

The Carronade

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THE CARRONADE, first produced in 1776 by the Carron Company of Scotland for which it was named, was perhaps the most important innovation in naval ordnance since the introduction of bronze guns at sea in the sixteenth century. This short, light gun of large bore, a hybrid between the traditional long gun and short howitzer was an important transitory weapon between the old long gun and the new shell gun. It had a service life of a half century.

Up until the introduction of the carronade, the Carron Company had enjoyed a mixed record in the production of ordnance. The Carron ironworks at Falkirk, named for the Carron River near there, cast its first gun, an experimental 6-pounder, in 1761. Labor difficulties, however, led to inferior products and, when the Board of Ordnance rejected some of its ordnance, the directors of the company decided to forgo the production of cannon. In 1764, however, Carron made another attempt to manufacture dependable cannon, at the same time lowering its price to undersell competing firms. The Board, tempted by the cheaper price, placed a number of ordnance orders with Carron, despite the fact that a higher percentage of its guns burst in proof than those from other companies. Then a number of Carron-cast guns burst on board ships. When tests determined them to be of inferior quality, in 1773 the Board of Ordnance informed Carron that it would accept no more of its guns, and many Carron-manufactured pieces were removed from Royal Navy vessels, although others were still aboard ship as late as 1777.¹

This rejection would have been sufficient for most companies, but Carron persevered, deter-

mined to produce high-quality guns. Among innovations, the company began casting its guns solid, instead of around a core. In January 1777, the Board of Ordnance ordered that no guns were to be accepted unless they were bored from the solid. This produced guns of greater strength. Although the Board of Ordnance tested a number of these guns, it decided not to buy any more guns from a firm with such a poor record.

Despite this Admiralty rebuff, Carron produced increasing quantities of ordnance for the private market. By 1776 it had a number of orders, chiefly from British and Spanish private merchants who had to arm their own vessels. In 1776 Carron produced a number of lighter weight guns. A 6-pounder, for example, was reduced from between 13.25 and 16.25 hundred weights (units of 112 pounds) to from between 8 and 8.5 hundred weights. This considerable savings in weight was important to merchantmen.

This new model, known as "Marine gun," was the prototype of the carronade. The Board of Ordnance continued to insist, however, that all guns produced for it be in strict conformity with the Establishment of 1743.² This did not trouble Carron in the private market where the arming of merchant vessels was a necessity, what with American privateers and naval vessels prowling off the British Isles. With these orders from merchant captains, Carron sold large numbers of guns.

In the autumn of 1778, Charles Gascoigne, a partner in the Carron firm contracted with his kinsman Captain William Elphinstone to transport Carron products to London. As part of the bargain the company agreed to arm Elphinstone's ships with a new type of gun that it had developed. Briefly known as a *gasconade*, in December 1778,

¹ R.H. Campbell, *Carron Company* (Edinburgh: Oliver and Boyd, 1961), pp. 82-88. Two Carron-cast guns burst on board *Egmont* in June 1777 resulting in the death of two men and "much wounding." The Board of Ordnance expressed surprise that there were still Carron guns in the fleet. Minutes of Board of Ordnance, 9, 17, and 18 July, 1777. Carron guns were still in the fleet in August, however. *Ibid.*, 2 August, 1777.

² Campbell, *Carron Company*, pp. 88-89; Minutes, Board of Ordnance, 10 January 1777.

when the company authorized unlimited orders for the new gun, its name was changed to carronade.³

The carronades mounted on Elphinstone's ships were in the nature of an experiment; but, as news of them spread, requests for them came from merchant firms. The first external sale was in November 1778 of sixteen carronades to an agent, Zuill,

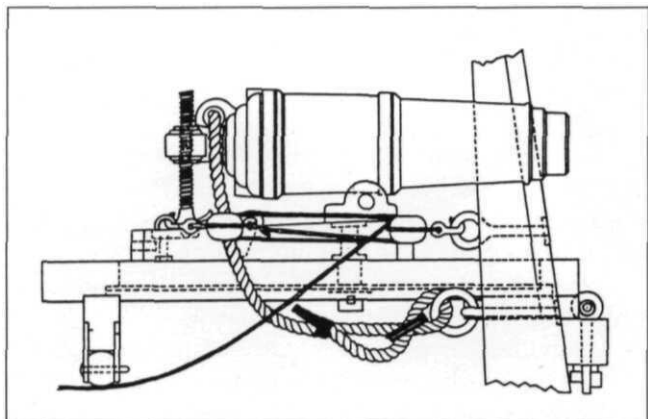


Figure 1. An English 24-pound carronade from about 1820. After Charles Dupin; redrawn from Clowes, *THE ROYAL NAVY*, volume 5. From Spencer C. Tucker, *ARMING THE FLEET, U.S. NAVY ORDNANCE IN THE MUZZLE-LOADING ERA* (Annapolis, Maryland: Naval Institute Press, 1989), p. 121.

arming a vessel, *Spitfire* of 200 tons, then fitting out in Liverpool. In a letter to Zuill, Gascoigne warned him to

prevent any person whatsoever from taking a pattern, model, drawing or dimensions of the Gasconades....As you are the first gentleman we have sold them to excepting those on board our own vessels, we would think it hard to be robbed of our scheme in its infancy, after having cost us so much trouble, pains and expense in completing them to the satisfaction of many able judges....⁴

