

This section discusses the use of muzzle-loading artillery for shore batteries and fixed fortifications. This section is not designed to be an exhaustive discussion on naval artillery, but to provide general information on the subject.

Heavy Artillery Overview

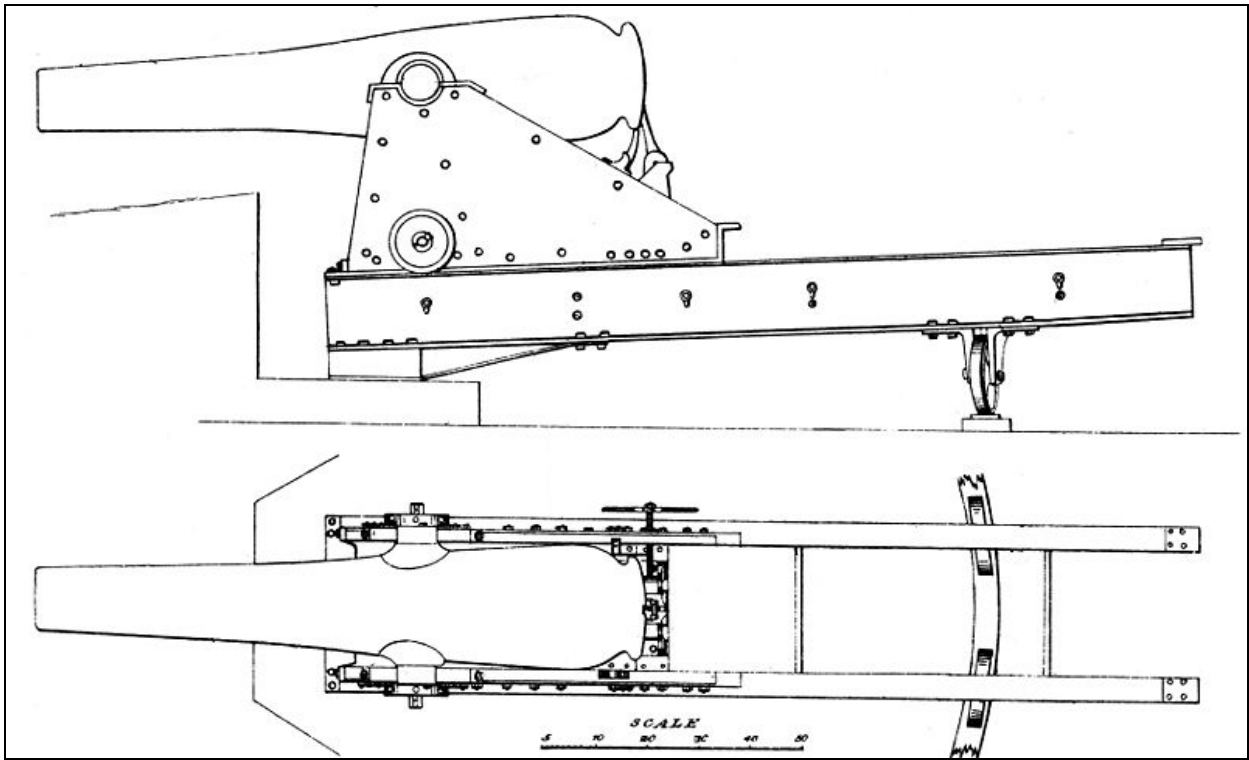
Heavy artillery was the commonly used term for what is properly referred to as foot artillery. The more descriptive names of siege and garrison artillery were frequently employed. Siege And Garrison Artillery is large and cumbersome weapons which could be moved, with difficulty, from one position to another. This type artillery was designated "siege" if it was used to attack a fortification and "garrison" if it was used to defend the fortification. The common weapons used for siege and garrison batteries were 12-, 18-, and 24-pounder guns; 8-inch howitzers; 8- and 10-inch and Cohorn mortars.

Carriages for fortifications were fixed in one position and needed to support much larger cannon, which in turn meant that they were subjected to much larger stresses during firing. Heavy Artillery was typically mounted on three type of carriages – a front-pintle barbette carriage, a center-pintle barbette carriage, and a casemate carriage. All of these carriages were made of wrought iron. All three types of carriage were similar in design having an upper carriage that was placed on a two rail chassis. The gun and upper carriage recoiled along the chassis. The chassis would pivot to train the gun left or right.

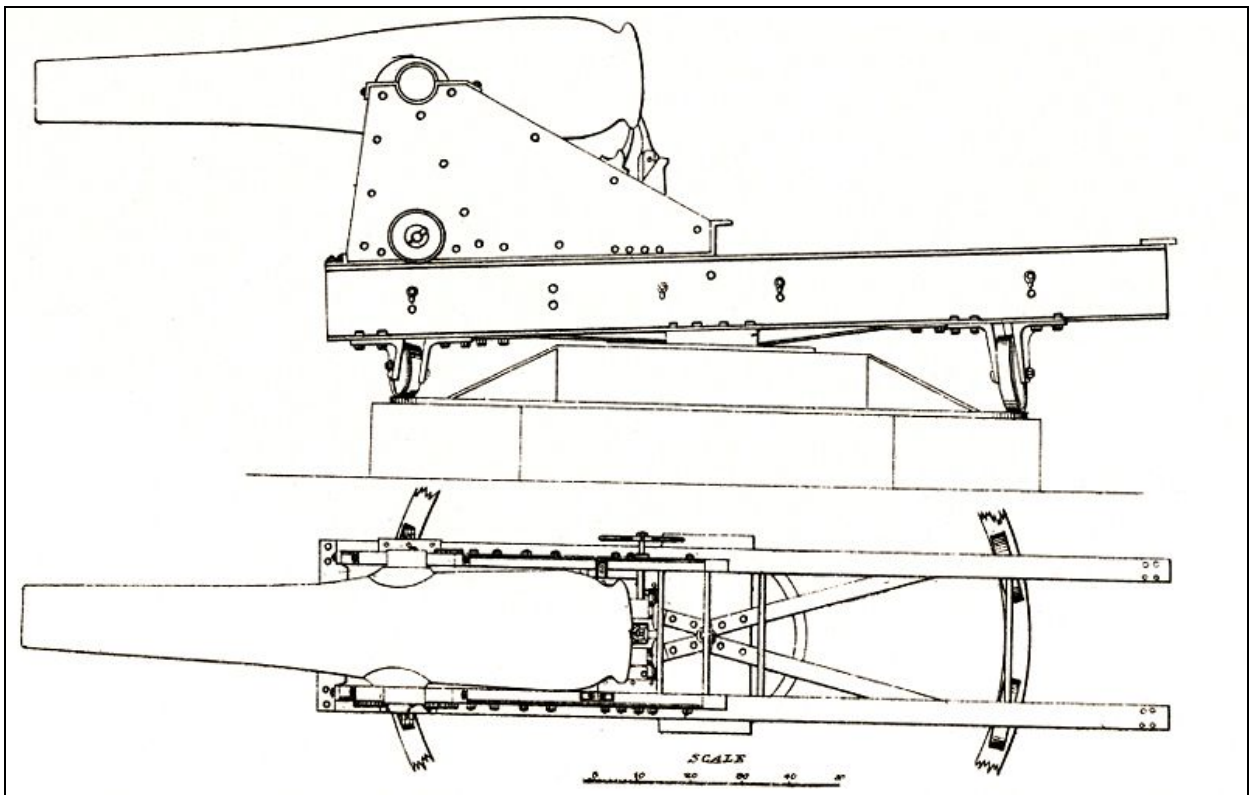
The barbette carriages were designed to fire over a parapet and could be used in either permanent or temporary fortifications. The carriage consists of two parts, the gun-carriage proper and the chassis. The gun-carriage rolls from front to back on the chassis when the gun recoils upon being fired, which dissipates the destructive energy of the recoil as well as putting the gun into position for loading. The gun-carriage is rolled forward into firing position by handspikes or block and tackle. Aiming the piece is accomplished by rotating the chassis.

