

P.A.C.S.
Provisional Artillery of the
Confederate States

Army of Tennessee
Army of The Tennessee

Artillery Drill Manual

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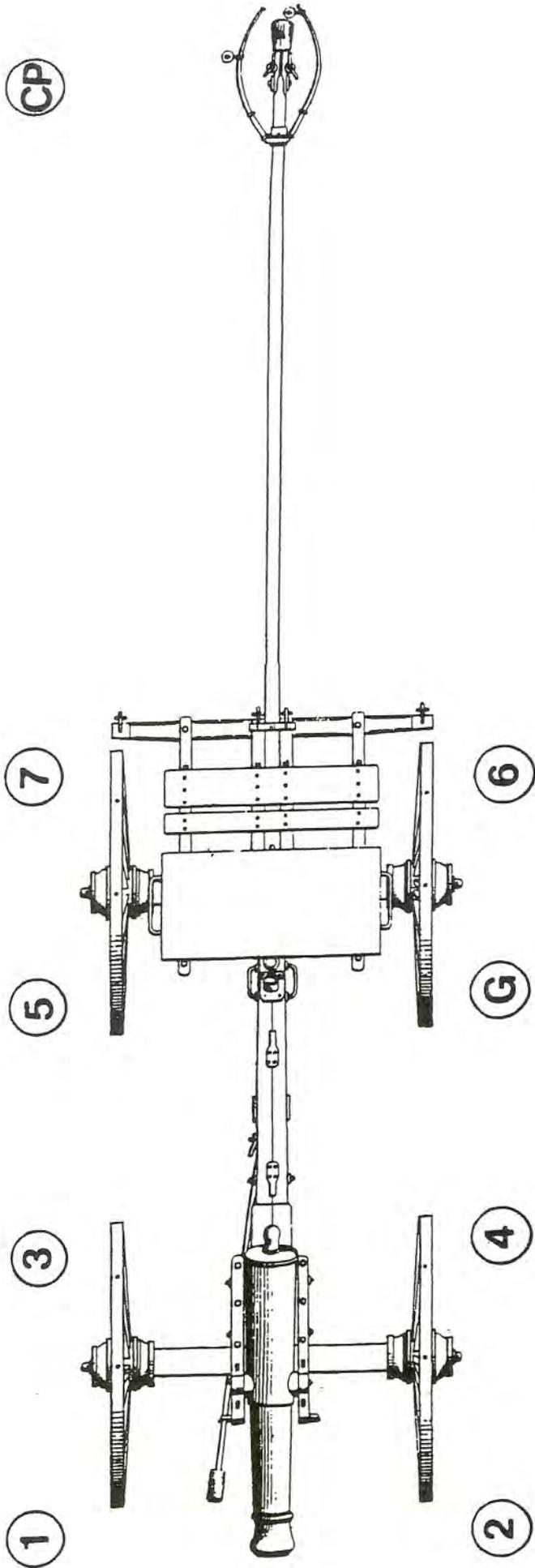
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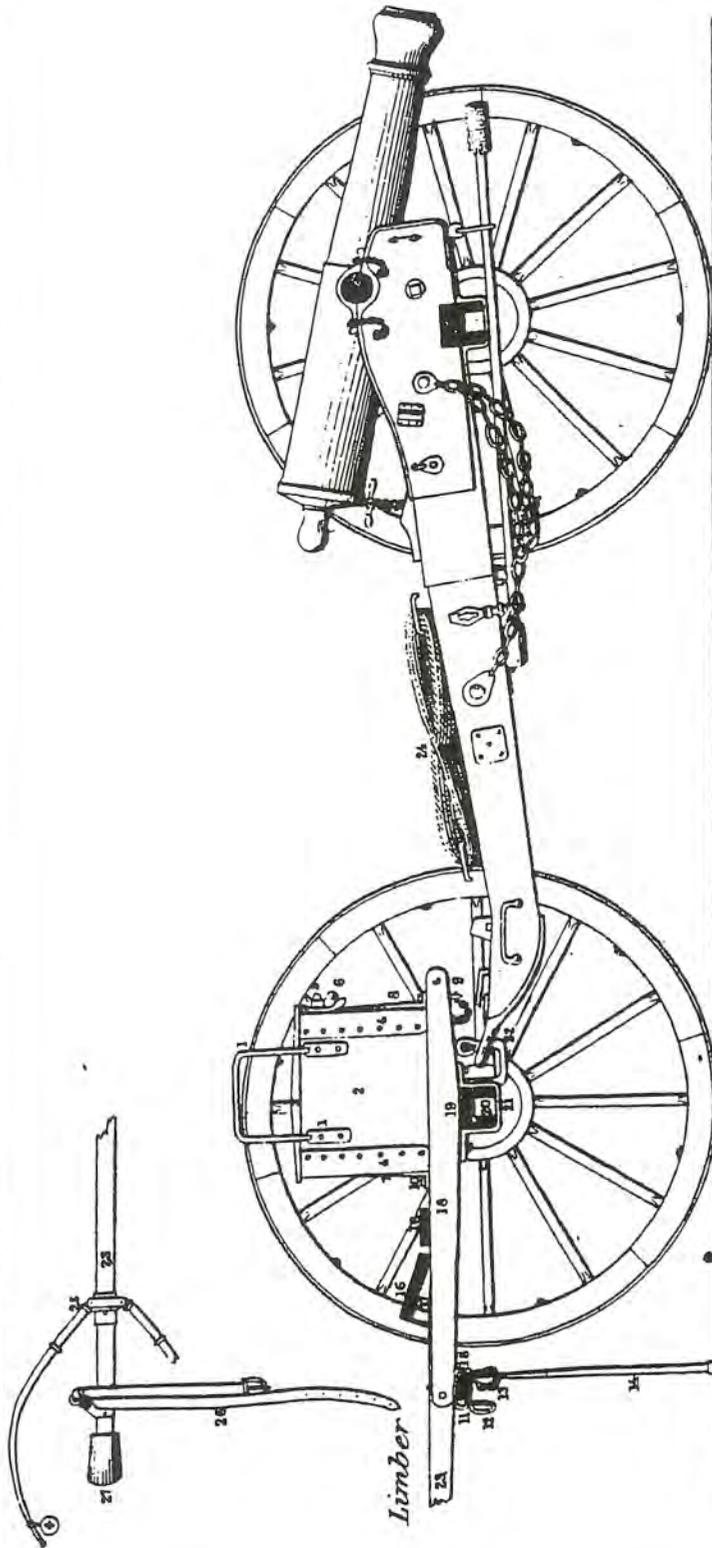
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Excerpts from:
Andrew's Mounted Artillery Drill
Complied According to the Latest Regulations
from Standard Military Authority