Spitfire was soon in action and reportedly did well against heavy odds. By early 1779 there was a heavy demand for the new gun. In addition to its use in arming merchant vessels, the new weapon was also in demand for privateers sailing against the rebellious American colonies. The captain of *Sharp* of Glasgow attributed a victory in an engagement near Cape Clear to the new gun, saying that "he never intended to arm with anything else in the future." When *Hawke*, also of Glasgow, fought off two privateers in the Bay

of Biscay in July 1779, its success was also attributed to the carronade.⁵

There is some controversy over who should receive credit for inventing the carronade: Gascoigne, General Robert Melville, or Patrick Miller. Most sources, including John Dahlgren, the father of nineteenth-century United States naval ordnance, and British naval historian William James have given credit to Melville. He was a British infantry officer, interested in gunnery, who carried on a wide correspondence, including with Gascoigne. He was at the very least consulted about the carronade's development, made helpful suggestions, and was present at some of the early trials. His claim to have invented the carronade is weakened, however, by the fact that he did not assert it until late in life. He does appear to have suggested the heaviest, 68-pounder size and to have given them the title of "smashers." But Roy H. Campbell, author of a history of the Carron Company, asserts that the smaller carronades were developed first. The strongest point in Melville's favor is that he suggested chambering the guns, which may have been the point that Gascoigne lacked.

The second claimant, Patrick Miller, was a banker and merchant of Edinburgh. He claimed to have ordered the guns for *Spitfire* cast according to his own directions, but this has not been substantiated. Miller was certainly interested in the development of a very heavy carronade and records of the firm indicate an order for a 132-pounder.

The third claimant was Charles Gascoigne. His main claim would appear to be based on the fact that in May 1779 he applied for a patent on the carronade. At the same time, the Carron Company sent letters to several founders, warning them not to imitate "our C.G. Esqrs invention." The letters may help substantiate Gascoigne's claim but they had no other effect, for the carronade was soon being copied. In any case, in July the board rejected the request for a patent, claiming "patents for any particular invention of ordnance would be highly prejudicial to the service and that the carronade was not a new invention, for which reason they would oppose the said Patent if further steps are taken to obtain the same."⁶

³ Campbell, *Carron Company*, p. 90.

⁴ *Ibid.*, pp. 90-91.

⁵ *Ibid.*, pp. 89-90, 93; William James, *The Naval History of Great Britain, From the Declaration of War by France in 1793, to the Accession of George IV* (new ed.; London: Richard Bentley, 1837), I, p. 33.

⁶ Minutes, Board of Ordnance, 1 June 1779 and 8 July 1779; Campbell, *Carron Company*, pp. 95-100.

It is judicious to share the credit; certainly whoever designed the carronade built on the work of many others, especially Benjamin Robins, who, in his treatise *New Principles of Gunnery* of 1747, advocated an increase in the caliber of guns at the expense of range. Robins' point was that the vast majority of ship actions were at close range and that the damage inflicted depended on the size of the ball. Also, mathematician Charles Hutton's arguments for reduction in windage had been confirmed in experiments at Woolwich.⁷

The carronade had a special appeal because it offered large caliber and relatively little weight. For example, a 42-pounder carronade, while shorter than a 3-pounder long gun, actually weighed less than a 12-pounder long gun. Another advantage of the carronade was that it could be worked by relatively few men. The normal gun crew for a 24-pounder long gun was eleven men, but Marine writer William Falconer noted in 1815 that a 42-pounder carronade could be worked by four men "without any exertion or difficulty."⁸ The carronade was also easy to load and hence more rapidly fired. William Clowes, the Royal Navy historian, noted an engagement involving *Milbrook*, in which she was able to fire eleven broadsides to only three for her opponent.⁹

In short, the carronade offered the advantages of projecting large shot with reasonable accuracy at the range at which most naval actions occurred (say up to 600 yards) with a savings of three-quar-

ters the weight, powder, and number of men to work the gun.

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The first reference to the carronade in Board of Ordnance minutes was on 20 February 1779, when the board read a memorandum from Captain