The front pintle carriage pivoted at the front of the chassis. This made the gun mount more compact and allowed the gun and detachment to be better protected by embrasures and traverses. The center pintle carriage gave the gun a 360° traverse and was stronger for guns firing at high angles because the pintle, the strongest part of the carriage, would have been under the breech when the gun was fired at high angles.

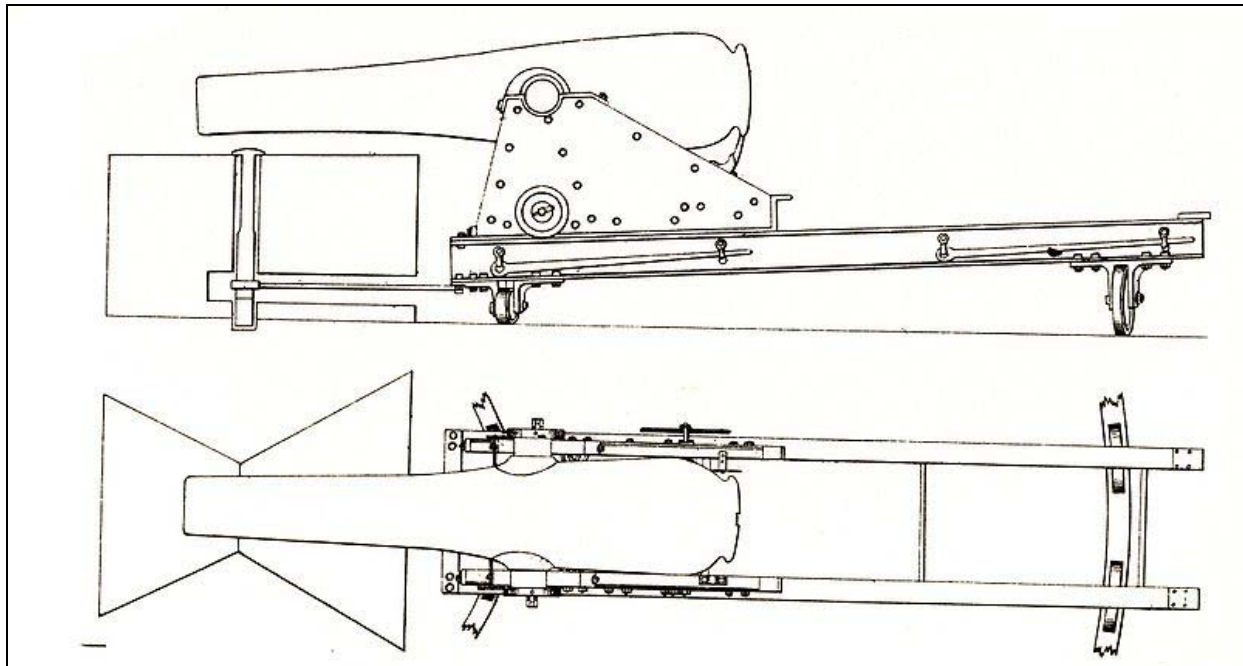
The casemate carriage was designed to fire from casemates which were chambers in permanent fortifications. The carriage was essentially a front-pintle design, with the pintle fixed in the masonry in front of the chassis and below the guns embrasure. A “tongue” connected the chassis to the pintle. The casemate carriage has a lower profile than the than the barbette carriages.



Front-Pintle Carriage



Center-Pintle Carriage



Casemate Carriage

Types of Heavy Artillery

Columbiads

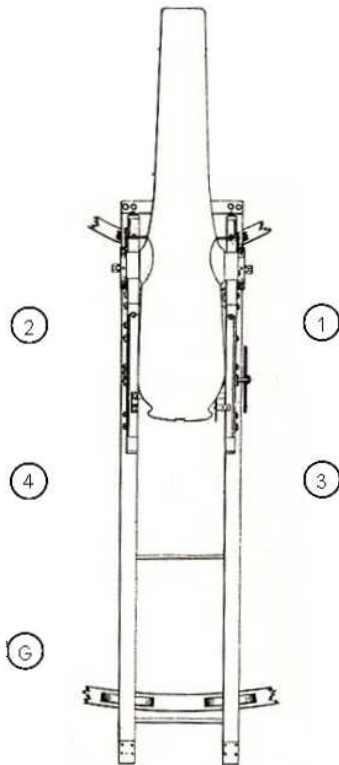
A Columbiad was a heavy iron artillery piece which could fire shot and shell at a high angle of elevation using a heavy powder charge. Columbiads were usually classified as seacoast defence weapons and were mounted in fortifications along the rivers and other waterways.

The original Columbiad, a 50-pounder, was invented in 1811 by Col. George Bomford and it was used in the War of 1812. Shortly afterwards it was considered obsolete and retired.

