and carronades. Often the blocks included in the kit are out of scale, making the rigged cannon look rather odd. Many modelers who want to achieve a more realistic model will purchase scale blocks from outside sources.

This article will cover the methods commonly used to mount cannons and carronades of all types including dummy cannons, fully rigged cannons and carronades, and swivel cannons. I will show you how to add details to your armament for additional realism.

Dummy Cannons

The first type of cannon that I will address is the dummy cannon. I want to address the dummy cannon first because, in all cases, certain preparation work must be done during the framing of the model to enable the dummy cannons to be installed later in construction. Photo 1 shows a typical dummy cannon.

Photo 1

As you can see, the dummy cannon is actually only a partial barrel. The aft end is missing, and in its place is a shaft or rod. This rod is inserted and glued into a hole that the modeler must drill through a corresponding board which is mounted to the model's framework behind the gunport openings.

Dummy cannons are commonly used on lower decks that are not open for viewing from above. Ship kits with multiple gundecks, such as the HMS Victory, HMS Vanguard, and USF Constitution, are kits that utilize dummy cannons.

Photo 2 shows the Amati kit HMS Vanguard. In this photo you can see a piece of wood that has been installed across the hull that sits inward from the edges of the bulkheads (blue arrows). This piece of wood is typical of a dummy cannon mounting strip. This strip of wood extends across the length of the hull and is fitted into notches in the bulkheads.

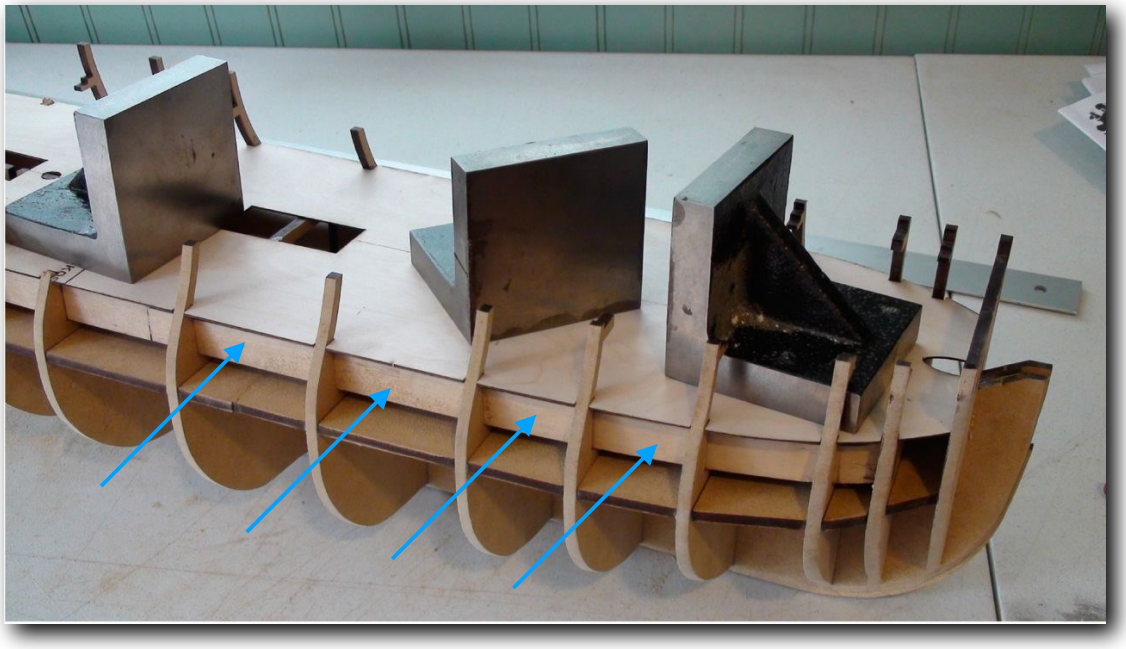


Photo 2

The Model Shipways kit USF Constitution uses a similar method for mounting the dummy cannons on the lower deck. In Photo 3 you can see an individual piece of wood set back from the outer edge of the bulkhead and attached directly to the side of the bulkhead.

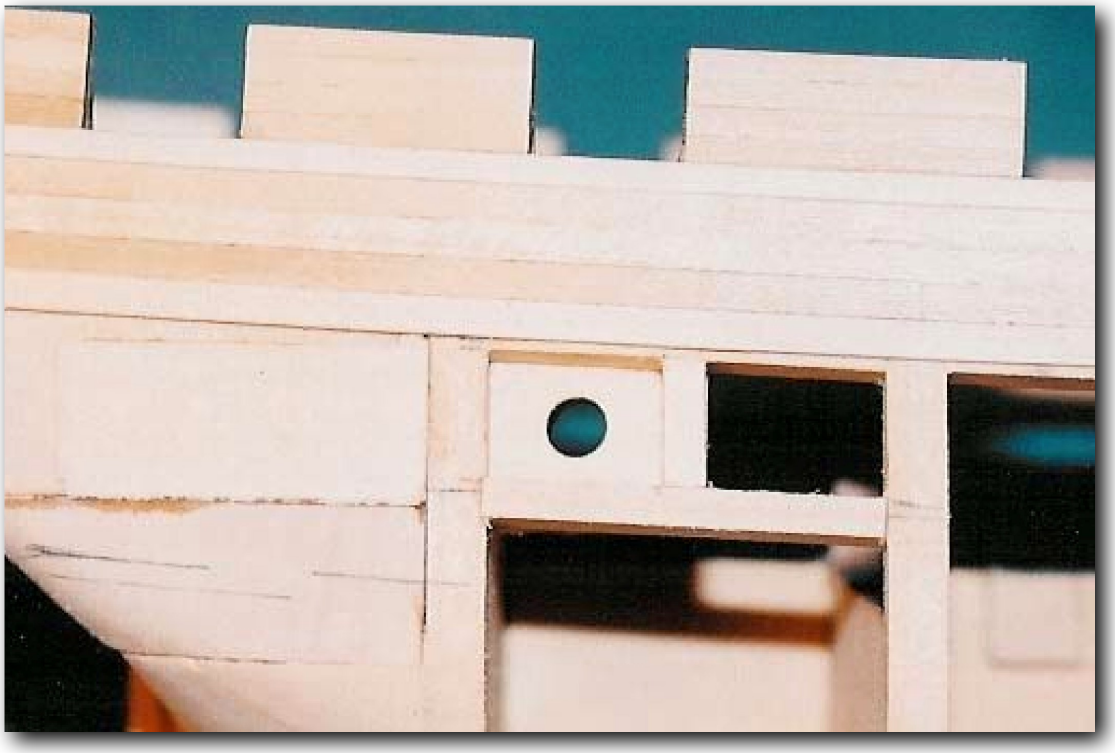


Photo 3

Whether your kit uses a strip of wood as shown in Photo 2 or individual pieces of wood as shown in Photo 3, these mounting strips must be installed before the hull is planked. The holes for the dummy cannons do not necessarily have to be drilled beforehand. Often the holes will be drilled after the hull is planked so that you can be sure that the hole is in the center of the gunport opening.

Before the cannon is installed into the hole in the mounting board, you should paint the interior of the gunport black. That means not only painting the mounting board but also any side pieces of wood that your kit might have instructed you to install. Photo 4 shows gunport painted black that have dummy cannons in them (blue arrows). From a normal viewing distance, the black paint makes it look like the deck is dark which helps hide the fact that the cannon barrel is not attached to a carriage. Photo 5 shows a view of the same ship before the mounting board was painted black. You can see how stark and visible the mounting board is when it has not been painted black.