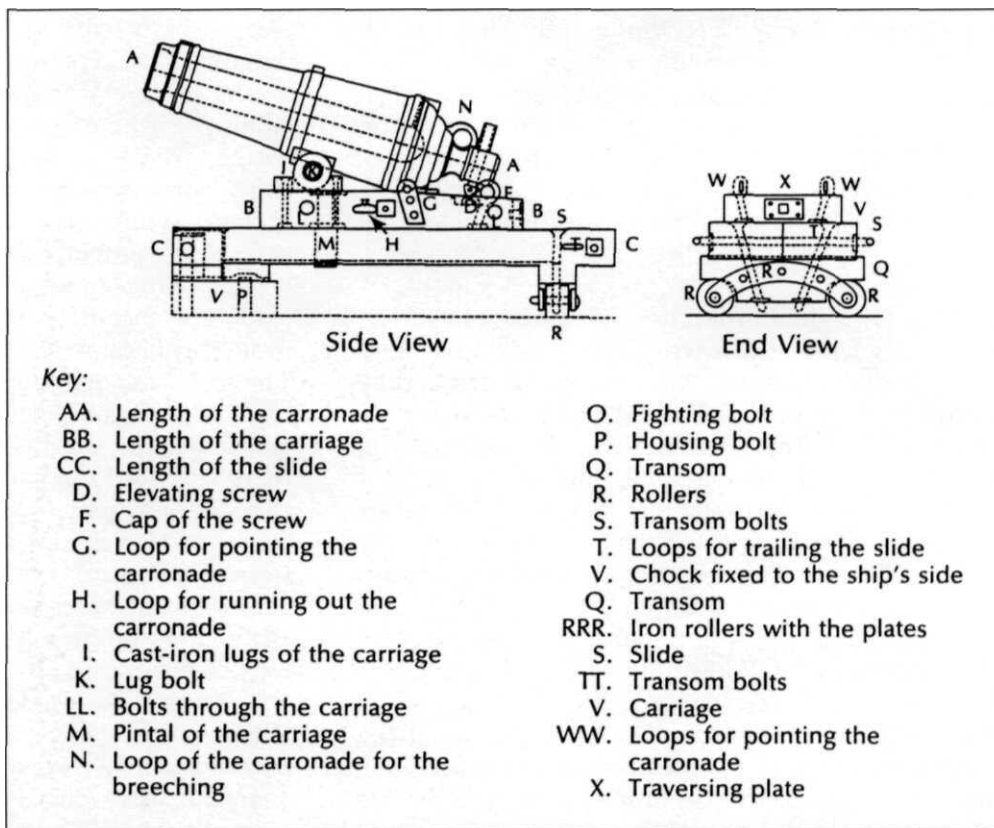


Figure 2. The parts of a carronade. After a drawing in Atkinson and Clarke, *NAVAL POCKET GUNNER* (London: 1814). From Spencer C. Tucker, *ARMING THE FLEET, U.S. NAVY ORDNANCE IN THE MUZZLE-LOADING ERA* (Annapolis, Maryland: Naval Institute Press, 1989), p. 121.

Blomefield of the Royal Artillery stating that Carron was casting 12-pounders 3 feet in length for the use of privateers. These guns, he said, were served by two men and loaded with "half the real charge of powder." The board approved the request of Master General of the Ordnance Lord Townshend to have one of the new guns shipped to Woolwich for trial. The carronade was first tried at Woolwich on 13 March, but the Earl of Dunmore persuaded the board to conduct a "full trial" in which the carronade (now referred to in Board of Ordnance minutes as such) would be matched with a 12-pounder long gun, but the carronade had already been put on board ship and sailed when the directive arrived. The board then authorized a trial aboard HMS *Berwick*. At the same time King George III

⁷ Frederick L. Robertson, *The Evolution of Naval Armament* (London: Harold T. Storey, 1968), pp. 122, 126.

⁸ Spencer C. Tucker, *Arming the Fleet, U.S. Naval Ordnance in the Muzzle-loading Era* (Annapolis, Maryland: Naval Institute Press, 1989), p. 43; William Falconer, *An Universal Dictionary of the Marine* (London: T. Cadell, 1830), p. 78.

⁹ William Laird Clowes, *The Royal Navy: A History from the Earliest Times to the Present* (London: Sampson Low, Marston, 1898), IV, p. 541.

authorized a full trial of 12- and 18-pounder carronades.¹⁰

Although the Board of Ordnance remained skeptical and indeed preferred the old long gun, perhaps because of its greater range, the Navy Board pointed out the advantages of this gun, especially for a smaller vessel. It cited as example the frigate *Flora*, the first vessel fought with carronades. On 10 August 1780, *Flora* fell in with the French frigate *Nymphe* off Ushant. A boatswain, assisted only by a boy, was able to fire a number of rounds from a forecastle-mounted 18-pounder carronade, thus helping to secure the surrender of the French warship. In the engagement *Nymphe* lost 136 of her complement of 291 men; while *Flora* sustained casualties of only 36 of 259 men.¹¹

IN July 1779 the Lords Commissioners of the Admiralty were at last won over. On 16 July, they decreed that as ships came in for refitting they would be equipped with differing numbers of carronades according to their rate. In August, the Board of Ordnance specified that carronades for the Royal Navy were to be fitted with sliding carriages. In September the board, which had already ordered 390 carronades, increased this to a total of 1,502 carronades (1,034 12-pounders, 444 18-pounders, and 24 24-pounders) to be shipped to the dockyards of Portsmouth, Plymouth, Chatham, and Sheerness. There was no more room for guns on the quarterdecks but the lightness of the carronade allowed it to be positioned on the poop deck (the roof of the captain's cabin, which was now reinforced) and on the forecastle. On the larger ships, the addition of the carronade did not alter the number of guns normally listed in the rating. On first rates of 100 guns, a pair of carronades were added on the forecastle and eight more on the poop; second, third, and fourth rates had two on the poop and six on the forecastle; fifth and sixth rates had two carronades only on the forecastle.¹²

Rearming with carronades meant a substantial increase in firepower. For example, prior to 1782,

when the Admiralty rearmed the fifth-rate 44-gun *Rainbow*, she had carried forty-four long guns (twenty 18-pounders, twenty-two 12-pounders, and two 6-pounders). In July 1782 she was armed with forty-eight carronades (twenty 68-pounders, twenty-two 42-pounders, and six 32-pounders). In the process her weight of broadside went from 318 to 1,238 pounds of shot. *Rainbow* is an extreme example, but all ships so armed experienced dramatic increases in weight of broadside, itself a powerful temptation to captains.¹³

The lightness of the carronade enabled it to be employed where a heavier gun could not be supported, on the poop or forecastle. For the smaller ships, ports were cut in the forecastles and quarterdecks. Captains were also given some latitude in varying the proportion of long guns to carronades.