The weapon was produced again in 1844 in 8- and 10-inch models. In 1858, a version was produced which eliminated the chamber in the breech, which strengthened the gun. In 1861, Lt. Thomas J. Rodman, of the U.S. Ordnance Department, contracted with the Fort Pitt Foundry in Pittsburgh, Pennsylvania, to produce Columbiads using a special casting method he had developed in 1844. His process, which caused less stress on the gun during casting thereby preventing cracks from forming, was a success and the Columbiad became widely known as a Rodman gun.

Columbiads were produced in 8-, 10-, 12-, 13-, 15-, and 20-inch models and were primarily smoothbore even though a few rifled models were turned out. The drills included here are for the 8 Inch model.

Columbiad Gun Posts and Duties



Positions for a Five Man Crew:

- **Number 1** – Sponges with Number 2, rams the cartridge with Number 2, and uses the handspike to adjust the angle of fire
- **Number 2** – Sponges with Number 1, takes the round from Number 4 and places it in the muzzle for ramming, rams with Number 1, and uses the handspike to adjust the angle of fire
- **Number 3** – Holds the rammer for Number 1 while sponging, holds the sponge for Number 1 while ramming, attaches the primer to the lanyard, and pulls the lanyard for firing
- **Number 4** – Retrieves and advances the cartridge
- **Gunner** – Keeps the vent covered while sponging and ramming, pricks the cartridge, sights the gun, inserts the primer, and calls the gun commands

In the case of a Seven Man Crew, Numbers 5 & 6 would handle the handspike duties for Numbers 1 & 2.

Columbiad Barbette Carriage Drill

Barbette Carriage Implements

The following implements are used with the 8 Inch Columbiad on a barbette carriage:

- **Truck Handspikes** – Two on each side of the carriage, laid on the trails, one in the rear of each truck wheel.
- **Manoeuvring Handspikes** – One on each side of the carriage, laid on the ground in a line with the cannoneers, opposite the traverse wheels, the small ends toward the parapet.
- **Elevating Bar** – Laid across the horizontal ties at the junction of the braces, handle to the left.
- **Sponge** – One yard behind the cannoneers of the right, the sponge above the rammer. The sponge head should be turned from the parapet and supported on a prop.
- **Rammer** - One yard behind the cannoneers of the right, the sponge above the rammer. The rammer head should be turned from the parapet and supported on a prop.
- **Haversack** – Suspended from the knob of the cascable.

- **Tube Pouch** – Containing friction primers and the lanyard, suspended from the knob of the cascable.
- **Gunner's Pouch** – Containing the Gunner's level, breech sight, finger-stall, vent prick or priming wire, Gunner's gimlet, vent punch, chalk line, and chalk, suspended from the knob of the cascable.
- **Vent Cover** – Covering the vent.
- **Tompion** – In the muzzle.
- **Chocks** – One on each side of the piece, laid on the front of the rails.
- **Broom** – Leaning against the parapet, to the left of the piece.
- **Budge Barrel (equivalent of the Limber)** – Containing the charges, placed at the safest and most convenient place to the rear of the piece.

CANNONEERS, TAKE IMPLEMENTS

Gunner – takes the vent cover off the piece and hands to Number 2 to place against the parapet, gives the Tube Pouch to Number 3, the haversack to Number 4, puts on the Gunner's Pouch, and places the Finger Stall on the second finger of his left hand. Then takes the elevating bar, steps between the rails, and levels the piece for loading. He applies the Gunner's Level on the base ring and marks the line of sight with a chalk line. He hands the chalk to Number 2 to do the same on the muzzle. Then he resumes his post with the elevating bar in his right hand.

Number 1 – takes the Truck Handspike with the hand furthest from the parapet.

Number 2 – takes the chalk from the Gunner and marks the line of sight on the muzzle, then takes the Truck Handspike with the hand furthest from the parapet.

Number 3 – Takes the Tube Pouch from the Gunner and puts it on, then takes the Truck Handspike with the hand furthest from the parapet.

Number 4 – Takes the haversack from the Gunner and puts it on the right shoulder to the left side, then takes the Truck Handspike with the hand furthest from the parapet.

FROM BATTERY

The piece is moved away from the parapet for loading. The manner depends on the carriage.

LOAD BY DETAIL

Number 1 – lays down the handspike.

Number 2 – lays down the handspike, takes out the tompion and places it near the vent cover on the parapet.

Number 3 – lays down the handspike.

Number 4 – lays down the handspike.

Gunner – mounts the carriage and turns the elevating screw (if necessary) to position the muzzle for easy loading. The Gunner should keep his body clear of the rear of the gun, and his hands (other than the finger stall) away from the vent at all times.

LOAD

Gunner – holds the vent brush (or prick) between the index finger and the thumb of the right hand, inserts and removes the vent brush (or prick) to ensure the vent is clear of debris, returns the vent brush or prick to the pouch, covers the vent with the finger stall, and shouts “CLEAR” to signal that the tube is ready for sponging.

Number 1 – takes hold of the sponge with his right hand three feet from the sponge head.

Number 4 – opens the budge barrel, removes the correct powder charge, places the charge in the haversack, closes the budge barrel, and moves to a position 18” behind Number 2.

Two

Number 1 –lowers the sponge into the sponge bucket, removes the sponge from the bucket, swings his left foot forward without moving the right foot and swings the sponge to the right, spins the shaft with his left hand to remove the excess water, swings his left foot backwards, turns to the left, steps up with his left foot on the rail of the chassis and his right foot whenever it is safe to do so.

Number 2 –steps up at the same time as Number 1 with his right foot on the rail of the chassis and his left foot whenever it is safe to do so.

Three

Number 1 – inserts the sponge head into the muzzle, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the sponge with his left hand just behind Number 1’s right hand.

Number 3 – Picks up the rammer.

Four

Number 1 & 2 – shout “ONE,” insert the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the sponge to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the sponge

has reached the breech, Number 1 & 2 put their other hand on the sponge staff so that both hands are on the staff.

SPONGE

Number 1 & 2 – looks at the vent to ensure it is closed, turns the sponge three turns to the left with both hands, turns the sponge three turns to the right with both hands, making sure that the sponge is all the way in and firmly against the breech. For best results the sponge should be pulled halfway out and rammed back in several times and turned left and right several times to ensure all embers are extinguished. If air is heard escaping from the vent, Number 1 or 2 yells, “STOP VENT.” Sponging continues until there is no air escaping from the vent.

Gunner – adjusts the finger stall (if “STOP VENT” is shouted) to maintain the air vacuum within the tube.

Two

Number 1 & 2 – remove their opposite hands from the sponge staff so that only one of their hands are on the staff, their opposite hands off the gun, and their bodies away from the muzzle. Number 1’s hand is next to the muzzle and Number 2’s hand right behind it.