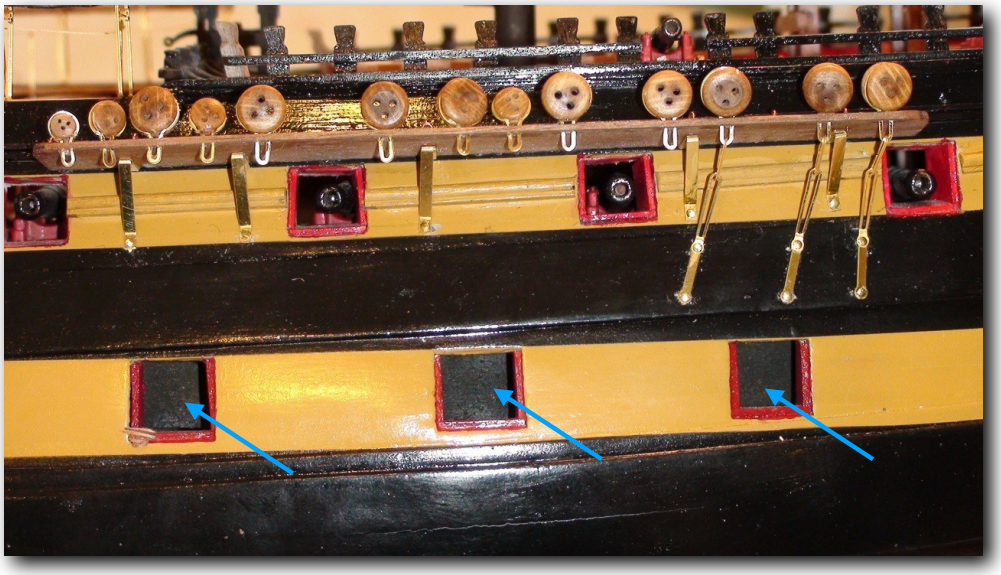


Photo 4

Photo 5

Photo 5 Before the cannon barrels can be mounted, they too should be painted black. Many modelers prefer a blackening agent rather than paint. Micro Mark sells such an agent called Jax Metal Finishing Solution, Pewter Black (item #86755). Photo 6 shows this product which will turn most brass and soft metal parts black when soaked in the solution. You can find other similar solutions on Amazon.

Photo 6

If you wish to use paint instead, most any black paint will work. Be sure to wash the barrels in soapy water and dry them thoroughly. Acetone should also be used to clean the barrels before painting. I like to use a round toothpick with one end cut off and stuck in the end of the barrel hold it while I paint. The pointed end can then be pushed into a piece of styrofoam while the paint or solution dries.

Drilling the hole in the mounting board works best if you use a Dremel tool with a drill bit that is just slightly larger than the rod on the dummy cannon barrel. Horizontal alignment can be determined by viewing the gunport straight on to ensure that the hole is centered and an equal distance from the two sides. Vertical alignment is the process of centering the hole so that it is an equal distance from the top and bottom. When determining the vertical alignment, it is important to also ensure that the hole for each dummy cannon is aligned across the length of the gundeck. The use of a drill bit slightly larger than the rod on the dummy cannon gives you some wiggle room to adjust the cannon barrel so that it lines up with the other cannons.

You will want to use epoxy to glue the cannon barrels in place. Five minute epoxy works best because it will set up quickly but still give you time to make minor alignment adjustments. You can find five minute epoxy in most home improvement centers such as Lowes, Home Depot, or Ace Hardware. It usually comes in a special dispenser that dispenses equal amounts of the two parts by using a syringe and tube type of device to dispense the epoxy for mixing.

After mixing the epoxy, spread some on the rod of the cannon barrel and insert it into the hole you drilled in the mounting board. The thickness of the epoxy will help to hold the barrel in position and the slightly large hole will allow you to make small adjustments in the alignment of the barrel.

The one inherent problem with cannon barrels, whether they are dummy barrels or full length barrels, is that they will protrude outside of the hull. Any part that protrudes from the side of the hull is one that you can bump with your hand while working on the model. That is why I recommend using epoxy to glue these barrels in place. It is much stronger and less likely to come loose if you accidentally bump a barrel. Trying to fish out a dummy cannon barrel that has been knocked loose can be a nightmare of a job and waste a lot of your time! It is best to install these dummy cannons as late in construction as possible for this reason.

Rigged Cannon

The rigged cannon is what you might consider the norm for armament on a period warship. However, I have found that many period warships used the carronade on upper decks and rigged cannons on lower decks. I will address the carronade in a separate section but want to point out that the rigged cannon is not always found on the upper, most visible decks of a large model warship.

Photo 7 shows a typical rigged cannon.

As you can see, the blocks that come in most kits are out of scale and look much too large for the size of the cannon and carriage. Photo 8 shows a similar cannon where the kit blocks have been replaced with after market blocks that are more to scale. Syren Ship Model Company and Dry Dock Models are two excellent sources for after market scale blocks.

Photo 7

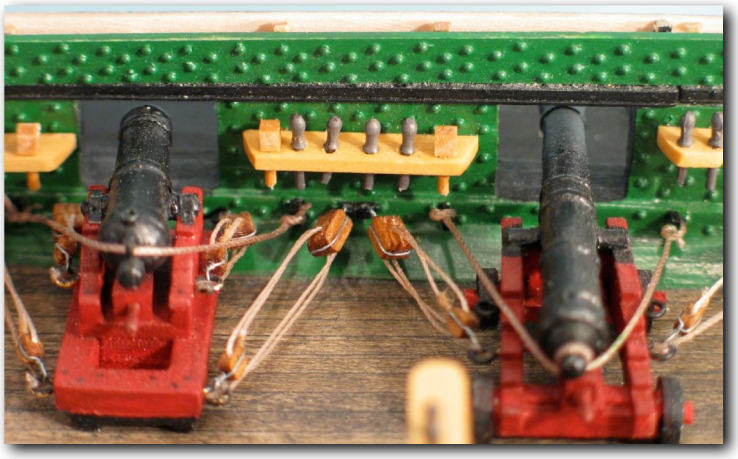


Photo 8

The blocks and associated rigging were used to move the cannon into firing position as shown in Photo V-7 and Photo 8. The coiled rope on the deck is a typical way to rig and display these lines on a model.

The larger, heavier rope that is attached to the bulwarks with eyebolts and wrapped around the cascabel of the cannon was used to keep the cannon from flying across the deck from the recoil of firing. This rope had a fixed length and was heavier than the rigged rope.

There is one more rigged rope that was commonly used on these types of cannons. That rope is often not shown in kit models, probably because the kit blocks are so out of scale that it's nearly impossible to rig the rope. The rope is attached at the center of the back axle. There is a block hooked onto an eyebolt on the axle and another eyebolt with a block hooked onto it several scale feet aft of the cannon carriage. This block and tackle setup was also used to move the cannon into the stowed position.

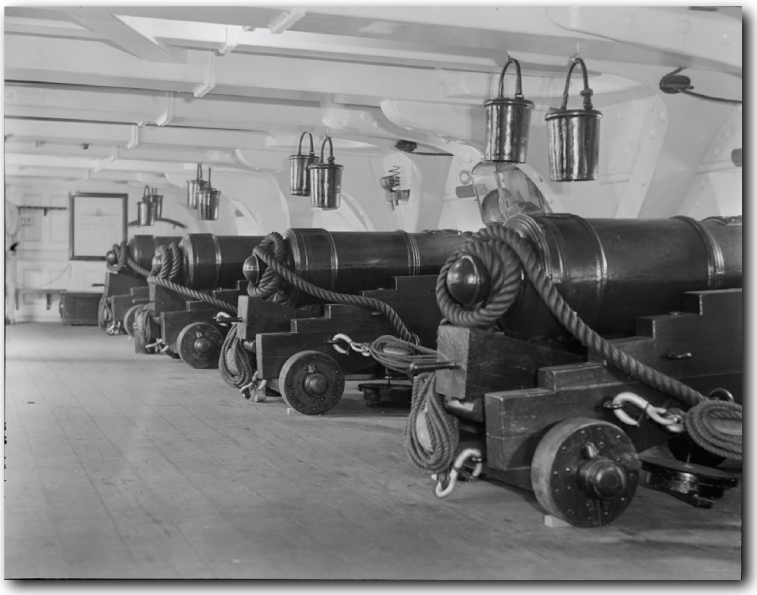


Photo 9

The stowed position of the cannon allowed for the gunports to be closed which was necessary in rough seas to prevent water from getting into the ship. Photo 9 shows cannons on the deck of the USF Constitution in the stowed position (courtesy of Wikipedia). You can see that the hook is attached to the back axle of these cannons but the blocks and tackle are not attached.