R. Snowden Andrews
(Lt. Col. Commanding Artillery Battalion, CSA)
1863

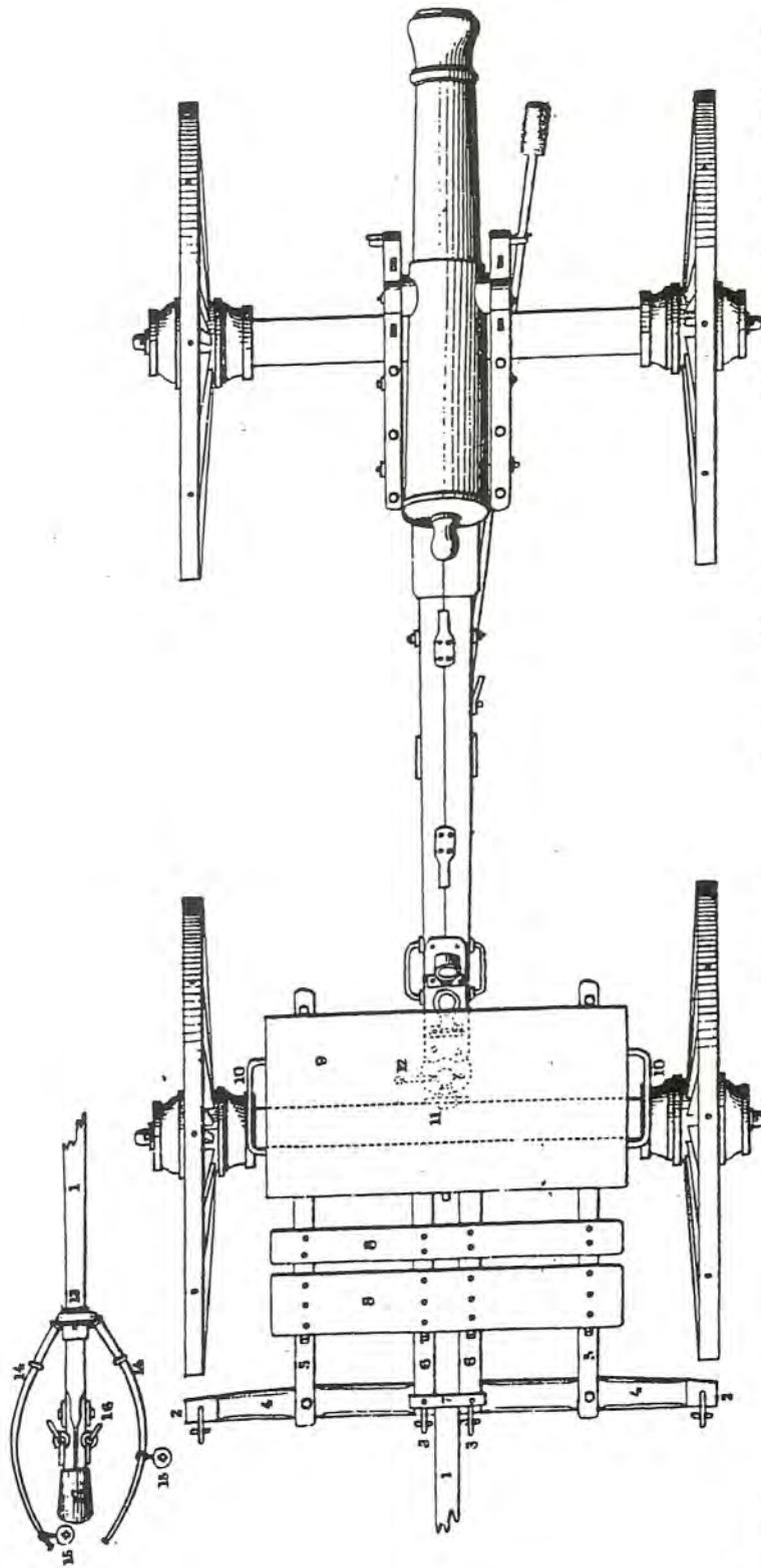


Post of the Cannoneers. Piece Limbered.



- | | | | | |
|----------------------|--------------------------------|---------------------------------|------------------|---|
| 1. Handles. | 7. Back strap. | 13. Pole prop chain. | 19. Axle body. | The shoulder washers, Linch pins, Linch |
| 2. Ammunition Chest. | 8. Front do. | 14. Pole prop/Socket & ferrule. | 20. Axle tree. | washers, and Wheels, are the same as |
| 3. Cover / or lid. | 9. Stay pins. Keys, &c. | 15. Splinter bar. | 21. Under strap. | for the Gun carriage. |
| 4. Corner plates. | 10. Stay for Amun. Chest. | 16. Foot boards. | 22. Fintle hook. | 25. Pole yoke. |
| 5. Turnbuckle. | 11. End bands of splinter-bar. | 17. Foot board brackets. | 23. Pole. | 26. Pole strap. |
| 6. Hasp. | 12. Trace Hooks. | 18. Hounds. | 24. Prolonge. | 27. Pole pad. |

Limber



- 1. Pole.
- 2. End bands of splinter bar and trace hooks.
- 3. Middle bands of splinter bar and trace hooks.
- 4. Splinter bar.
- 5. Hounds.
- 6. Fork.
- 7. Fork strap.
- 8. Foot boards.
- 9. Ammunition chest.
- 10. Handles of Amm. chest.
- 11. Pintle hook.
- 12. Pintle hook Key.
- 13. Muff and collar of Pole yoke.
- 14. Branches of do. do.
- 15. Sliding rings.
- 16. Pole strap iron.
- 17. Pole pad.

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The following pages are the minimum basic requirements. Additional safety regulations may be added at your discretion. We appreciate your efforts in exercising safety.