Number 1 & 2 – shout “ONE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “THREE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “FIVE,” pull the sponge to the end of the muzzle, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Three

Number 1 – removes the sponge from the muzzle, rises on his left leg and turns to his left, hands the sponge to Number 3 with his left hand while taking the rammer from Number 3 with his right hand. The sponge is passed above the rammer.

Number 3 – hands the rammer up to Number 1 with his left hand, keeping the rammer staff-end up, and takes the sponge from Number 1 with his right hand, hands the sponge to Number 3 with his left hand. The sponge is passed above the rammer. Number 3 then places the sponge on the prop and returns to POST position.

Number 1 – places the rammer to the right of the muzzle bore, and tapping the muzzle two times to signal Number 2 that he is ready to ram the charge.

Number 4 – moves forward to deliver the powder charge to Number 2, opens and raises the pouch so Number 2 can retrieve the powder charge, returns to the budge barrel, removes the

correct round and wadding, places the round and wadding in the haversack, closes the budge barrel, and returns to a position 18” and behind Number 2 (if not firing a live round, Number 4 just returns to POST position once the powder charge has been give to Number 2).

Number 2 – reaches into the pouch carried by Number 4 and extracts the powder charge and carefully sets the charge just inside the muzzle, making sure to place the back-end of the powder charge in first.

Four

Number 1 – inserts the rammer head only into the muzzle as soon as Number 2 has inserted the powder charge, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the rammer with his left had just behind Number 1’s right hand.

Number 1 & 2 – shout “ONE,” insert the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the rammer to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the rammer has reached the breech, Number 1 & 2 put their other hand on the rammer staff so that both hands are on the staff.

RAM

Number 1 & 2 – pull the rammer out to the full extent of their arms, and then ram the powder charge home with a single motion.

Two (this step is omitted if not firing a live round)

Number 2 – releases the rammer.

Number 1 – removes the rammer out with his right hand, thumb pointing away from the muzzle, allowing it to slide through the hand as far as the middle of the staff, grabs the staff with the left hand close to the rammer head, thumb pointing away from the muzzle, removes the rammer, and places the rammer to the right of the muzzle bore.

Number 4 – moves forward to deliver the round and wadding to Number 2, opens and raises the pouch so Number 2 can retrieve the round and wadding, and returns to his POST position.

Number 2 – reaches into the pouch carried by Number 4 and extracts the round and wadding and carefully sets the round and wadding just inside the muzzle, making sure to place the back-end of the round in first.

Three (this step is omitted if not firing a live round)

Number 1 – inserts the rammer head only into the muzzle as soon as Number 2 has inserted the round and wadding, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the rammer with his left hand just behind Number 1's right hand.

Number 1 & 2 – shout "ONE," insert the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout "TWO," slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout "THREE," push the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout "FOUR," slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout "FIVE," push the rammer to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the rammer has reached the breech, Number 1 & 2 put their other hand on the rammer staff so that both hands are on the staff.

Four (this step is omitted if not firing a live round)

Number 1 & 2 – pull the rammer out to the full extent of their arms, and then ram the round and wadding home with a single motion. If the round is a shell, this step is omitted.

Five

Number 2 – releases the rammer and steps down, and sweeps his area if necessary. Number 2 then returns to POST position.

Number 1 – removes the rammer out with his right hand, thumb pointing away from the muzzle, allowing it to slide through the hand as far as the middle of the staff, grabs the staff with the left hand close to the rammer head, thumb pointing away from the muzzle, removes the rammer, steps down, places the rammer back on the prop, and sweeps his area if necessary. Number 1 then returns to POST position.

Six

Gunner – uncovers the vent, holds the vent prick or priming wire between the index finger and the thumb of the right hand, inserts the vent prick or priming wire to prick the powder charge, returns the vent prick or priming wire to the pouch. At no time should the Gunner's hand or any part of his body be directly above the vent. **Note:** if the piece is moved IN BATTERY, the vent prick or priming wire is left in the vent until the cannon is moved into position.

IN BATTERY

The piece is moved forward to the parapet for aiming and firing. The manner depends on the carriage.

POINT

Number 3 – lays down his handspike, extracts a friction primer from the pouch, takes the lanyard, and places the lanyard hook through the eye of the friction primer wire. The lanyard is held in the right hand and the hook/primer between the right thumb and forefinger.

Number 1 & 2 – go to the traverse wheels, passing outside the other cannoneers, and place their manoeuvring handspikes under the wheels.

Gunner – removes the vent prick or priming wire (if the piece is moved IN BATTERY).

Two

Gunner – gives the directions “LEFT” or “RIGHT” as needed. To move left, the Gunner taps on the left side of the carriage while saying LEFT so Number 2 will know to make the proper adjustment. To move right, the Gunner taps on the right side of the carriage while saying RIGHT so Number 1 will know to make the proper adjustment.

Three

Gunner – uses the elevating bar to insert the pawl of the elevating machine, and places the breech sight on the chalk mark. The Gunner then gives the proper elevation to Number 4.

Number 4 – turns the elevating screw as instructed by the Gunner.

Gunner – shouts “READY” when the piece is correctly pointed and raises both hands straight up to signal that the piece is ready.

Four

Number 1 & 2 – lay down their handspikes and return to POST position.

Number 3 – hands the friction primer to the Gunner.

Gunner – takes the friction primer from Number 3 by the hook and places it in the vent, making sure that no part of his hand or body is ever directly above the vent. The Gunner then slides his hand down to hold the lanyard rope against the side of the piece, making sure that it is not tight against the friction primer. Once his hand is in position, the Gunner nods to Number 3.

Number 3 – once the Gunner nods, Number 3 uncoils the lanyard to its full length, being careful to keep some slack in the lanyard. Once uncoiled, the lanyard is held in Number 3’s hand closest to the piece and Number 3 side steps away from the piece to the right and rear. Once the lanyard is sufficiently stretched,, Number 3 nods to the Gunner and covers the ear closest to the piece with his free hand.

Gunner – once Number 3 nods, the Gunner dismounts the piece and moves to the windward side to observe the effect of the fire.

FIRE

Number 3 – pulls the lanyard firmly toward his body or behind his body. If the gun fired correctly, Number 3 rewinds the lanyard around the handle and returns it to the tube pouch.

Number 1 & 2 – if the gun fired correctly, Number 1 & 2 chock the rollers.

Gunner – if the gun fired correctly, the Gunner returns to POST position after observing the effect of the fire.