Photo 10 shows a drawing of the typical rigging of a rigged cannon. Here you can see how the aft bock and tackle are used to pull the cannon back (out-haul) so that it can be loaded. Once loaded. the two side blocks and tackle being held by two men in this drawing are pulled to move the cannon into the firing position (inhaul).

You should check your kit's plans to see what blocks and rigging are provided. Not every rope shown in Photo 10 will be included in every kit.

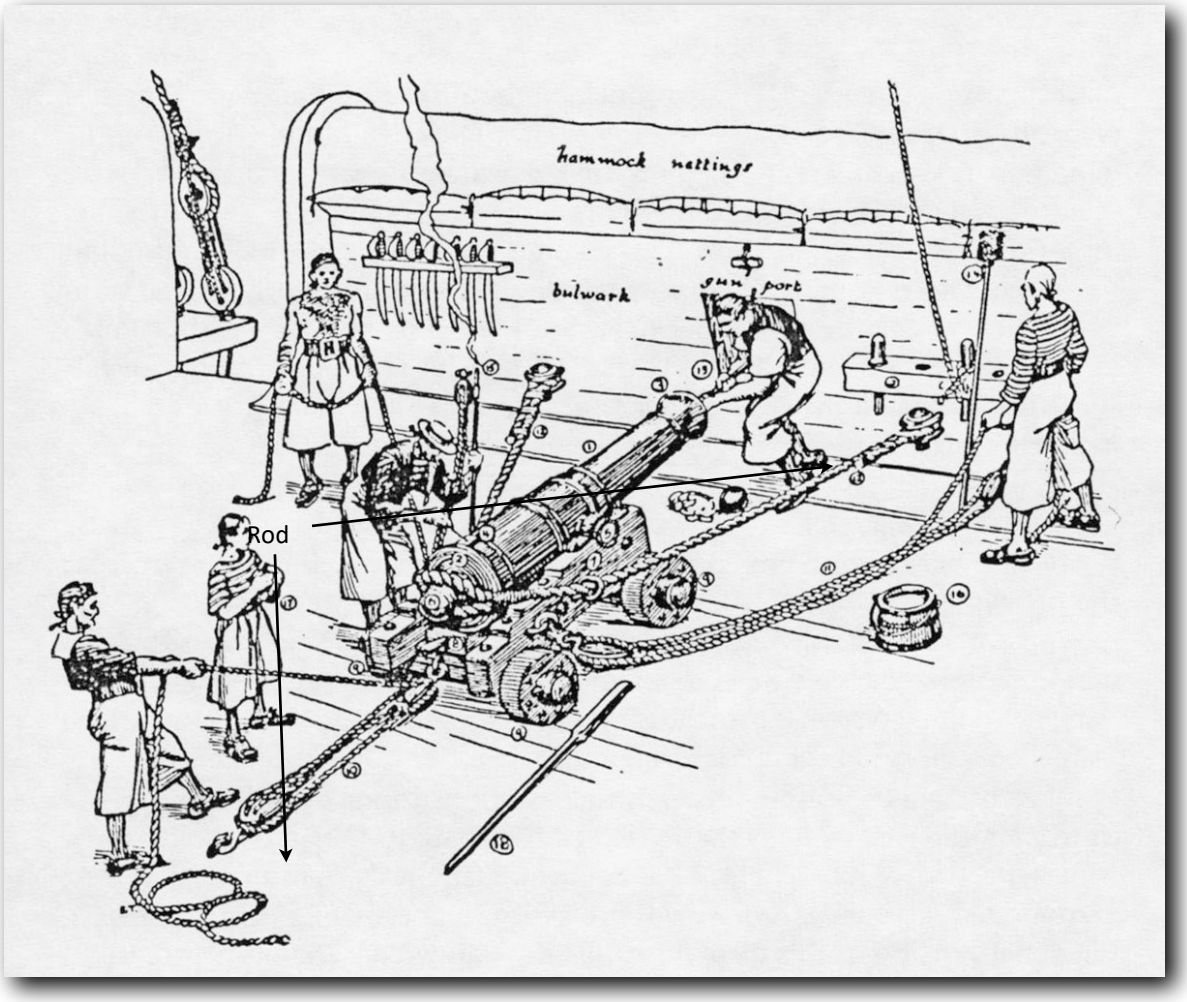


Photo 10

It is best to seize the lines to their respective blocks, hooks, and eyebolts, as applicable. Seizing a line is the process of folding the rope over itself and then wrapping a separate piece of rope around the folded area to lock it in place. A website called Rope Works (http://www.ropeworks.biz/) is an excellent resource for seeing how various ropes on a ship were tied. They provide books and CD's that demonstrate how to tie these various knots, including how ropes were seized on a ship. I would recommend that you visit that website and consider adding some of their material to your model shipbuilding library.

The carriage that the cannon is mounted to will vary from one kit to another. Some kits might have one solid piece that has two sides and a bottom to it. Others might have separate pieces for the sides and bottom. I've even seen kits which have metal cast carriages with various details that you must painted. Photo 11 shows a cannon carriage on the Amati kit HMS Vanguard that was cast metal. You can see some of the details on the carriage that were painted black to simulate the iron fittings.

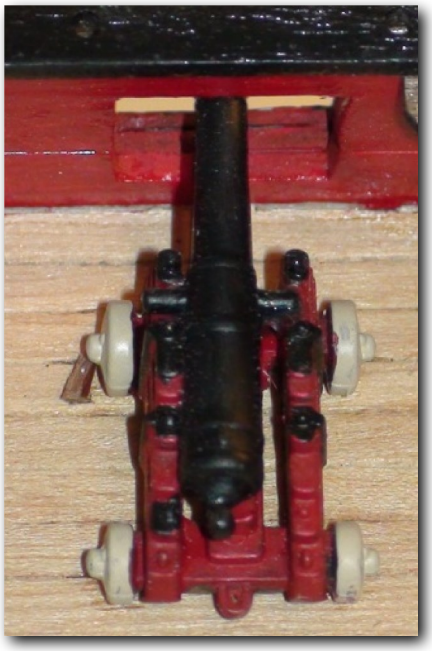


Photo 11

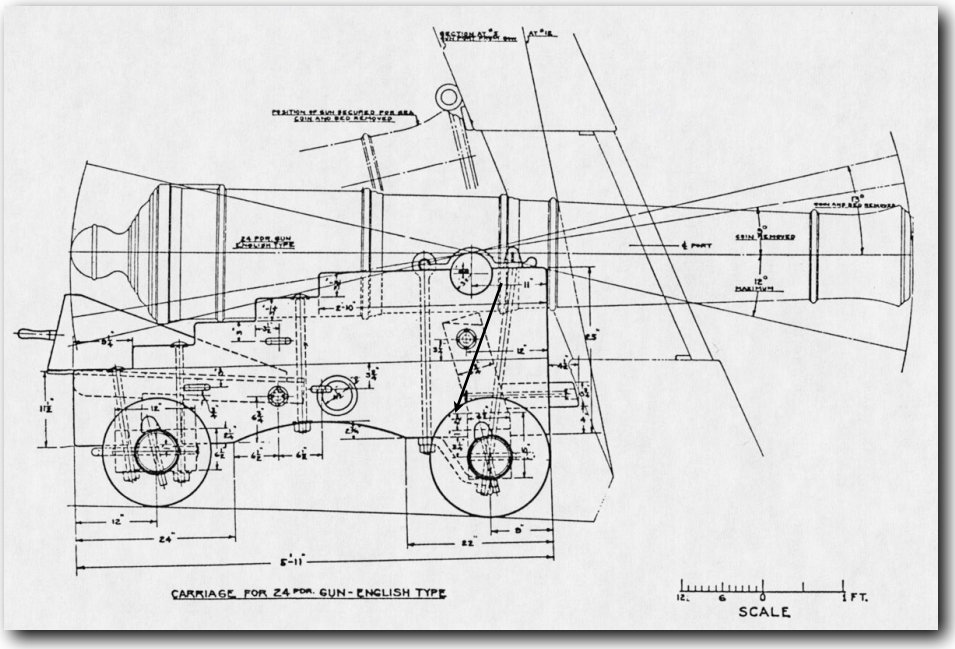


Photo 12

Due to the scale of this model, it was not practical to install any rigging to the carriage nor was any provided in the kit.