The savings in weight that the carronade afforded made it especially popular for smaller vessels, and, in fact, it became the principal armament of brigs. The carronade replaced the small, 6- to 12-pounder long guns that had been carried on the forecastle and quarterdeck of frigates. While in the smaller vessels there was a shift to carronades, in the larger vessels the long gun remained in favor — although there, too, some carronades were included for close-in actions. Some carronades were also mounted on small common truck carriages so that they could fire from the poop or quarter-deck at high angles against the tops of enemy vessels. In such cases the breeching was longer than usual to allow for recoiling and had a hook at each end to allow it to be secured to a ring bolt or round the capstan.¹⁴

Carronades were cast in all calibers, but the most common were 12-, 18-, 24-, and 32-pounders. Table 1 is a comparison of carronades and long (chase) guns, in about 1810.¹⁵

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Probably the most famous carronades were two 68-pounders mounted on the forecastle of HMS *Victory*; they performed well at the October 1805 Battle of Trafalgar. By contrast, the largest long guns in use at sea were 32- and 42-pounders aboard ships of the line. The 68-pounder was but

¹⁰ Minutes, Board of Ordnance, 20 February, 16, 23 March, and 15, 18 May 1779.

¹¹ J.J. Colledge, *Ships of the Royal Navy* (Annapolis, Maryland: Naval Institute Press, 1987), p. 246; James, *Naval History*, I, p. 35.

¹² Minutes, Board of Ordnance, 24 August and 6 September 1779; also tables in Robert Simmons, *The Sea-Gunner's Vade Mecum*, in *Sail-making and Gunnery*, Vol. II of David Steel, *The Elements and Practice of Rigging, Seamanship, and Naval Tactics, Including Sail-making, Mast-making, and Gunnery* (London: J.W. Norie and Co., 1821), pp. 165-170.

¹³ James, *Naval History*, I, p. 37.

¹⁴ E.W. Petrejus, *Modelling the Brig-of-War "Irene," A Handbook for Marine Artists* (Hengelo, Holland: N.V. Uitgeversmaatschappij "De Esch," 1969), p. 115; Clowes, *The Royal Navy*, IV, p. 544; Robertson, *Evolution of Naval Armament*, pp. 125-126; and Simmons, *The Sea-Gunner's Vade-Mecum*, pp. 135-136.

¹⁵ There are some slight discrepancies, depending on sources. Tucker, *Arming the Fleet*, p. 125.

little used, however. One Royal Navy source for the period 1807-1813 notes the 68-pounder as being carried only by two ships of the line and several bomb vessels.¹⁶

The carronade steadily increased in popularity. By January 1781, 429 ships in the Royal Navy mounted a total of 604 carronades. In 1782 the Navy Board recommended allowing two 68-pounder

had no trunnions. Trunnioned short guns are more properly known as *gunnades* (probably a combination of "gun" and "carronade"). The true carronade was mounted on a carriage of completely new design, secured to its bed by means of a bolt through a loop cast on the underside of the piece. The bed recoiled along a slide, held in place by means of another bolt in a slot. The slide pivoted

on a bolt in the ship's side and traversed on small rollers at the rear end of the slide. The gun was elevated by means of a wooden wedge, known as a *quoin*, or a screw placed through the *casabel*, or button or knob, at the end of the gun. It was trained by means of traversing bars or training ropes. When fired, the carronade recoiled, pushing the bed back along the slide and against the breeching ropes. After reloading the carronade, the crew would use the side tackles to return it to firing position.¹⁸

In addition to the absence of trunnions, all carronades had chambers and much less *windage* than contemporary guns. For example a 32-pound shot had a diameter of 6.105 inches for both guns. A 32-pounder long gun had a bore diameter of 6.41 inches, while a carronade of the same size had a bore of only 6.25 inches. The car-

raronade's vent was also smaller. The smaller vent meant that the coarser cannon powder could not be used, but a quick match sufficed. Later, locks were used to fire the guns.¹⁹

All carronades were short, only about seven calibers in length. Carronades also had no muzzle swell. Royal Navy carronades weighed about 50 to 60 pounds of metal for every pound of shot. United States Navy carronades were closely patterned after those of the Royal Navy but they were heavier: 60 to 70 pounds of metal per 1 pound of shot. This was in contrast to as much as 150 to 200 pounds per 1 pound of shot in long guns.

Table 1.
Comparison of Carronades and Long Guns in about 1805.