4.0 Equipment Requirements for the Limber Chest and Cannon

4.1 The Field Limber Chest

No 6 and/or No 7 man is in charge of the limber chest. It shall be maintained in an orderly manner and free of loose powder at all times. The limber chest shall be placed thirty (30) feet behind the cannons or as far away as feasible.

The minimum contents of the limber chest shall include:

- ❖ a prick made of copper, bronze, or brass only
- ❖ a vent brush
- ❖ two (2) pairs of leather gloves for No 1 and 2
- ❖ a leather gunner haversack free of loose powder
- ❖ a thumb stall or glove for stalling the vent
- ❖ a gimlet or other extraction tool
- ❖ two (2) lanyards of appropriate length
- ❖ a lock
- ❖ a bright flashlight or mirror
- ❖ hearing protection devices - should be non visible to spectators
- ❖ a fire extinguisher - preferred

4.2 Equipment for the Cannon

No 5 man is in charge of the gun.

- ❖ 1 sponge mandatory, 2 preferable - made of non static causing material, capable of pulling a vacuum on tube
- ❖ 1 sponge bucket
- ❖ 1 grease bucket - recommended
- ❖ 1 worm - prongs sharp and unbent
- ❖ 1 rammer head - tight fitting and tapered at shaft
- ❖ 1 hand spike, 2 preferable

5.0 School of the Piece

5.1 Worming the Tube

No 2 man shall be in charge of this action. Worming or clearing the tube should be done prior to every battle. No 3 man shall loudly say vent clear prior to worming. No 2 man shall worm after the vent is cleared and stalled.