Photo 12 shows the typical parts to a cannon and cannon carriage (courtesy of the Naval Historical Foundation).

Seldom will a kit have all of the parts shown in this photo. Common parts to a carriage include the sides, trucks, axles, bed, quoin, and transom. Notice that the front wheels, commonly called "trucks," are larger than the back wheels to compensate for the camber of the deck. Some kits will not have this detail.

The trunion is actually a part of the cannon and is attached to each side. Most kits will have a hole through the cannon where a metal rod serving as the trunion passes completely through. The cascabel at the aft end is used to attach the large rope that keeps the cannon from flying across the deck when it is fired.

A common detail added to the carriage is the cap-square that fits over the trunion to lock it in place. Photo 13 shows a replica cannon with the cap-square and other details.

Photo 13

Some kits include a brass part for the cap-square, but most often the part is simply made from some black card stock glued to the top of the carriage side and bent over the trunion.

The quoin is seldom included in a kit. The quoin is actually the small metal handle that is attached to a wedge shaped block of wood. By pushing the wedge under the bottom of the aft end of the cannon barrel you can change the elevation of the barrel.

The trucks were made of wood and most often are cutout parts in the kit. Seldom do you see the locking pin that passes through the axle to hold the truck on. The scale of most kits is too small to model such details. Some kits include brass rings that go around the trucks.

Various eyebolts can be seen on the sides of the carriage which serve to attach the rigging. These are usually included in most kits but are often out of scale.

All of these photos should help you understand how a cannon carriage is made and what the purpose is of some of the hardware. You should follow your kit's plans and instructions when making and installing cannons on your model because every kit is different. Many kits provide a simplified version of a carriage and often the carriages can't be rigged due to the scale of the model.

Photo 14

The color scheme of a cannon carriage varied from one ship to another. I've seen kits that recommend they be painted red, while others might recommend they be painted yellow ochre. Many kits make no distinction at all on what color to paint them. You should check your kit's plans and instructions to see what color your cannon carriages should be painted.

Photo 14 shows a cannon from the Model Shipways kit, USF Constitution. I simulated the cap-square by painting the area around the trunion black. Due to the scale of this cannon, you could not tell the difference when viewing the model from a few feet away.

Some kits seem to skimp on their cannon carriages by providing minimalistic parts such as the cannon carriages shown in Photo 15. These are carriages found in the Caldercraft kit, HM Bark Endeavour.

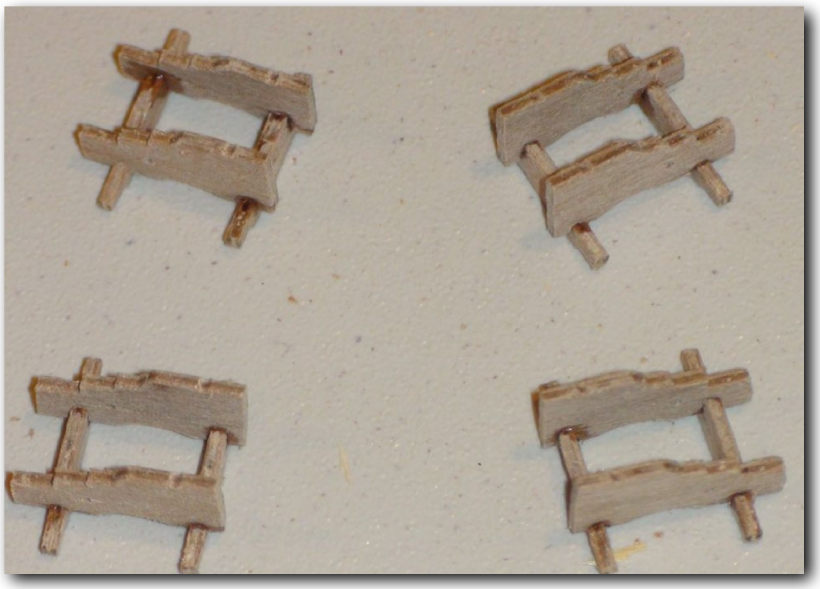


Photo 15

These carriages are made from walnut plywood. Unfinished, they are not very impressive looking. Their small size makes it difficult to add details such as eyebolts and rigging blocks because such additions would look out of scale and unrealistic. However, I was able to add some small details as shown in Photo 16.

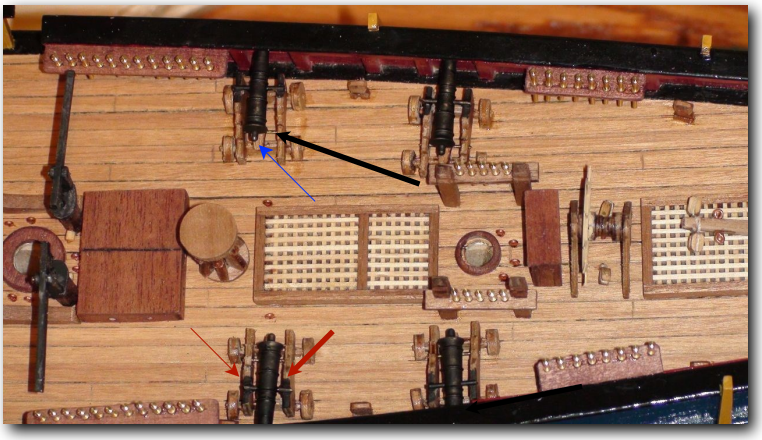


Photo 16

As you can see, I added a bed underneath the cannon barrel (blue arrow). By drilling a hole through each side and sliding a small piece of brass wire (black arrow) through the hole, the bed was able to sit on top of the wire and the rear axle. This setup can be seen in the detailed diagram in Photo 12 and is historically correct. The cap-squares in Photo 16 were made from black construction paper (red arrows.

As small as these carriages are, it is still possible to create something a bit more detailed and realistic. Photo 17 shows some scratch built carriages I made for my HMS Kingfisher kit I developed and produced many years ago.

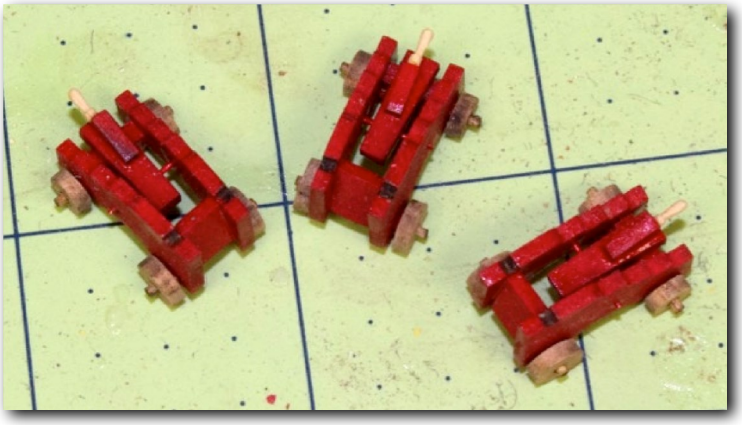


Photo 17

These carriages have the two sides, two axles with trucks attached, the transom, the bed with metal rod supporting the fore end, and the quoin with a small wooden handle made from a toothpick.