Weight of Shot, pounds	Type	Length, feet-inches	Weight, pounds	Powder Charge, pounds-ounces	Bore Diameter, inches	Shot Diameter, inches
68	Carronade	5-2	4,032	6-2	8.05	8.000
42	Long Gun	10-0	7,504	14-0	7.018	6.684
42	Carronade	4-3.5	2,492	4-8	6.85	6.684
32	Long Gun	10-0	6,496	10-11	6.41	6.105
32	Carronade	4-3.5	1,918	4-0	6.25	6.105
24	Long Gun	10-0	5,824	8-0	5.824	5.547
24	Carronade	3-7.5	1,456	3-0	5.67	5.547
18	Long Gun	9-6	4,704	6-0	5.292	5.040
18	Carronade	3-3	1,008	2-0	5.14	5.040
12	Long Gun	9-6	3,808	4-0	4.623	4.403
12	Carronade	2-2	654	1-8	5.500	4.403
9	Long Gun	9-6	3,388	3-0	4.200	4.00
6	Long Gun	9-0	2,688	2-0	3.668	3.498
4	Long Gun	6-0	1,372	1-5	3.204	3.053
3	Long Gun	4-6	812	1-0	2.913	1.775

carronades for the forecastles of all classes of ships capable of supporting them on the requisition of their captains, and 32- and 42-pounders for lower rates. The War of the American Revolution ended before many ships could be fitted, but one source estimates that about half of the active ships in the Royal Navy carried carronades by the end of the war.¹⁷ The carronade did not appear aboard Colonial naval vessels during the War of the American Revolution, but they were included aboard United States Navy vessels after the official recreation of the navy in 1794.

Some writers identify many short guns as carronades, and at least one suggests that the first carronades were trunnioned. But the true carronade

¹⁶ B. Lavery, "Carronades and Blomefield Guns," in Robert D. Smith, ed., *British Naval Armaments* (London: Royal Armouries Conference Proceedings 1, 1989), pp. 15-16.

¹⁷ James, *Naval History*, I, 36; Lavery, "Carronades and Blomefield Guns," pp. 15-16, 18.

¹⁸ B. Lavery, "Carronades and Blomefield Guns," p. 16; James Inman, *An Introduction to Naval Gunnery* (Portsea, England: W. Woodward, 1828), pp. 9, 131.

¹⁹ Letter of 27 May 1783 from Gascoigne to Ten Cate, in J.P. Puype, "The Introduction of the Carronade into Dutch Naval Service in the Late 18th Century," in Smith, *British Naval Armaments*, p. 33.

Increasing the weight of the carronade made them less likely to create problems in action. As one American contemporary put it the heavier United States carronades fared better in battle: "hence our breeching stood better; and we hear less of carronades flying round and looking their crews in the face."²⁰ Carronades had no muzzle swell, but there was a cup or enlargement of the bore at the muzzle to allow space for fingers when the shot was loaded.

THE carronade used approximately one-third the powder charge of its counterpart long gun. This varied from one-eighth to onesixteenth the weight of shot. The normal charge for a carronade was one-twelfth, but this was still proportionally higher for its metal than the charge for a long gun, which was usually a third the weight of shot. It was this reduced charge, of course, that made it possible to make the gun far lighter than ordinary cannon. Balls fired by carronades moved at relatively slow velocity. At its highest initial velocity of 1,500 feet per second, the momentum (weight times velocity) of a 9-pound shot from a long gun was 13,500 pounds. A 32-pound shot from a carronade, with an initial velocity of 750 feet per second, was 24,000 pounds, or nearly double. The low muzzle velocity allowed a sharp reduction in windage. This quite often produced greater accuracy at shorter ranges of fire, especially in the yardarm-to-yardarm actions so preferred by the Royal Navy and typified by the remark attributed to Admiral Horatio Nelson, "If you lay your enemy alongside, you cannot be out of your place."²¹

Low velocity shot fired from the carronade against a wooden ship at close range would produce a large irregular hole difficult to patch; it also produced considerable splintering, and it is well to remember that splinters were the chief cause of human casualties in a ship battle in the age of sail.

The carronade was ideally suited for close actions, but it had its disadvantages. One was its excessive recoil. Robert Simmons, writing in 1812, noted that its recoil was "almost ungovernable."²² This was especially a problem when the carronade was double shotted, something that could easily occur in the heat of battle. This was likely to dismount the carronade when it was fired, and so this procedure, while common for long guns, was thus prohibited for carronades. Also if the breeching

stretched too far, the vertical connecting bolt could strike the end of the slide, break off, and put the gun out of action. Care thus had to be taken by the crew to insure that the breeching ropes had not stretched too much. Another disadvantage was that, as the carronade was so short, burning powder from it might ignite its own ship's side or rigging. Captains of 32-gun frigates, in particular, complained that one pair of their quarterdeck carronades was in the way of the rigging so as to endanger the lanyards of the shrouds and asked to have the number of them reduced from six to only four.²³

This was later rectified by adding a thin projection of metal at the muzzle "to carry the explosion of the charge clear of the ship's sides and rigging," but crews still had to take care to run it out as far as possible prior to firing.²⁴ Gascoigne noted that this threat would be minimized and power increased if the shot was placed directly against the charge without the use of a wad. Once loaded, the carronade was wadded in the usual manner. Care had also to be taken, because the windage was so slight, that the shot for the carronades be carefully sized, stored separately from that for other guns, and properly protected from the elements and, hence, from rusting, which was always a problem aboard warships.²⁵

The chief weakness of the carronade, however, was its lack of range. Carronades were employed at point-blank, which meant about 450 yards for a 68-pounder and 230 yards for a 12-pounder. If the fighting was at long range, the carronade was a liability, as was revealed during the War of 1812.²⁶



Despite the controversy that accompanies most new inventions, the carronade grew steadily in popularity. For some time it remained exclusively British, for the French were slow to adopt it. Reportedly, in 1780 the French captured an English brig, *Finkastre*, armed with carronades and used these aboard their frigate *La Precieuse*, but the results do not seem to have been satisfactory. In any case, the French did not adopt car-

²⁰ United States National Archives, Record Group 45, Entry 464.