5.2 Advancing the Round

No 6 and/or No 7 man is in charge of this position. He will be careful not to raise the lid unnecessarily. The lid shall be kept closed as much as possible. The ammunition pouch or haversack should be hung from the left shoulder to the right side of hip. At the command "load", he removes a round from the limber chest placing it in his haversack, advances it to the piece, stopping at the gunner or No 4 man for inspection of the fuse before delivering it to the No 2 man. He immediately returns to the limber chest.

5.3 Placing the Round in the Tube

No 2 man is in charge of this action. After receiving the round from the ordinance pouch advanced by No 6, he then orientates it correctly for loading. Caution should be taken if a buffer is in front of the powder to ensure proper orientation of the round. Staying behind the muzzle at all times, he then inserts round in to the face of the muzzle, ensuring that no part of the round is exposed. He then picks up worm, relocates from the inside of the wheel to the outside of the hub while remaining behind the muzzle at all times. His stance just prior to and during discharging of the gun should be with his right hand covering his right ear while his head is slightly turned toward the muzzle of the gun to monitor proper discharge of the round.

5.4 Seating the Round in the Tube

No 1 man is in charge of this action. He steps from outside the hub to inside the wheel. Then he shall grasp the rammer with his right hand palm facing up and thumb pointing away from the muzzle of the gun. He shall seat the round with only one (no double tamping allowed) quick continuous thrust of the rammer, following through with his hand going under the muzzle of the gun, after a couple of seconds he shall retrieve the rammer with palm facing up and thumb pointing away from the muzzle of the gun. He then relocates with rammer in his right hand from the inside the wheel to outside of the hub. His stance just prior to and during discharging of the gun should be with his left hand over his left ear while his head is slightly turned toward the muzzle of the gun to monitor proper discharge of the round. The rammer should be placed on his right toe.

5.5 Pricking of the Round

No 3 man is in charge of this action. He stands on the right side of the piece in line with the knob of the cascable covering No 1 man. At the command to "load" he steps to the left inserts and removes vent brush or prick from the vent prior to worm or sponge being inserted. He wipes the vent field with the thumbstall or glove. He then stalls the vent by covering it with the thumbstall or glove, keeping his elbow raised, his fingers on the left side of the piece, so as to allow the gunner to aim over his thumb. His right hand is on the tube pouch. After the piece is charged, the rammer removed from the bore by No 1 man and the command ready is given he then pricks the round with one stroke of his left hand, palm facing up and the left arm fully extended. At no time shall he insert his finger into the eye of the prick. After No 4 man has inserted the primer No 3 man places his prick on the lanyard cord and keeps eye contact with No 4 man as he steps outside the wheel. Once No 4 gives him a signal he steps to his right clearing the wheel.

5.6 Firing of the Round

No 4 man is in charge of this position. He is on the left side of the piece standing in line with the cascable covering No 2 man. At the command to "load", No 4 man inserts the lanyard hook into the ring of the primer and stands fast. At the command "ready", he steps in with the right foot, drops the tube in the vent, takes the lanyard in his right hand, moves to the rear so far as to keep the lanyard slack, but capable of being stretched, without altering his position, which should be clear of the wheel, left foot broken to the left and rear. While moving outside the wheel, he shall keep eye contact with No 3, giving him a signal when he is ready so No 3 can step outside the wheel. After ensuring that No 3 is outside the wheel, No 4 turns his head slightly to left while continuing to monitor the muzzle of the gun for proper discharge of the round. He then raises his left hand to notify the commander that the piece is ready to be discharged. On the command to "fire", he pulls the lanyard briskly and firmly, passing the hand, in a downward direction to the rear, so as to keep the lanyard hook from flying back in the direction of his face. After the piece discharges, he returns to the position of his post. There must be a 50 yard safe zone between the piece and the men on the field.

5.7 Stalling and Clearing of the Vent

No 3 man shall be in charge of this action. A prick or vent brush is acceptable to use when clearing the vent. After clearing the vent, he covers the vent with a thumbstall or glove. He then calls out loudly, vent clear, to inform the crew that the piece is ready to be serviced. Holding this position until the order prick and prime or clean and secure is given.