The first step in making a cannon carriage from scratch is to make the two sides. Photo 18 on the next page shows the two sides of a carriage that I made using two pieces of wood glued together to give it a more historically accurate look. The pinvise was used to drill holes in each side for the eyebolts. By stacking the two pieces on top of each other, you can be assured that the holes are in the exact same spot on each one when you drill these holes.

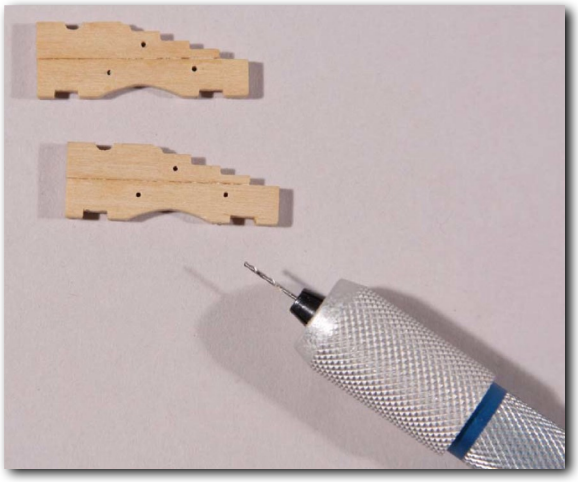


Photo 18

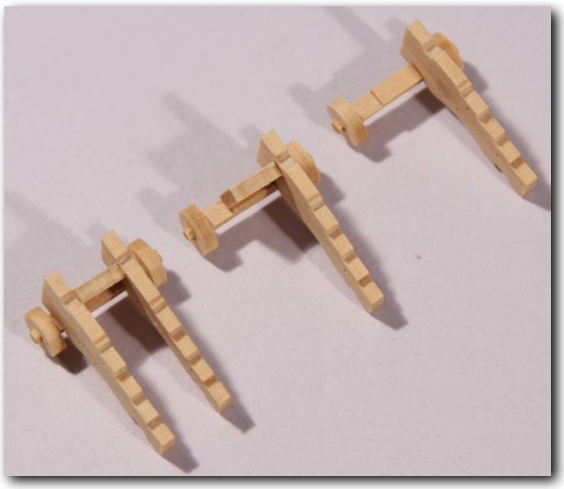


Photo 19

The assembly of the carriages can be done in assembly line fashion. As shown in Photo 19, the front axle with trucks is attached to one side part and the transom is attached to the axle. Then the other side part is attached.

Photo 20 shows the bed before being attached. You can see the brass rod, inserted through holes in the sides, that the bed will sit on. Notice the notch in the bottom of the bed that will fit over the rear axle bed support piece. Another similar notch will be cut at the narrow end that will sit on the metal rod. This is all historically correct. Photo 21 shows the assembly with the bed now attached.

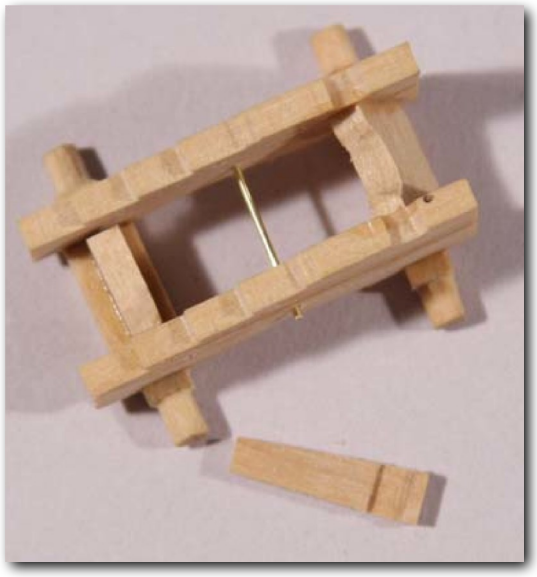


Photo 20

Photo 21

As you can see, the aft end of the bed sits on top of the support piece which is attached to the top of the rear axle. The fore end has a notch in it that sits on top of the brass rod.

Because this carriage was so small that the kit eyebolts looked terrible due to their scale, I used thin brass wire and a special pair of round, needle nose pliers to bend the wire into a small eyebolt as shown in Photo 22. on the next page.

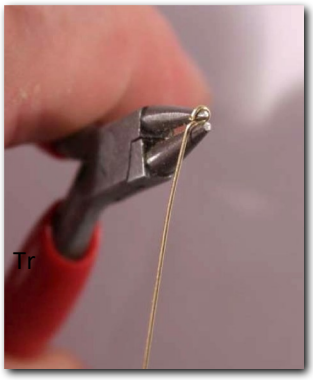


Photo 22

Photo 23

Photo 24

Photo 23 shows an eyebolt and a larger brass ring, both made from scratch using these pliers. You can purchase these pliers at almost any arts and crafts store that sells jewelry making tools or at Micro Mark (item #84988). Photo 24 shows these rings painted black and mounted to the carriage.

Finally, Photo 25 shows the completed cannon installed on the model. At this scale, it would have been difficult to rig, given the small size blocks that would have been needed.

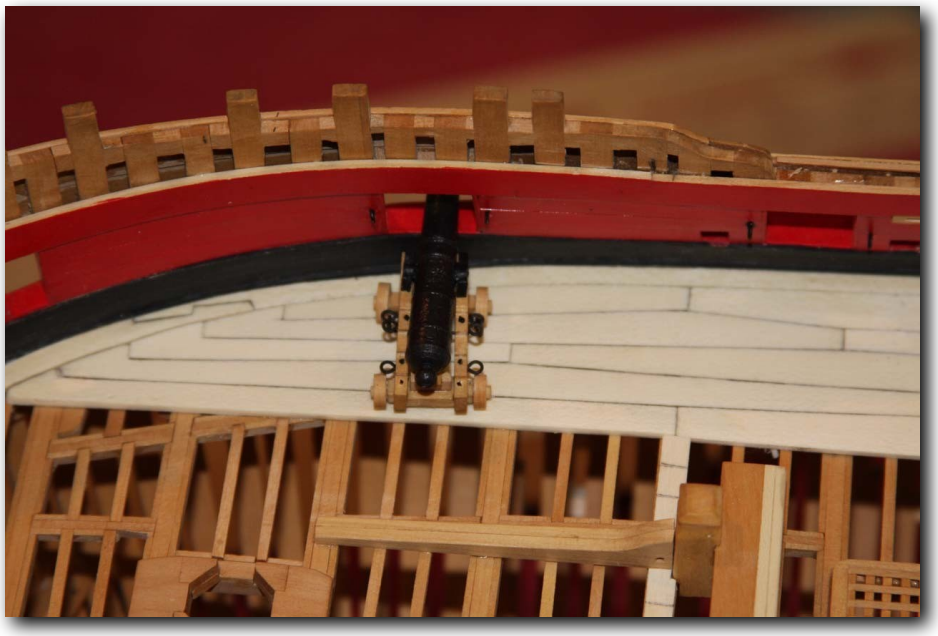


Photo 25

Rigging a cannon is not all that difficult. Blocks should be attached to the carriage eyebolts first. Typically, this block will have a leader rope attached on the outer end of the block. The blocks at the bulwarks should also be attached to eyebolts before the eyebolts are attached. Photo 26 shows a cannon with the carriage block attached. Notice the leader rope on this block. This rope will pass through a double block on the bulwarks, then come back and pass through itself, and end by passing through the double block again, where it will then be coiled up on the deck.