SERVICE

Gunner – mounts the carriage and turns the elevating screw (if necessary) to position the muzzle for easy loading, holds the vent brush (or prick) between the index finger and the thumb of the right hand, inserts and removes the vent brush (or prick) to ensure the vent is clear of debris, returns the vent brush or prick to the pouch, covers the vent with the finger stall, and shouts “CLEAR” to signal that the tube is ready for sponging.

Number 1 – takes hold of the sponge with his right hand three feet from the sponge head.

Number 3 & 4 – remains at POST position.

Two

Number 1 – lowers the sponge into the sponge bucket, removes the sponge from the bucket, swings his left foot forward without moving the right foot and swings the sponge to the right, spins the shaft with his left hand to remove the excess water, swings his left foot backwards, turns to the left, steps up with his left foot on the rail of the chassis and his right foot whenever it is safe to do so.

Number 2 – steps up at the same time as Number 1 with his right foot on the rail of the chassis and his left foot whenever it is safe to do so.

Three

Number 1 – inserts the sponge head into the muzzle, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the sponge with his left hand just behind Number 1’s right hand.

Four

Number 1 & 2 – shout “ONE,” insert the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the sponge to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the sponge has reached the breech, Number 1 & 2 put their other hand on the sponge staff so that both hands are on the staff.

SPONGE

Number 1 & 2 – looks at the vent to ensure it is closed, turns the sponge three turns to the left with both hands, turns the sponge three turns to the right with both hands, making sure that the sponge is all the way in and firmly against the breech. For best results the sponge should be pulled halfway out and rammed back in several times and turned left and right several times to ensure all embers are extinguished. If air is heard escaping from the vent, Number 1 or 2 yells, “STOP VENT.” Sponging continues until there is no air escaping from the vent.

Gunner – adjusts the finger stall (if “STOP VENT” is shouted) to maintain the air vacuum within the tube.

Two

Number 1 & 2 – remove their opposite hands from the sponge staff so that only one of their hands are on the staff, their opposite hands off the gun, and their bodies away from the muzzle. Number 1’s hand is next to the muzzle and Number 2’s hand right behind it.

Number 1 & 2 – shout “ONE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “THREE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “FIVE,” pull the sponge to the end of the muzzle, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Three

Number 2 – releases the sponge and steps down, and sweeps his area if necessary. Number 2 then returns to POST position.

Number 1 – removes the sponge out with his right hand, steps down, places the rammer back on the prop, and sweeps his area if necessary. Number 1 then returns to POST position.

Gunner – dismounts and returns to POST position.

CEASE FIRE

When this command is issued by the Gunner or other commanding officer, the cannon crew returns to POST positions and awaits further orders. If the cannon has just been fired, the cannon is serviced first.

Any member of the gun crew is not only allowed, but is required to shout “CEASE FIRE!” if the field of fire is not clear or if there is another potential safety problem. It is the responsibility of each member of the gun crew to act as a Safety Officer.

If the CEASE FIRE command is not given, the gun crew repeats the Load By Detail commands and movements until the CEASE FIRE command is given.

Once the gun crew understands and can demonstrate the By Detail drill proficiently, the gun crew should practice the drill without detail.

The commands without Detail (LOAD FOR ACTION) are as follows:

FROM BATTERY; LOAD; IN BATTERY; POINT; READY; FIRE; SERVICE; CEASE FIRE

For the purposes of drilling, the Instructor typically takes the role of the Gunner and issues all commands. When drilling Gunners, the Instructor takes the role of Chief of the Section or another commanding officer.

SECURE THE PIECE AND REPLACE IMPLEMENTS

These commands are given after the CEASE FIRE command is given and the IN BATTERY command is given to return the piece to its forward position.

When SECURE THE PIECE is commanded, Number 2 places the tompion in the muzzle and hands the vent cover to the Gunner. The Gunner places the vent cover over the vent.

When REPLACE IMPLEMENTS is commanded, Numbers 3 & 4 give their handspikes to Numbers 1 & 2 so that all handspikes can be placed against the parapet. The Gunner then hangs all pouches, haversacks, etc., on the knob of the cascable.

Columbiad Casemate Carriage Drill

Casemate Carriage Implements

The following implements are used with the 8 Inch Columbiad on a casemate carriage:

- **Truck Handspikes** – One on each side of the carriage, leaning against the wall, in line with the cannoneers.
- **Elevating Handspikes** – One on each side of the carriage, leaning against the wall, behind Numbers 3 & 4. These are manoeuvring handspikes.
- **Traversing Handspikes** – One on each side of the carriage, leaning against the wall, opposite the end of the tongue. These are manoeuvring handspikes.
- **Roller Handspikes** – Leaning against the wall, behind the Gunner, or laid down in the alignment on his right.
- **Sponge** – One yard behind and parallel to the line of the cannoneers of the right, the sponge above the rammer. The sponge head should be turned from the parapet and supported on a prop.
- **Rammer** - One yard behind and parallel to the line of the cannoneers of the right, the sponge above the rammer. The rammer head should be turned from the parapet and supported on a prop.
- **Pass Box** – Behind Number 4.
- **Tube Pouch** – Containing friction primers and the lanyard, suspended from the knob of the cascable.
- **Gunner's Pouch** – Containing the Gunner's level, breech sight, finger-stall, vent prick or priming wire, Gunner's gimlet, vent punch, chalk line, and chalk, suspended from the knob of the cascable.
- **Vent Cover** – Covering the vent.
- **Tompion** – In the muzzle.
- **Chocks** – One on each side of the carriage, on the front transom of the chassis, handles outward.
- **Broom** – Leaning against the scarp wall, on the left of the piece.
- **Budge Barrel (equivalent of the Limber)** – Containing the charges, placed at the safest and most convenient place to the rear of the piece. The cannon balls are regularly stacked against the wall behind Number 2. The wadding is between the wall and the cannon balls, partly resting on them.

CANNONEERS, TAKE IMPLEMENTS

Gunner – steps to the cascable, takes the vent cover off the piece and hands to Number 2 to place against the epaulment outside the pass box, gives the Tube Pouch to Number 3, the haversack to Number 4, puts on the Gunner's Pouch, and places the Finger Stall on the second finger of his left hand. Then levels the piece for loading by use of the elevating screw. He applies the Gunner's Level on the base ring and marks the line of sight with a chalk line. He hands the chalk to Number 2 to do the same on the muzzle. The Gunner then picks up the Roller Handspike and holds it in his right hand with the lower end on the ground in line with the toes and the arm extended naturally. Then he returns to his POST position.