5.8 Sponging of the Tube

No 1 man shall be in charge of this action. Wet sponge the tube rotating the sponge 360 degrees at the breech end of the tube, if a second sponge if available it shall be dry and used for the second sponging of the tube. If a second sponge is not available the wet sponge shall be used again rotating the sponge in the opposite direction for 360 degrees at the breech end of the tube. Sponges shall be dipped no more than half way into the water bucket. If excess water is present on the sponge, No 1 shall spin the rammer in order to remove the excess water in a safe distance from other crew members. For safety reasons both the sponge and rammer ends shall never be in contact with the ground.

5.9 Misfire Drill

Despite the procedure and drill a crew follows, an equipment failure or a human error can cause the piece to misfire. When this occurs, the piece will have to be reprimed. The following are instructions on how to SAFELY reprime the piece with built-in precautionary measures to reduce the possibility of injury.

In case of a misfire any member on the piece shall call out misfire. The gunner immediately commands "DO NOT ADVANCE - THE PRIMER HAS FAILED". The cannoneers remain in the ready position except for No 1 and No 2, who place their implements vertically on the wheel hubs, as a signal to all others of the piece they have a malfunction. The gunner first informs his Chief of the Piece or Section Chief of the incident then removes his time piece. After ensuring a MINIMUM of three (3) minutes has elapsed, the Gunner commands: "REPRIME".

The cannoneers remain in their READY position except as noted below:

No 2 lays the worm on the axle, and then steps inside the wheel refusing his body to the muzzle by brushing his abdomen against the wheel, and when reaching the axle does a left face.

No 3 steps forward and hands No 2 his priming wire over the top of the wheel with his left hand.

No 2 then removes the faulty primer with the priming wire or gunner's pliers. He then takes the priming wire in his left hand, placing the shaft of the wire, point down, between the ring and middle finger with the palm up. (NOTE: The fingers are NEVER inserted into the ring or loop of the priming wire).

No 2 inserts the wire in the vent. If the priming wire does not drop down to the ring, he repunctures the round with two GLANCING blows to the top of the priming wire with the back of his left hand. He then removes the wire by grasping the straight portion of the wire between the middle and ring fingers of his left hand, again palm up, and lifts up quickly.

No 2 then returns the priming wire to No 3 with his left hand over the right wheel, then receives from No 4 a new friction primer attached to the lanyard over the top of the left wheel. He then inserts the primer into the vent with his left hand and holds the lanyard with the side of his left hand against the barrel, away from, but near the vent.

No 4 extends the lanyard by moving to his position to fire the piece, keeping eye contact with No 3. Once No 4 has removed the slack from the lanyard and is ready, he indicates to No 2 with a nod of his head that he is ready.

No 2 after receiving the nod from No 4, moves back outside the piece in the same manner he came inside the wheel, retrieves his worm and returns to his READY position.

The Gunner insures that all cannoneers are in their READY position BEFORE giving the command: "FIRE"

If the piece does not fire on the third attempt, the above procedure shall be followed again; however, the vent shall be flooded with water, then the muzzle (in place of repuncturing the cartridge). The round is withdrawn by the worm after it has been sufficiently soaked for a period of three (3) minutes.

At any time the primer has failed and/or there is a probability of supporting or opposing troops moving into the muzzle blast area while the cannon is loaded, No 1 and No 2 shall place their implements on the hub of the piece and hold them in a vertical position as a signal that the gun is loaded.

These directions should be followed to the letter. There have been occasions where the above practices have been necessarily implemented due to a faulty primer. Not following the procedure following a misfire could cause injury due to a hang-fire.

6.0 School of the Soldier

6.1 Commands

Commands are given in two parts: The *preparatory command* and the *command of execution* with a pause between the two parts. The *preparatory command* is given first and informs the cannoneers that something is going to happen and be prepared to do it. The action is carried out on the *command of execution*. For example, the command is given: **Attention ... Detachment!** The command **Attention...** is the preparatory command. When the *command of execution* is given, **Detachment**, the cannoneers performs the maneuver (in this case, comes to the position of attention).

6.2 Position of Attention

The command will be given: **Attention ... Detachment!** In this position, the cannoneers will turn his feet out at something less than a right angle with the heels together, body relaxed but straight, hands down at the sides in a natural position, fingers together, the little fingers touching the seams of the pants, and the head erect and square to the front with the eyes striking the ground about fifteen paces to the front (Figure 1.1). When at this position, no talking is allowed unless one is addressed by and officer or N.C.O.