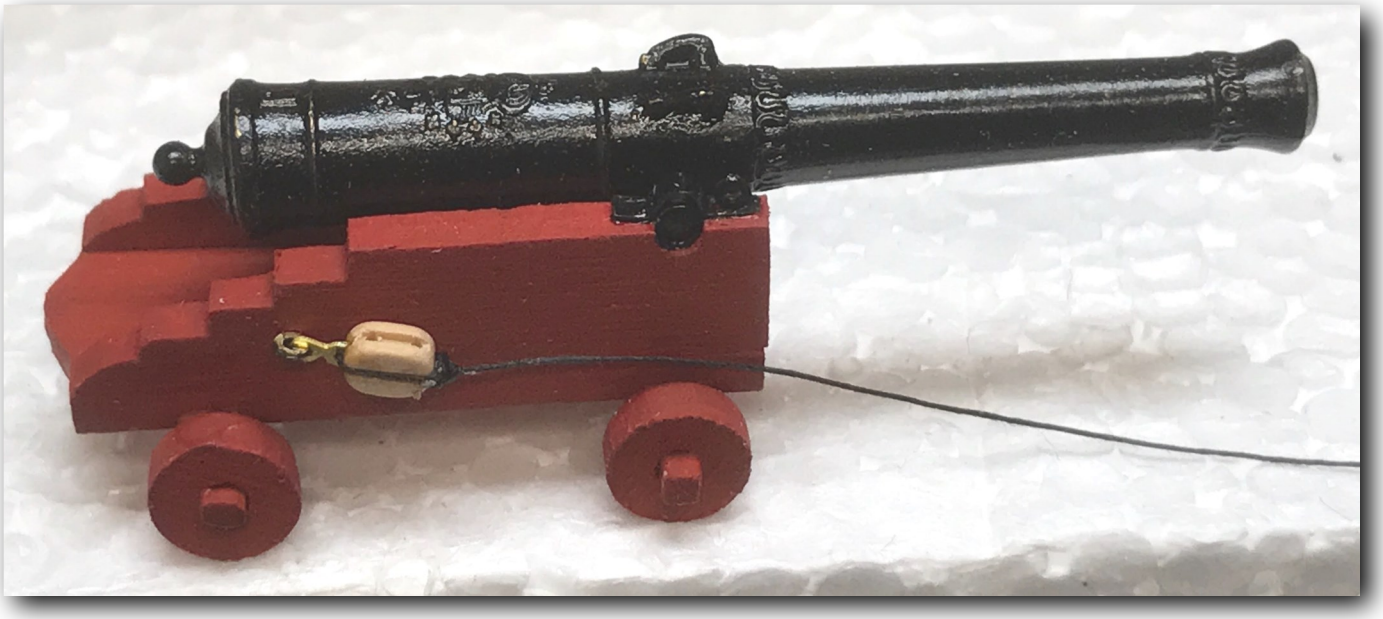


Photo 26

As you can see, the leader rope is actually thin thread wrapped around the single block and seized on the fore end. The single block has a small brass eyebolt on the aft end that is glued into a small hole drilled in the end of the block. This eyebolt is then attached to another eyebolt that is attached to the side of the carriage. This is very small work that requires patience, tweezers, and a good set of magnifying glasses!

How much detail you wish to show on your cannon carriages will depend on your skills and the materials available to you. Very small blocks can be obtained on the secondary market as can fine rigging line. You must do your research to track down these items, using ship modeling forums and the experience and knowledge of other modelers.Carronades Carronades

Photo 27

The carronade is another common type of armament found on period ships. The carronade had less recoil than a cannon. The recoil was absorbed by the carriage which did not move when the carronade was fired. Photo 27 is a photo of a carronade on the HMS Victory.

As you can see, it had the same rigging as a cannon. It also had a quoin for changing the elevation and a cascabel with an iron loop on it for the heavy rope that limited the recoil travel. Later versions had an elevation screw under the cascabel instead of a quoin.

At the aft end of the carriage you can see a slot in the bed of the carriage (black arrow). The upper part of the carriage had hardware underneath that allowed the carronade to recoil across the lower bed while the bed did not move.

I've seen many different designs to the carronades in a kit. Photo 28 shows a carronade from the Model Shipways kit, USF Constitution. You can see that the design of this carronade is much different from the one in Photo 27. Rather than sitting on a large iron mount, this carronade sits on a wooden mount similar to a cannon carriage.

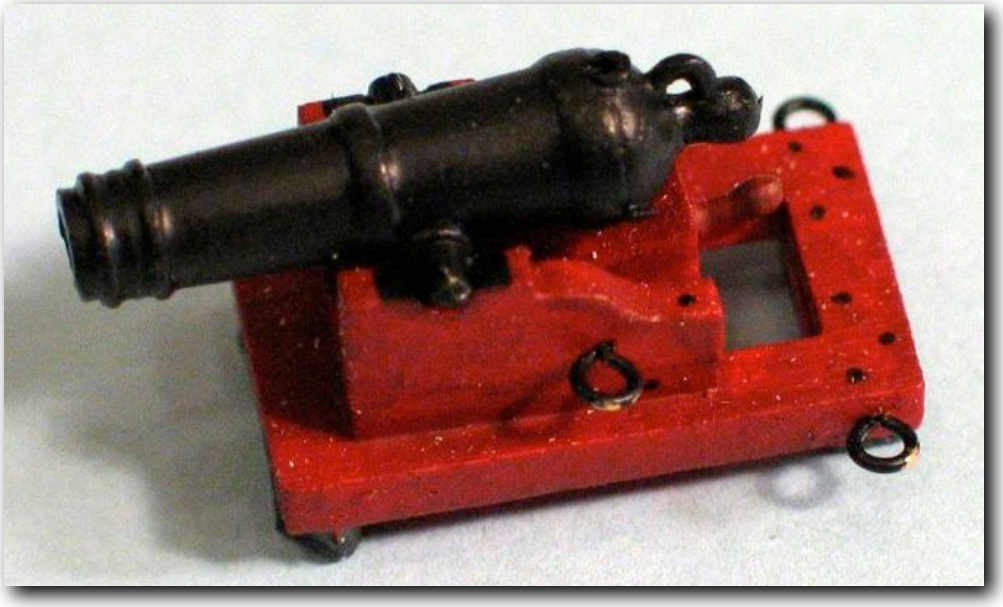


Photo 28

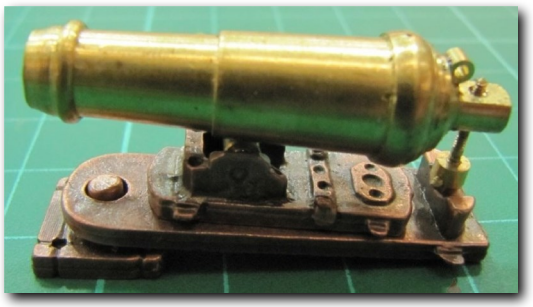


Photo 29

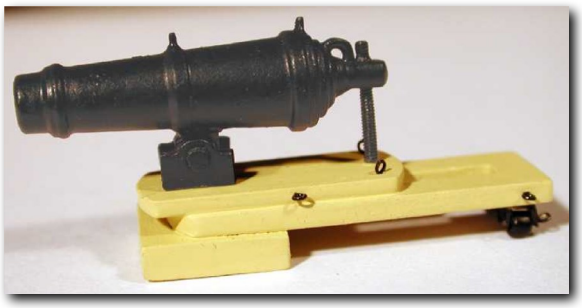


Photo 30

Notice the black dots on the back end of the carronade. These are simulated bolts made with a fine felt tip pen. If you study the drawings of your kit's cannon carriages, often these small details are seen. They're easy to simulate and can add some realism to your model.

Photo 29 and Photo 30 show two examples of European kit carronades. The first shows a carronade from Amati, and the second shows one from Caldercraft.

The base of the Caldercraft carronade is wooden, making it look more realistic and historically correct. However, the screw on the aft end is not as accurate as the Amati screw. The Caldercraft screw has no way of actually being turned. Photo 31 shows a typical mechanism found on carronades that enabled the elevation screw to be raised and lowered. The Amati carronade (Photo 29) appears to have something similar on its elevation screw.