Number 1 – takes two Handspikes and passes them to Number 3, then takes one Truck Handspike for himself, holding it in the hand farthest from the wall vertically with the lower end on the ground.

Number 2 – takes the chalk from the Gunner and marks the line of sight on the muzzle, takes two Handspikes and passes them to Number 4, then takes one Truck Handspike for himself, holding it in the hand farthest from the wall vertically with the lower end on the ground.

Number 3 – Takes the Tube Pouch from the Gunner and puts it on, helps the Gunner level the piece, then takes the handspikes from Number 1.

Number 4 – Takes the handspikes from Number 2.

FROM BATTERY

Gunner – embars in the left mortise of the roller.

Numbers 1 & 2 – facing from the scarp wall, embar in the most convenient front mortises of the truck-wheels, the hand farthest from the carriage at the top of the handspike, the other hand eight inches lower.

Numbers 3 & 4 – go to the assistance of Numbers 1 & 2, and facing toward them, seize the handspikes with both hands between those of Numbers 1 & 2.

Heave

Gunner – presses the roller under the rear transom of the gun carriage by bearing down on the handspike.

Numbers 1, 2, 3, & 4 – bear upon the handspikes until they are nearly down to the rails.

Unbar

Gunner – disengages the roller from under the transom by raising the handspike.

Numbers 1 & 2 – let go of the handspikes with the hand nearest the carriage and chock the wheels.

Numbers 3 & 4 – withdraw the handspikes and pass them to Numbers 1 & 2.

Numbers 1 & 2 – take the handspikes from Numbers 3 & 4 and reinsert them in the front mortises.

Heave/Unbar

These commands and motions are repeated until the piece is in the desired position – about one yard away from the wall.

Halt

Gunner – raises his handspike and shifts it to the right mortise of the roller, then returns to his POST position.

Numbers 1 & 2 – replace their handspikes against the wall and chock the wheels.

Numbers 1, 2, 3, & 4 – return to their POST positions.

LOAD BY DETAIL

Number 1 – lays down the handspike.

Number 2 – lays down the handspike, takes out the tompion and places it near the vent cover.

Number 3 – facing the epaulment, embars under the breech until the gunner has the gun levelled for convenient sponging, then returns to his original position and lays down the handspike.

Number 4 – lays down the handspike.

Gunner – steps toward the carriage, places his left foot forward, turns the elevating screw (if necessary) to position the muzzle for easy loading, and signals for Number 3 to unbar. The Gunner should keep his body clear of the rear of the gun, and his hands (other than the finger stall) away from the vent at all times.

LOAD

Gunner – holds the vent brush (or prick) between the index finger and the thumb of the right hand, inserts and removes the vent brush (or prick) to ensure the vent is clear of debris, returns the vent brush or prick to the pouch, covers the vent with the finger stall, and shouts “CLEAR” to signal that the tube is ready for sponging.

Number 1 – turns to his left, steps over the sponge, turns back toward the piece, and takes hold of the sponge with his right hand three feet from the sponge head and the left 18 inches from the sponge head.

Number 4 – opens the budge barrel, removes the correct powder charge, places the charge in the pass box, closes the budge barrel, and moves to a position 18” behind and to the right of Number 2.

Two

Number 1 – lowers the sponge into the sponge bucket, removes the sponge from the bucket, swings his left foot forward without moving the right foot and swings the sponge to the right, spins the shaft with his left hand to remove the excess water, swings his left foot backwards, turns to the left, enters the staff in the embrasure, placing his left foot between the wheel and the face of the piece in line with the face of the piece.

Number 2 –steps up at the same time as Number 1.

Three

Number 1 – breaks to the right with the right foot, the heels on a line parallel to the piece, the left leg straightened, the right knee bent, the body erect upon the haunches, and inserts the sponge head into the muzzle, the staff in the prolongation of the bore, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – steps to the muzzle and occupies a position on the left of the piece corresponding to that of Number 1 on the right, grasps the staff of the sponge with his left hand just behind Number 1's right hand.

Number 3 – steps over the rammer and picks up the rammer with his right hand three feet from the rammer head and the left 18 inches from the rammer head.

Four

Number 1 & 2 – shout “ONE,” insert the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the sponge to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the sponge has reached the breech, Number 1 & 2 put their other hand on the sponge staff so that both hands are on the staff.

SPONGE

Number 1 & 2 – looks at the vent to ensure it is closed, turns the sponge three turns to the left with both hands, turns the sponge three turns to the right with both hands, making sure that the sponge is all the way in and firmly against the breech. For best results the sponge should be pulled halfway out and rammed back in several times and turned left and right several times to ensure all embers are extinguished. If air is heard escaping from the vent, Number 1 or 2 yells, “STOP VENT.” Spinging continues until there is no air escaping from the vent.

Gunner – adjusts the finger stall (if “STOP VENT” is shouted) to maintain the air vacuum within the tube.

Two

Number 1 & 2 – remove their opposite hands from the sponge staff so that only one of their hands are on the staff, their opposite hands off the gun, and their bodies away from the muzzle. Number 1's hand is next to the muzzle and Number 2's hand right behind it.

Number 1 & 2 – shout “ONE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “THREE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “FIVE,” pull the sponge to the end of the muzzle, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Three

Number 1 – removes the sponge from the muzzle, rises on his left leg and turns to his left, hands the sponge to Number 3 with his left hand while taking the rammer from Number 3 with his right hand. The sponge is passed above the rammer.

Number 3 – hands the rammer up to Number 1 with his left hand, keeping the rammer staff-end up, and takes the sponge from Number 1 with his right hand, hands the sponge to Number 3 with his left hand. The sponge is passed above the rammer. Number 3 then places the sponge on the prop and returns to POST position.

Number 1 – places the rammer to the right of the muzzle bore, and tapping the muzzle two times to signal Number 2 that he is ready to ram the charge.

Number 4 – moves forward to deliver the powder charge to Number 2, opens and raises the pass box so Number 2 can retrieve the powder charge, goes to the stack of cannon balls, retrieves the correct round and wadding, places the round and wadding in the pass box, and returns to a position 18” and behind Number 2 (if not firing a live round, Number 4 just returns to POST position once the powder charge has been give to Number 2).

Number 2 – reaches into the pass box carried by Number 4 and extracts the powder charge and carefully sets the charge just inside the muzzle, making sure to place the back-end of the powder charge in first.

Four

Number 1 – inserts the rammer head only into the muzzle as soon as Number 2 has inserted the powder charge, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the rammer with his left had just behind Number 1’s right hand.