6.3 Position of Parade Rest

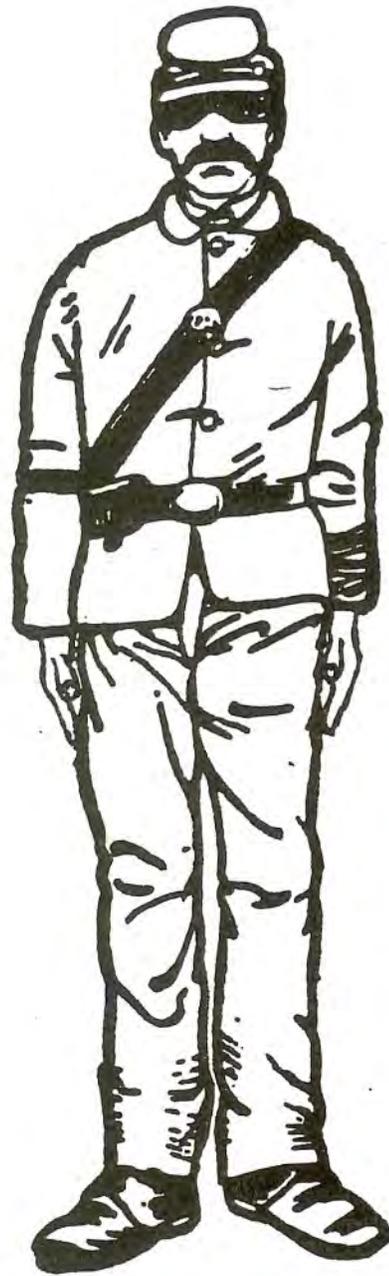
The command will be given: **Parade... Rest!** The command is usually given when at the position of attention. It is a more relaxed position than attention, but talking is not permitted unless one is addressed by an officer or N.C.O. At the command **Rest**, move the right foot 6 inches to the rear, the left knee slightly bent, the body upright on the right leg; the hands being crossed in front, the left over the right. If the saber is drawn, the back of the saber rests in the hollow of the right arm. **Rest!** At this *command of execution* the cannoneers is free to relax and talk to his fellow cannoneers, but cannot leave the formation.

6.4 Eyes Right - Eyes Left

The instructor commands: **Eyes... Right!** At the command **Right**, turn the head slightly to the right, so that the inner corner of the left eye may be on a line with buttons of the jacket, the chin well drawn in. At the command **Front**, turn the head gently to the front. The command **Eyes... Left** is executed on the same principles.

6.5 Facing Movements

To face the to the right or left, the command will be given: **Left (Right)... Face!** All facing movements are executed from the position of attention. Left or right facing movements for either direction are accomplished as follows: The cannoneers lifts the right foot slightly on the *preparatory command*, Right or Left. On the command "Face", he turns on is left heel in the indicated direction and then places the right heel next to the left heel (Figure 1.2). To face the men to the rear or about, the command will be given **Rear... Face!** On the command "Rear," the cannoneers point his left foot straight ahead. He places the hollow of the right foot three (3) inches behind his left heel, toes pointed to the right. On the command "Face," the cannoneers pivot clockwise on both heels until he faces the rear. He then places the right heel next to the left heel (Figure 1.3).

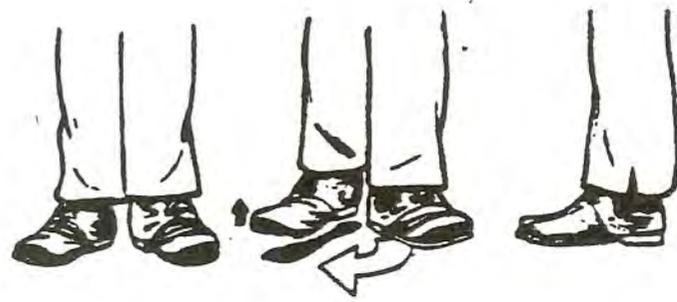


Position of Attention

[FIGURE 1.1]

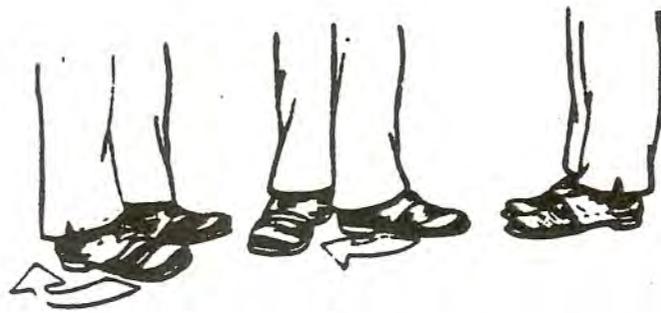


Left Face



Right Face

[FIGURE 1.2]



Rear Face

[FIGURE 1.3]

6.8 Saluting and Presenting Arms (without Arm)

These movements are basically the same. However saluting is done when an enlisted man (or officer) encounters an officer. The command to **Present Arms** is usually given in a formation such as morning parade and color.