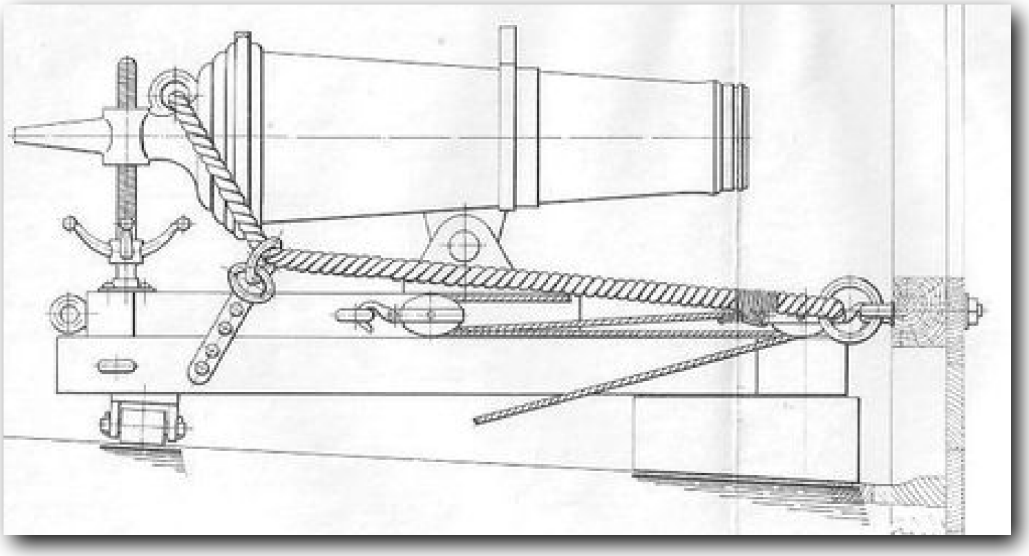


Photo 31

The point I'm trying to make is that even though a simple internet search turns up historical data on how the carronade was mounted, kit makers sometimes fail to implement a historically correct version of one in their kits. This drawing and actual photos of a replica might help you in making your kit carronade look a little more accurate.

Assembly of a kit carronade is usually straight forward and just a matter of attaching the actual barrel to the base. The base might be cast metal, or it might be made from several cutout pieces of wood. Follow your kit's plans and instructions to assemble your carronades. Rig them in the same manner as a cannon is rigged, attaching the ropes before you mount the carronade to your model.

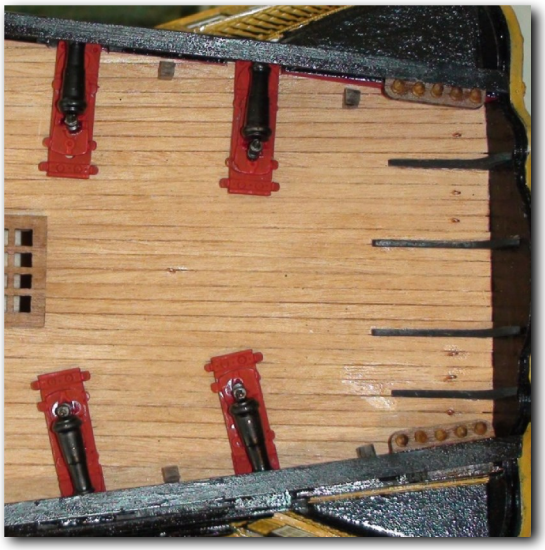


Photo 32

Photo 32 shows four carronades mounted to the poop deck of the Amati kit, HMS Vanguard. The carriage of these carronades is a molded piece of metal that is painted red. The brass carronade barrel is painted black and mounted separately. Your kit's plans or instructions should give you information on the color scheme of the carriage. Most carronades barrels would have been black in color.

Carronades were often found on the forecastle and poop deck of ships because they weighed less than a cannon and used less gunpowder. They were designed as a short range weapon to be used most often in close quarters fighting.

Swivel Cannons

The last type of armament I will cover is the swivel cannon. Any kit of a warship will likely have swivel cannons included. I have seen swivel cannons of many designs. The gun was originally designed as a short range anti-personnel weapon. Due to their short range and small caliber, they could not actually sink a ship.

Most swivel cannons were muzzle loaders like the cannon and carronade. They usually had a handle of some sort (often metal) attached to the cascabel, such as the one shown in Photo 33 on the replica ship Lynx (courtesy of Wikipedia). The handle was used to aim the weapon.

This photo shows the swivel cannon mounted to the caprail of the ship. More commonly, special wooden

Photo 33

mounts were attached to the outer bulwarks of the ship on which the swivel cannon was mounted. Photo 34 shows several swivel cannons mounted on bulwark posts in the Model Shipways kit, Armed Virginia Sloop.

Photo 35 shows a close up of this cannon. As you can see, the aiming handle is different from the one shown in Photo 33.

Photo 34

The swivel cannon barrels shown in this photo were cast metal. They were fitted into a cast metal mount that allowed them to swivel up and down to change the elevation of the weapon. The mount could swivel right and left, thus the name “swivel cannon.”

Photo 35

Photo 36 shows a different design for a kit swivel cannon. This photo shows the mounting base for a swivel cannon on the Caldercraft kit, HMAV Bounty. The mount itself is a photoetched part that was bent into a “U” shape. The mount had a pre-drilled hole in the center so that it could be mounted using a small brass nail. The handle used to swivel the cannon side to side was another photoetched part, also with a pre-drilled hole that was mounted to the “U” shaped piece.

There is also a pre-drilled hole on each side of the mounting piece where a small brass rod could pass through. The cannon barrel in this kit also had a pre-drilled hole through the barrel. Photo 37 shows this swivel cannon after painting it and attaching the barrel to the mounting piece.

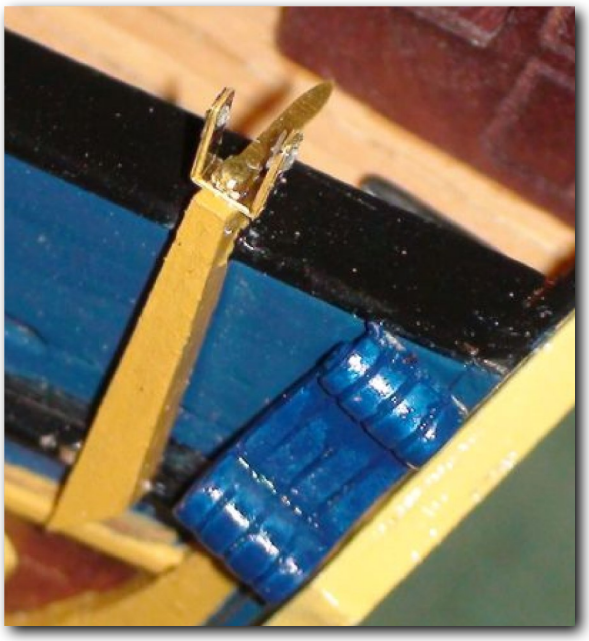


Photo 36

Photo 38 shows swivel cannons mounted to the Kammerlander kit, Duke William. These cannons were cast metal with a cast metal base. Notice how similar they look to the ones in the Armed Virginia Sloop kit shown in Photo 35.

Photo 37

What is interesting about these swivel cannons is that the wooden mounting post is attached to the inside of the bulwarks instead of the outside. I'm not sure how historically correct that is. I have always seen the wooden post mounted to the outside bulwarks. Since the cannon has nothing to lessen its recoil, it seems to me that constant firing would put undue stress on the wooden mount and eventually cause failure to whatever method

Photo 38

was used to attach the post to the bulwarks. Think about that for a moment before you attach these mounts to your model. It might be better to attach them to the outside surface of the bulwarks.

On my scratch built Hannah model shown in Photo 39, I used metal cast swivel cannons that included the base with the cannon barrel so they were static - they did not swivel up and down. Notice how the mounting posts on the outside of the bulwarks intersects the various moldings on the side of the ship as well as the caprail.