²¹ Simmons, *The Sea-Gunner's Vade-Mecum*, p. 133.

²² Simmons, *The Sea-Gunner's Vade-Mecum*, p. 131.

²³ Puype, "The Introduction of the Carronade into Dutch Naval Service in the Late 18th Century," p. 36; James, *Naval History*, I, p. 34.

²⁴ Inman, *An Introduction to Naval Gunnery*, p. 131; Simmons, *The Sea-Gunner's Vade-Mecum*, p. 136.

²⁵ Puype, "The Introduction of the Carronade into Dutch Naval Service in the Late 18th Century," p. 33; Simmons, *The Sea-Gunner's Vade-Mecum*, p. 135.

²⁶ Theophilus S. Beauchant, *The Naval Gunner* (London: Hurst, Chance, 1829), p. 33.

ronades until 1787, under the designation of *obusiers de vaisseaux* (ship howitzers). In contrast to their English counterparts, French carronades were bronze. It was only in 1804 that iron carronades, similar to the English models, replaced them.²⁷ Napoleon Bonaparte was certainly an advocate of the carronade. He wrote his Minister of Marine in March 1805, "In this war the English have been the first to use carronades and everywhere they have done us great harm. We must hasten to perfect their system...." Napoleon was also ahead of his time in favoring the abolition of light guns aboard ship and standardization of caliber at 36-pounder long guns and 36-pounder carronades.²⁸

Other powers, such as the Dutch and Spanish, appear to have been late in adopting the carronade for their navies. The Dutch were certainly aware of them early; in 1780 Captain Baron von Knickel of the Admiralty of Zealand brought two examples of carronades to the Netherlands. The Dutch did obtain some additional carronades before 1795, when the Netherlands became a French satellite. But the Dutch seem to have had few carronades; only one or two lighter vessels mounted them during the battle off Camperdown in 1797. War between the Netherlands and Great Britain prevented the delivery of more carronades. Spanish Navy vessels carried 24-pounder carronades.²⁹

The date the Americans adopted the carronade is obscure, although it certainly antedated the Revolutionary War. By 1799, Henry Foxall of the Eagle Foundry in Philadelphia was producing them for the United States Navy. Foxall was probably the first American founder to bore cannon from the solid, using machinery he himself had constructed for the purpose, and he was the first to cast the carronade.³⁰

By the War of 1812 carronades had replaced the smaller long guns in the United States Navy and were also on the upper decks of frigates. *Constellation*, *Constitution*, *Philadelphia*, and *United States* all carried them. The heavier American

frigates mounted 32-pounder carronades. During the war, *Constitution* mounted twenty 32-pounders, probably those ordered by the navy from Foxall in 1808. *President* was the lone American frigate to carry 42-pounders. The United States Navy retained a preference for the long gun for chase purposes and as main armament, but on many smaller American vessels carronades formed the entire armament.



The first major action involving the carronade occurred on 12 April 1782 in the Battle of the Saints between the fleets of British Admiral Sir George Rodney and French Admiral Count Francois de Grasse. Carronades mounted on the British ships before they sailed to the West Indies contributed to the heavy weight of shot that caused the French to surrender. The French were certainly aware of the carronade before the battle. The Marquis de Vaudreuil who led the French attack during the battle had written, "If we will have placed ourselves at close quarters to their carronades, we will quickly be unrigged and will have been beaten."³¹

Perhaps the most dramatic victory ever attributed to the carronade occurred with *Rainbow*, the 44-gun frigate experimentally rearmed with the largest carronades. With forty-eight carronades, including twenty 68-pounders, on 4 September 1782, *Rainbow*, Captain Henry Trollope, fell in with a large new French frigate, *Hebe*, Captain de Vigney, off Isle de Bas. *Hebe*, with a crew twice as large as that aboard the English vessel, was armed with forty guns: twenty-eight 18-pounders and twelve 8-pounders. The British lulled the French into a fight at close quarters. Owing to the bearing of the French vessel, one of *Rainbow's* 32-pounder forecastle carronades was the first gun fired. Several of its shot hit the French vessel, killing the first lieutenant and helmsman. *Hebe's* captain, who was slightly wounded, concluded that if such large shot came from the forecastle guns, he would not stand a chance against the enemy ship's main battery. De Vigney then ordered a broadside fired for the honor of the flag and surrendered. *Hebe* was immensely valuable as a model for future English

²⁷ Jean Boudriot, "L'Artillerie de Mer de la Marine Française, 1674-1856, B1, Les Carronades," *Neptunia*, LXXXIV (3rd trimestre, 1969), p. 2.

²⁸ Julian S. Corbett, *The Campaign of Trafalgar* (London: Longmans, Green, 1919), I, p. 52.

²⁹ Puype, "The Introduction of the Carronade into Dutch Naval Service in the Late 18th Century," pp. 31 and 37; Clowes, *The Royal Navy*, III, p. 544.

³⁰ Letter from Timothy Pickering to Secretary of the Navy Benjamin Stoddert, 4 January 1799, United States National Archives, Record Group 45, Entry 464.