Number 1 & 2 – shout “ONE,” insert the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the rammer to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the rammer has reached the breech, Number 1 & 2 put their other hand on the rammer staff so that both hands are on the staff.

RAM

Number 1 & 2 – pull the rammer out to the full extent of their arms, and then ram the powder charge home with a single motion.

Two (this step is omitted if not firing a live round)

Number 2 – releases the rammer.

Number 1 – removes the rammer out with his right hand, thumb pointing away from the muzzle, allowing it to slide through the hand as far as the middle of the staff, grabs the staff with the left hand close to the rammer head, thumb pointing away from the muzzle, removes the rammer, and places the rammer to the right of the muzzle bore.

Number 4 – moves forward to deliver the round and wadding to Number 2, opens and raises the pass box so Number 2 can retrieve the round and wadding, and returns to his POST position.

Number 2 – reaches into the pass box carried by Number 4 and extracts the round and wadding and carefully sets the round and wadding just inside the muzzle, making sure to place the back-end of the round in first.

Three (this step is omitted if not firing a live round)

Number 1 – inserts the rammer head only into the muzzle as soon as Number 2 has inserted the round and wadding, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – grasps the staff of the rammer with his left had just behind Number 1’s right hand.

Number 1 & 2 – shout “ONE,” insert the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the rammer as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the rammer staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the rammer to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the rammer has reached the breech, Number 1 & 2 put their other hand on the rammer staff so that both hands are on the staff.

Four (this step is omitted if not firing a live round)

Number 1 & 2 – pull the rammer out to the full extent of their arms, and then ram the round and wadding home with a single motion. If the round is a shell, this step is omitted.

Five

Number 2 – releases the rammer and steps down, and sweeps his area if necessary. Number 2 then returns to POST position.

Number 1 – removes the rammer out with his right hand, thumb pointing away from the muzzle, allowing it to slide through the hand as far as the middle of the staff, grabs the staff with the left hand close to the rammer head, thumb pointing away from the muzzle, removes the rammer, steps down, places the rammer back on the prop, and sweeps his area if necessary. Number 1 then returns to POST position.

Six

Gunner – uncovers the vent, holds the vent prick or priming wire between the index finger and the thumb of the right hand, inserts the vent prick or priming wire to prick the powder charge, returns the vent prick or priming wire to the pouch. At no time should the Gunner’s hand or any part of his body be directly above the vent.

IN BATTERY

Numbers 1 & 2 – unchock the wheels, and facing away from the scarp wall, grab the front of the cheeks with their hands.

Numbers 3 & 4 – facing toward the scarp wall, grab the handles with their hands.

Gunner – raises his handspike and shifts it to the right mortise of the roller, then returns to his POST position.

Two

Gunner – bears down carefully on the roller handspike.

Numbers 1, 2, 3, & 4 – move the piece forward until the wheels touch the hurters.

Halt

Gunner – releases the roller handspike.

Numbers 1, 2, 3, & 4 – return to their POST positions.

POINT

Number 1 & 4 – take the traversing handspikes, facing the scarp wall, embark under the ends of the rear transom of the chassis. Number 1 passes outside Number 3.

Number 2 – takes an elevating handspike and embarks upon the left check under the reinforce.

Gunner – removes the vent prick or priming wire (if the wire is left in place when moving IN BATTERY).

Two

Gunner – places the breech sight on the chalk mark, gives the directions “RAISE” or “LOWER” as needed. To raise, the Gunner taps on the upper side of the knob of the cascable while saying RAISE so Number 2 will know to make the proper adjustment. To lower, the Gunner taps on the bottom side of the knob of the cascable while saying LOWER so Number 2 will know to make the proper adjustment.

NOTE: If an elevation screw is used, Number 3 steps forward and turns the screw with the right hand to raise or lower the elevation. If a quoin is used, the Gunner moves the quoin in and out with the right hand to raise or lower the elevation.

Three

Gunner – gives the directions “LEFT” or “RIGHT” as needed. To move left, the Gunner taps on the left side of the carriage while saying LEFT so Number 4 will know to make the proper adjustment. To move right, the Gunner taps on the right side of the carriage while saying RIGHT so Number 1 will know to make the proper adjustment.

Number 3 – extracts a friction primer from the pouch, takes the lanyard, and places the lanyard hook through the eye of the friction primer wire. The lanyard is held in the right hand and the hook/primer between the right thumb and forefinger.

Gunner – shouts “READY” when the piece is correctly pointed and raises both hands straight up to signal that the piece is ready.

Four

Number 1, 2, & 4 – lay down their handspikes and return to POST position.

Number 3 – hands the friction primer to the Gunner.

Gunner – takes the friction primer from Number 3 by the hook and places it in the vent, making sure that no part of his hand or body is ever directly above the vent. The Gunner then slides his hand down to hold the lanyard rope against the side of the piece, making sure that it is not tight against the friction primer. Once his hand is in position, the Gunner nods to Number 3.

Number 3 – once the Gunner nods, Number 3 uncoils the lanyard to its full length, being careful to keep some slack in the lanyard. Once uncoiled, the lanyard is held in Number 3’s hand closest to the piece and Number 3 side steps away from the piece to the right and rear. Once the lanyard is sufficiently stretched,, Number 3 nods to the Gunner and covers the ear closest to the piece with his free hand.

Gunner – once Number 3 nods, the Gunner dismounts the piece and moves to the windward side to observe the effect of the fire.

Numbers 1 & 2 – take up the chocks and stand ready to chock the wheels.

FIRE

Number 3 – pulls the lanyard firmly toward his body or behind his body. If the gun fired correctly, Number 3 rewinds the lanyard around the handle and returns it to the tube pouch.

Number 1 & 2 – if the gun fired correctly, Number 1 & 2 chock the wheels.

Gunner – if the gun fired correctly, the Gunner returns to POST position after observing the effect of the fire.

SERVICE

Number 3 – facing the epaulment, embars under the breech until the Gunner has the gun levelled for convenient sponging, then returns to his original position and lays down the handspike.

Gunner – steps toward the carriage, places his left foot forward, turns the elevating screw (if necessary) to position the muzzle for easy loading, and signals for Number 3 to unbar, holds the vent brush (or prick) between the index finger and the thumb of the right hand, inserts and removes the vent brush (or prick) to ensure the vent is clear of debris, returns the vent brush or prick to the pouch, covers the vent with the finger stall, and shouts “CLEAR” to signal that the tube is ready for sponging. The Gunner should keep his body clear of the rear of the gun, and his hands (other than the finger stall) away from the vent at all times.