Photo 40 is a close-up view of these moldings. Typically it is easier to cut out the area in the moulding where the post must pass through. However, the opposite was true on a real ship. On a real ship, the mounting post was cut to the profile of the moulding so that the mounting post passed over the moulding.

Photo 39

The mounting post will usually be made from a piece of kit stripwood. The post will have a hole drilled in the center top so that the cannon can be mounted. Mounting swivel cannons is simple to do. Check your kit plans to properly locate each swivel cannon mount.

Photo 40

I prefer to follow the relationship of the mounting post to other features on the ship rather than rely on measurements taken from the kit's plans. The reason is that your model will not always adhere to the measurements taken from the plans, and the end result might be that the swivel cannon is in the way of certain rigging lines. As a matter of fact, you should consider this factor when attaching the mounting posts to your model. If you look at Photo 22, you can see that the aft swivel cannon is nestled among the ship's shroud lines.

3D Printed Cannons

With the advancement of three dimensional printing technology, it is now possible to draw a cannon, carronade or swivel cannon using computer aided design software (CAD) and have that drawing printed in full 3D. I have personally created such drawings using a software program called AutoCAD and had the 3D drawing printed by a company called Shapeways.

Shapeways provides various materials for printing three dimensional objects. Depending on the materials used, the quality of these prints can be as good as a metal or resin cast part. The price of a 3D printed part is comparable to metal or resin castings.

Photo 29 shows three 3D printed cannons I created for my Patrick Henry kit which I am no longer producing. The same drawing I created was used to print each one. One cannon was printed using Shapeways' high resolution material which is translucent. I painted it black.

The second cannon was printed using Shapeways' medium resolution material in white which I then painted black. The third was printed using Shapeways' medium resolution material in black. I wanted to test each material because the cost of printing each one was slightly different. As you can see, it is difficult to distinguish the difference.

This concludes my discussion on deck furniture found in kits and the different designs used. I hope you find this information helpful in your model building.

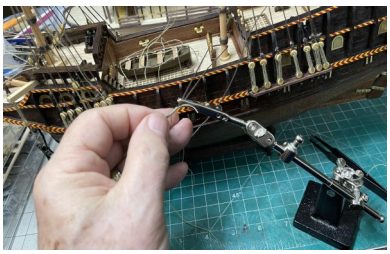
Photo 41

The College of Model Shipbuilding

by Robert E. Hunt @ www.lauckstreetshipyard.com

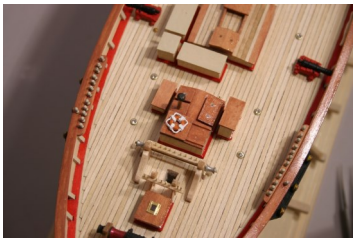
Hello, my name is Bob Hunt. I own a small business called Lauck Street Shipyard. I specialize in providing very detailed instruction on how to build model ships from kits or from scratch. Other subjects are also covered in detail as well, which are all part of my College of Model Ship Building

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.



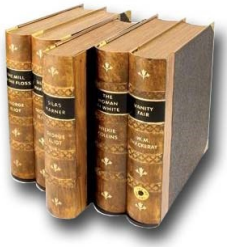
Our Junior Courses are for modelers with much more experience who want to start learning kit bashing and scratch building. These courses include the Mamoli kit Rattlesnake and the Panart kit HMS Victory.

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

The Modelers Work Bench

“Pliers and Cutters”

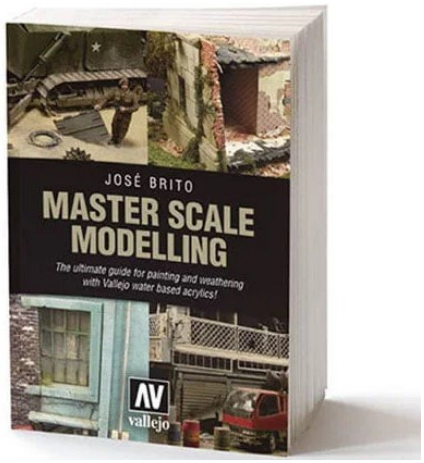
A good set of pliers and cutters is a must have set of tools on your bench. They come in varying sizes and shapes not to mention quality . The set above comes from Lee Valley tools. As with all your tools I recommend that you buy the best that you can afford. If you can’t afford good quality tools to start with find ones that will get you buy until you can replace them with better ones. Are you a flea market type of person? I have found over the years that older tools tend to be better made than they make them today. You can often find them at flea markets and garage sales for a very reasonable price (along with a lot of other tools).



The Book Nook

Books of interest for the Model Ship Builder

New & Old



Master Scale Modeling

By: Jose Brito

ISBN: 978-84-09-20559-2
Pages: 552
Publisher: Vallejo

In this book we find 10 years of work by the great modeler José Brito; throughout the 552 pages, the author shows his different techniques and tricks to build, construct and paint models, almost always in a setting of a diorama. The book has been written as much for novices as for experienced modelers, beginning with a description of the tools, materials and colors used by José Brito, and following with step by step descriptions of the models shown on the pages.

Being such a large work, the models in the book cover a large number of subjects: buildings of different periods, sea and beaches, wooded areas and deserts, realistic settings or Science Fiction scenes, different seasons of the year, figures and military vehicles and aircraft. In all cases, the author presents the step by step processes in a clear way, with all the information needed to obtain the surprising results which are shown in the book.

Although this publication has not been conceived as a guide, the multiple examples shown are perfect for finding most of the building and painting techniques which are actually in use, the more basic ones as well as the most complex, which lets the modeler choose the technique most suited to the subject.

Genes Nautical Trivia

Cargo/Trade Goods

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

BARLEY
BEEF
COAL
COCOA
COFFEE
COTTON
FIGS
FISH
FURS
GOLD
GRAPES
GUANO
INDIGO
IRON
IVORY
MARBLE
OIL
OLIVES
POTTERY
RICE
RUM
SALT
SILK
SILVER
SPICES
SUGAR
TEA
TEXTILES
TIMBER
TOBACCO
WHEAT
WINE
WOOL

Genes Nautical Trivia

Scrambled Shipboard Locations

1.	COPPEDOK	_ _ _ _ _ _ _ _
2.	EQUATERRCDK	_ _ _ _ _ _ _ _ _ _ _ _
3.	MAGZNEAI	_ _ _ _ _ _ _ _
4.	LEGALY	_ _ _ _ _ _
5.	DOHL	_ _ _ _
6.	GRANITECAB	_ _ _ _ _ _ _ _ _ _ _
7.	PETROOF	_ _ _ _ _ _ _
8.	SCREWSTON	_ _ _ _ _ _ _ _ _
9.	SHADE	_ _ _ _ _
10.	GIBERD	_ _ _ _ _ _

A well known Author

Each letter in the phrase has been replaced by a number
Solve this quote by A well known Author

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

1 26 3 7 19 20 22 26 13 9 3 3 15 12 21 12 7 13 11 3 5

13 15 15 1 26 12 18 26 12 16 12 21 8 20 16 16 12 2 15 3

11 26 3 7 1 26 13 11 3 9 3 23 23 3 21 13 12 7 16

26 20 1 3 9 3 23 12 21 8 23 20 2 13 2 15 3 21 22 16 11

2 3 11 26 3 11 23 22 11 26

Genes Nautical Trivia

Answers

Shipboard Locations

1. POOP DECK
2. QUARTER DECK
3. MAGAZINE
4. GALLEY
5. HOLD
6. GREAT CABIN
7. FORE TOP
8. CROWS NEST
9. HEADS
10. BRIDGE

A well known Author

"When you have eliminated all which is impossible then whatever remains however improbable must be the truth"

This is the code used to encode the
quotation made by A well known Author

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
13	2	18	5	3	25	24	26	12	4	14	15	21	7	20	8	17	23	16	11	22	9	1	10	19	6