³¹ Campbell, *Carron Company*, p. 94; and Robertson, *Evolution of Naval Armament*, p. 134; Spencer C. Tucker, "Saintes, Battle of the (West Indies), April 12, 1782," in Richard L. Blanco, ed., *The American Revolution 1775-1783, An Encyclopedia* (New York: Garland, 1993), II, 1463; and Peter Padfield, *Guns at Sea* (New York: St. Martin's Press, 1974), p. 108.

frigates, but her captain was later cashiered and sentenced to fifteen years in prison.³²

In the Royal Navy, as the carronade increased in popularity, captains of 36- and 38-gun frigates applied for and received permission to arm their vessels with 24-pounder carronades in lieu of the standard 18-pounder long guns. The high point for the carronade came during the Wars of the French Revolution and Napoleon, when they were used exten-

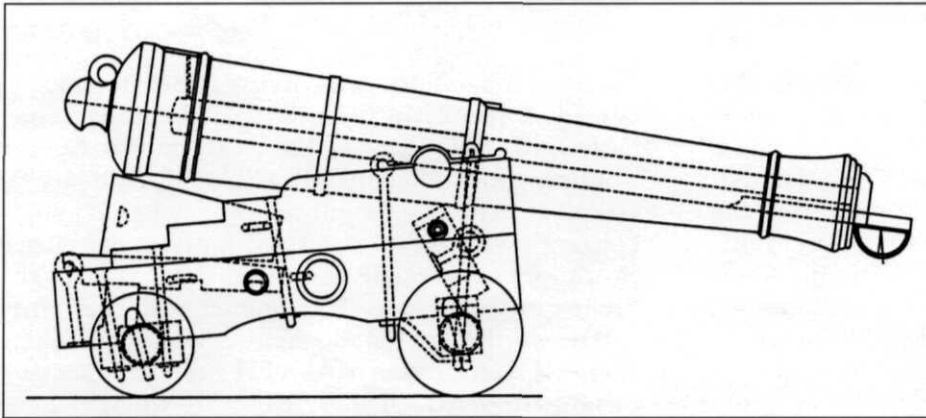


Figure 3. A Blomefield-Pattern gun on a carriage. After a drawing in Atkinson and Clarke, *NAVAL POCKET GUNNER* (London: 1814). From Spencer C. Tucker, *ARMING THE FLEET, U.S. NAVY ORDNANCE IN THE MUZZLE-LOADING ERA* (Annapolis, Maryland: Naval Institute Press, 1989), p. 119.

sively on land by Wellington, in casemates, and also at sea. Captain Henry Trollope, who had commanded *Rainbow* during her engagement with *Hebe*, won another engagement with the carronade during these wars. In 1795, he commanded *Glatton*, one of a few East Indiamen purchased by the Admiralty that year and converted into a warship. A fifth rate of fifty-six guns, she was armed exclusively with carronades — twentyeight 32-pounders and twenty-eight 18-pounders. On her way to join a squadron in the North Sea, *Glatton* fell in with six French frigates, a brig-corvette, and a cutter off the coast of Flanders. Believing *Glatton* to be easy prey, the French ships engaged her at close quarters, only to haul off one after another badly damaged.³³

The War of 1812 also revealed the fatal weakness and heralded the end of the carronade. As noted, the Americans preferred the long gun. Their frigates were faster, stouter, and more heavily armed than their British counterparts and although carrying carronades, they were not in such a high proportion. Royal Navy captains found themselves at a disad-

vantage when confronted by an enemy who could shoot with reasonable accuracy at long range. While a formidable weapon at close range, at longer range the carronade was no match for long guns, even of smaller caliber.

This spelled doom for the carronade-armed British ships on Lakes Erie and Ontario. Commodore Sir James Yeo reported that in an engagement on Lake Ontario on 12 September 1813, the Americans had been able to stand off at long range and use their long 24- and 32-pounders. Light wind prevented the British from closing to employ their carronades. As Yeo put it:

I found it impossible to bring [the Americans] to close action. We remained in this mortifying situation five hours, having only six guns in the fleet that would reach the enemy, not a carronade was fired. At sun set a breeze sprang up from the westward, when I maneuvered to oblige the enemy to meet us on equal terms. This, however, he carefully avoided.¹⁴

Following the decisive American naval victory on Lake Erie on 10 September 1813, the English commander, Captain Barclay, noted:

The weather-gauge gave the enemy a prodigious advantage, as it enabled them not only to choose their position, but their distance also, which they did in such a manner as to prevent the carronades of the *Queen Charlotte* and *Lady Prevost* from having much effect; whilst their long guns did great execution, particularly against the *Queen Charlotte*.³⁵

In a battle fought at close quarters, 32-pounder carronades on *Wasp* inflicted heavy damage on HMS *Frolic*, also armed largely with carronades. The same was true in the victory won by *Hornet* over HMS *Peacock*, another contest in which carronades were the principal armament.

Late in the war, the tables were turned on the Americans when the United States Navy frigate *Essex*, armed almost exclusively with carronades, was defeated at long range by the British warships

³² James, *Naval History*, I, pp. 37, 40-41; Boudriot, "L'Artillerie de Mer de la Marine Française, 1674-1856, B1 - Les Carronades," p. 2.

³³ Colledge, *Ships of the Royal Navy*, p. 150; Robertson, *Evolution of Naval Armament*, p. 137.