When saluting or the command **Present Arms** is given, the right hand comes up the front of the body with the palm facing the body. The fingers are straight and together, the thumb against the edge of the hand. (The position of the fingers and thumb is similar to placing the hand, palms down, flat on a table and moving the thumb and fingers together.) Before the hand reached the brim of the hat, the palm is smartly turned 180 degrees outward in the manner associated with the British.

When the salute is returned or the command **Order Arms** is given, the right hand reverse the movement to the salute and returns to the position it had while at attention.

While in camp, all company grade officers (captain and below) are not saluted unless the soldier is performing duties such as guard duty whereas he would be armed with a musket. If a soldier is ordered to report to an officer he should salute when doing so. All field grade officers (major and above) should be saluted if he approached them to speak. They should also be saluted if they are walking past. One does not salute an officer if he is not wearing his coat (displaying rank). When you salute, you are showing respect for the rank and is a part of the military courtesy and your impression.

7.0 School of the Detachment

7.1 Formation

When the detachment is called to fall in, each cannoneer has a specific place within the formation based upon his position in the gun crew. The cannoneers will fall in at the position attention, elbows touching that of the man next to him, the even numbered men in the front row, the odd numbered in the back row with the lowest numbers to the right of the formation (Figure 2.1).

Sergeants (chiefs of piece) and corporals (gunner) have unique positions in the detachment. If the formation is called by an officer or N.C.O. other than a member of the detachment (e.g. the first sergeant), the chief of piece's position is on the extreme right of the formation, in line with the front row, his left elbow touching the right elbow of No. 2. The gunner is located one (1) yard behind No. 1 (Figure 2.2)

If, for any reason, the chief of piece vacates his position next to No. 2, the gunner will automatically fill the sergeant's position (Figure 2.3).

7.2 Inspection

To open the ranks, the following command will be given: **To the rear, open order... March! Right... Dress! Front!** At the first command, the gunner steps back briskly five (5) yards, and halts opposite their place in line. At the command **March** the rear rank marches backward five (5) yards and halts, each cannoneer accurately covering his file leader. At the command **Dress** the men cast their eyes to the right, adjust their position until standing squarely to the front, touching the elbow of the man on the right, and see the breast of the second man on that side. To close the ranks, the command is: **Close order... March!** At the command **March**, the rear rank moves forward five (5) yards to their original position.

7.3 Marching

The length of the marching step is twenty-eight (28) inches; its quickness at the rate of one hundred ten (110) steps per minute. To move the detachment forward, the command is: **Detachment, forward... March!** At the command **Forward**, shift the weight of the body to the right leg. At the command **March**, move briskly forward beginning with the left foot at the rate of one hundred ten (110) steps per minute.

7.4 To Mark Time When Marching

The instructor commands: **Mark Time... March!** At the command **March!**, bring the heels by the side of each other, and mark the cadence of the step by raising and lowering the feet without advancing them. Marking time is marching in place. (The purpose of marking time is to dress to the guide to insure proper alignment before halting or continuing.) The cannoneer continues to mark time until the command is given to either **Halt or Forward... March.**

7.5 To Halt the Detachment

The command to halt the detachment will be: **Detachment... Halt!** The command of execution can be given on either foot. When it is given, take one more step and bring the rear foot to the side of the foot that is in front. For example, if the command **Halt** is given when the right foot strikes the ground, take a step with the left and bring the right foot next to the left.

7.6 Flanking Movements

These movements are utilized by a cannoneer or detachment to change direction 90 degrees while marching from one place or position to another. When performed as a detachment, everyone performs this maneuver at the same time. **By the left flank... March!** The command of execution is given on the left foot. As the right foot strikes the ground, pivot on the ball of the foot 90 degrees to the left and step off with the left foot in the new direction (Figure 2.4) **By the right flank... March!** The command of execution is given on the right foot. As the left foot strikes the ground, pivot on the ball of the left foot 90 degrees to the right and step off with the right foot in the new direction (Figure 2.5). **Note:** These movements are executed by the cannoneer individually without the commands when marching to and from his post at the piece. Flanking movements are also used when a cannoneer reports to an officer or N.C.O. in front of a formation and when he returns to his position in the formation.

7.7 Oblique Movements

These movements are the same as flanking movements except they are used to change direction 45 degrees while marching from one place or position to another. This movement is utilized more in the School of the Battery. **Left oblique... March!** The *command of execution* is given on the left foot. As the right foot strikes the ground, pivot on the ball of the right foot 45 degrees to the left and step off the left foot in the new direction (Figure 2.6). **Right oblique... March!** The command of execution is given on the right foot. As the left foot strikes the ground, pivot on the ball of the left foot 45 degrees to the right and step off with the right foot in the new direction (Figure 2.7).