Number 1 – turns to his left, steps over the sponge, turns back toward the piece, and takes hold of the sponge with his right hand three feet from the sponge head and the left 18 inches from the sponge head.

Two

Number 1 –lowers the sponge into the sponge bucket, removes the sponge from the bucket, swings his left foot forward without moving the right foot and swings the sponge to the right, spins the shaft with his left hand to remove the excess water, swings his left foot backwards, turns to the left, enters the staff in the embrasure, placing his left foot between the wheel and the face of the piece in line with the face of the piece.

Number 2 –steps up at the same time as Number 1.

Three

Number 1 – breaks to the right with the right foot, the heels on a line parallel to the piece, the left leg straightened, the right knee bent, the body erect upon the haunches, and inserts the sponge head into the muzzle, the staff in the prolongation of the bore, supported by his right hand with arm extended and left hand flat against his thigh.

Number 2 – steps to the muzzle and occupies a position on the left of the piece corresponding to that of Number 1 on the right, grasps the staff of the sponge with his left hand just behind Number 1’s right hand.

Four

Number 1 & 2 – shout “ONE,” insert the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “THREE,” push the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands back along the sponge staff until they are grasping it at arms length.

Number 1 & 2 – shout “FIVE,” push the sponge to the breech, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle. Once the sponge has reached the breech, Number 1 & 2 put their other hand on the sponge staff so that both hands are on the staff.

SPONGE

Number 1 & 2 – looks at the vent to ensure it is closed, turns the sponge three turns to the left with both hands, turns the sponge three turns to the right with both hands, making sure that the sponge is all the way in and firmly against the breech. For best results the sponge should be pulled halfway out and rammed back in several times and turned left and right several times to ensure all embers are extinguished. If air is heard escaping from the vent, Number 1 or 2 yells, “STOP VENT.” Spinging continues until there is no air escaping from the vent.

Gunner – adjusts the finger stall (if “STOP VENT” is shouted) to maintain the air vacuum within the tube.

Two

Number 1 & 2 – remove their opposite hands from the sponge staff so that only one of their hands are on the staff, their opposite hands off the gun, and their bodies away from the muzzle. Number 1’s hand is next to the muzzle and Number 2’s hand right behind it.

Number 1 & 2 – shout “ONE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “TWO,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “THREE,” pull the sponge as far as the hand of Number 1 allows, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Number 1 & 2 – shout “FOUR,” slide their hands up along the sponge staff until they are grasping it next to the muzzle.

Number 1 & 2 – shout “FIVE,” pull the sponge to the end of the muzzle, keeping their bodies erect, their opposite hands off the gun, and their bodies away from the muzzle.

Three

Number 2 – releases the sponge and steps down, and sweeps his area if necessary. Number 2 then returns to POST position.

Number 1 – removes the sponge out with his right hand, steps down, places the rammer back on the prop, and sweeps his area if necessary. Number 1 then returns to POST position.

Gunner – dismounts and returns to POST position.

CEASE FIRE

When this command is issued by the Gunner or other commanding officer, the cannon crew returns to POST positions and awaits further orders. If the cannon has just been fired, the cannon is serviced first.

Any member of the gun crew is not only allowed, but is required to shout “CEASE FIRE!” if the field of fire is not clear or if there is another potential safety problem. It is the responsibility of each member of the gun crew to act as a Safety Officer.

If the CEASE FIRE command is not given, the gun crew repeats the Load By Detail commands and movements until the CEASE FIRE command is given.

Columbiad Misfire Drill

There are a number of reasons a cannon may misfire: the Gunner may not have broken open the powder charge with the vent prick, the primer may be bad, the charge may have rolled away from the vent, etc. If the cannon fails to go off, the Gunner will give the command:

FAILED PRIMER – DO NOT ADVANCE!

Gunner – secures the pliers and other primer removal implements and places them in his pouch.

The remaining members of the gun crew remain in their READY positions.

When at least 3-5 minutes have elapsed from the time the gun has stopped smoking, the Gunner will give the command:

REPRIME!

Gunner –takes the pliers and carefully removes the faulty primer, then returns the pliers to his pouch. The Gunner then takes the vent prick or priming wire from the pouch, holds the vent prick or priming wire between the index finger and the thumb making sure that no part of his hand is directly above the prick or inside the prick ring, inserts the vent prick or priming wire into vent and re-pricks the powder charge, and returns the vent prick or priming wire to the pouch.

Number 3 – steps forward and hands the Gunner the lanyard with another primer attached.

Gunner – inserts the primer and holds the lanyard against the rear and left of the tube while Number 3 removes the slack in the lanyard.

Number 3 – removes the slack in the lanyard and signals with a nod to Gunner that he may dismount.

Gunner – upon receiving the nod from Number 3, dismounts and returns to the READY position.

Gunner – ensures everyone is in their READY position before giving the command to FIRE the cannon again.

If the cannon fires, the cannon is serviced normally. If the cannon fails to fire, the above procedure shall be followed again to extract the primer. However, rather than attempt another firing, the vent shall be flooded with water to put out any spark left by the primer, and then the muzzle shall be flooded with water. The Gunner will give the order:

FLOOD THE TUBE!

All members of the gun crew not directly involved should fall in well behind the piece.

Number 4 – brings forward a large syringe to the Gunner.

Gunner – injects at least 10 syringe loads are squirted into the vent.

Number 1 – uses the sponge bucket to flood the muzzle with a minimum of 5 gallons of water.

After the powder charge has had time to be sufficiently soaked, the command is given:

REMOVE THE CHARGE!

Number 1 – worms the charge out and submerges it in the water bucket. After several minutes, Number 1 breaks open the powder charge in the water, walks it away from the piece a safe distance, and, using the worm, removes the charge.

The United States National Park Service also recommends using a CO2 fire extinguisher or forced air extractor, rather than water, to handle rendering a misfired charge inert in the tube. The CO2 is injected into the tube via the vent. This deprives the charge of the oxygen needed to ignite, and in many cases will actually cause the misfired charge to exit the tube due to the pressure introduced by the CO2 fire extinguisher. All members of the gun crew should take positions well away from the cannon carriage when the CO2 is released into the vent.

There is a slight chance of a static spark being created by the movement in the tube of the misfired charge in the CO2 environment. As with all misfires, extreme caution should be used to prevent injury should the powder accidentally ignite.

Once the misfired charge has been removed from the tube, the misfired charge needs to be handled according to the Misfire Drill (submerged and broken open – see above).