³⁴ Lieut.-General Sir Howard Douglas, *A Treatise on Naval Gunnery* (3rd ed., London: James Murray, 1851), p. 148.

³⁵ Captain T.F. Simmons, *Ideas as to the Effect of Heavy Ordnance Directed Against and Applied by Ships of War, Particularly with Reference to the Use of Hollow Shot and Loaded Shells* (London: F. Pinkney, 1837), p. 4.

Phoebe and *Cherub*, both armed with long guns. The American vessel possessed superior speed — the essential for carronade armament — but *Essex* was damaged early in the engagement and her speed could not be used. The British warships were able to stand off at long range and pound the American vessel. As Captain Porter of *Essex* put it:

The *Phoebe* by edging off was enabled to choose the distance which best suited her long guns, and kept up a tremendous fire, which mowed down my brave companions by the dozen. The enemy from the smoothness of the water, and the impossibility of reaching him with our carronades, was enabled to take aim at us as at a target; his shot never missed our hull, and my ship was cut up in a manner which was perhaps never before witnessed.³⁶

After two-and-a-half hours of battle, with their ship disabled and on fire, the *Essex's* crew surrendered. This engagement considerably tarnished the reputation of the carronade and reinforced the conclusion that vessels should not be armed exclusively with them.

★ ★ ★ ★ ★

Carronades continued in service for some years. A French commission visiting Britain in 1835 found that although they were still part of the regular armament of older ships, carronades were being replaced "to a great extent by guns of newer construction."³⁷ By 1849 the *Times* of London observed that carronades were fit only for use by pirates. The last carronade was cast at Carron in 1852. Carronades continued to be used in the Dutch Navy at least until well into the second half of the nineteenth century. The United States Navy continued to employ them until the period from 1844 to 1848, when they were removed from most ships. There are frequent examples, however, of carronades being used during the American Civil War, many of them in land batteries.³⁸

What then was the importance of the carronade? Besides being a novel and easily recognized ordnance design, it raised the whole issue of windage and led to its reduction in all types of guns. It also illustrated the advantage of more rapid firing and of

uniformity of caliber aboard ship. With its introduction, the old swivels and howitzers were relegated to revenue cutters.³⁹ The relatively smooth lines of the carronade also had an influence on external gun design, especially on the Congreve gun but also on other types.

The carronade did not lead to the shell gun, as might have been the case. Its large bore would have made it ideal for the projection of shells, which are hollow shot filled with powder. This was evidently not considered because shells were inferior in range, accuracy, penetrating power, and the ability to stand double shooting and over-charging. Many captains and seamen feared the use of shell aboard ship, and

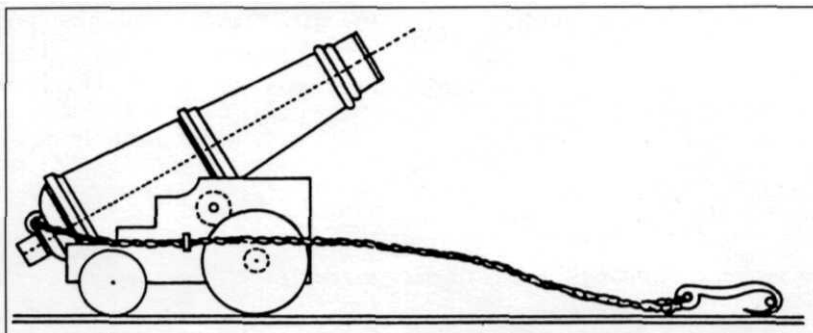


Figure 4. A carronade mounted as armament for a launch. A carronade intended for service as a launch gun had to be ready for other service, as well. The barrel was mounted on a small carriage and was used to fire at enemy's tops. After a drawing in Robert Simmons, *THE SEA-GUNNER'S VADE-MÉCUM*. From Spencer C. Tucker, *ARMING THE FLEET, U.S. NAVY ORDNANCE IN THE MUZZLE-LOADING ERA* (Annapolis, Maryland: Naval Institute Press, 1989).

the explosive power of shell against wooden warships was not really appreciated until the experiments conducted by French Colonel (later General) Henri Paixhans at Brest in 1822. Paixhans saw the weakness of a short gun firing shot and the advantages to be gained by firing explosive shell from them. As John Dahlgren wrote in 1856: "The idea of General Melville included incidently all the elements of a naval shell system." This, if properly developed, "might have anticipated the Paixhans system by half a century....The of shells was, at best, little more than a vague conception; its formidable powers unrealized, unnoticed, were doomed to lie dormant for nearly half a century after the carronade was invented, despite the evidence of actual trial and service."⁴⁰ Despite this, the carronade was an important transitional weapon in naval gunnery. ☆

³⁶ Douglas, *Treatise on Naval Gunnery*, p. 149.

³⁷ Robertson, *Evolution of Naval Armament*, p. 138.

³⁸ Campbell, *Carron Company*, p. 94; Puype, "The Introduction of the Carronade into Dutch Naval Service in the Late 18th Century," p. 37.

³⁹ Howard I. Chapelle, *The History of the American Sailing Navy, The Ships and their Development* (New York: W.W. Norton, 1949), p. 133; James, *Naval History*, I, p. 38.

⁴⁰ John A.B. Dahlgren, *Shells and Shell Guns* (Philadelphia: King and Baird, 1856), pp. 8-10.