8	6	4	2
7	5	3	1

Formation of the Detachment without Gunner and Chief of Piece

[FIGURE 2.1]

8	6	4	2	S
7	5	3	1	

G

Formation of the Detachment with Gunner and Chief of Piece

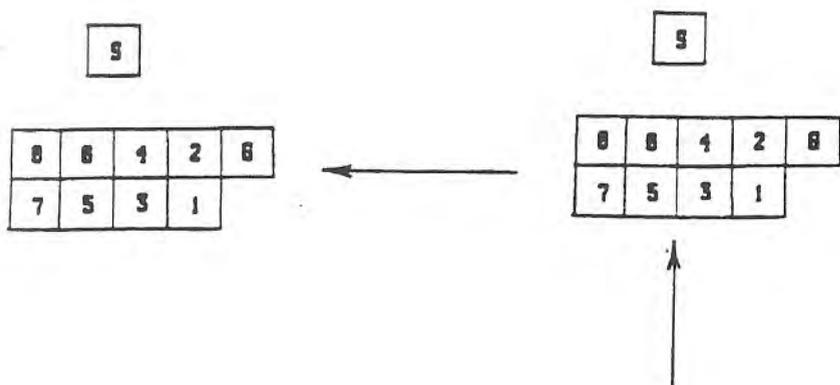
[FIGURE 2.2]

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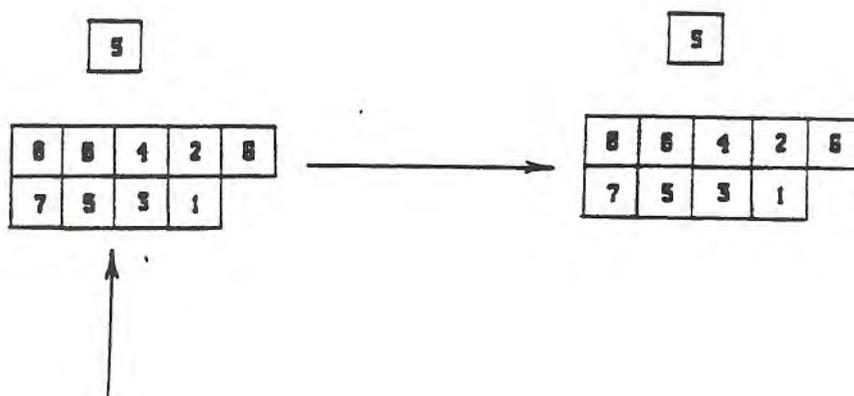
8	6	4	2	G
7	5	3	1	

Formation of the Detachment with Chief of Piece in Front of Formation

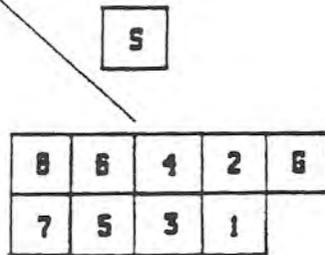
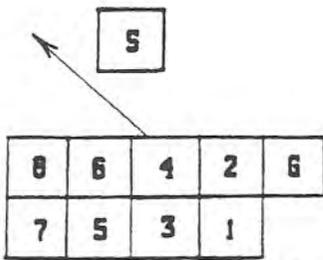
[FIGURE 2.3]



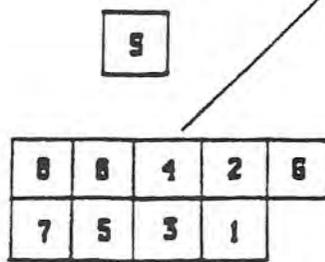
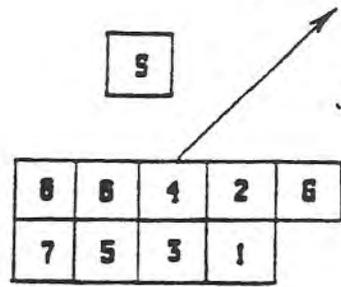
Left Flank
[FIGURE 2.4]



Right Flank
[FIGURE 2.5]



Left Oblique
[FIGURE 2.6]



Right Oblique
[FIGURE 2.7]

7.11 To Reverse Direction

To quickly change the direction of march 180 degrees the command will be given:

To the rear... March! The *command of execution* is given on the right foot. As the left foot strikes the ground, pivot on the ball of both feet to the right (clockwise) 180 degrees and step off with the left foot in the new direction.

7.12 Wheels

Wheels are used to change direction while maintaining the same rank in the front of the formation and can be to the left or right.

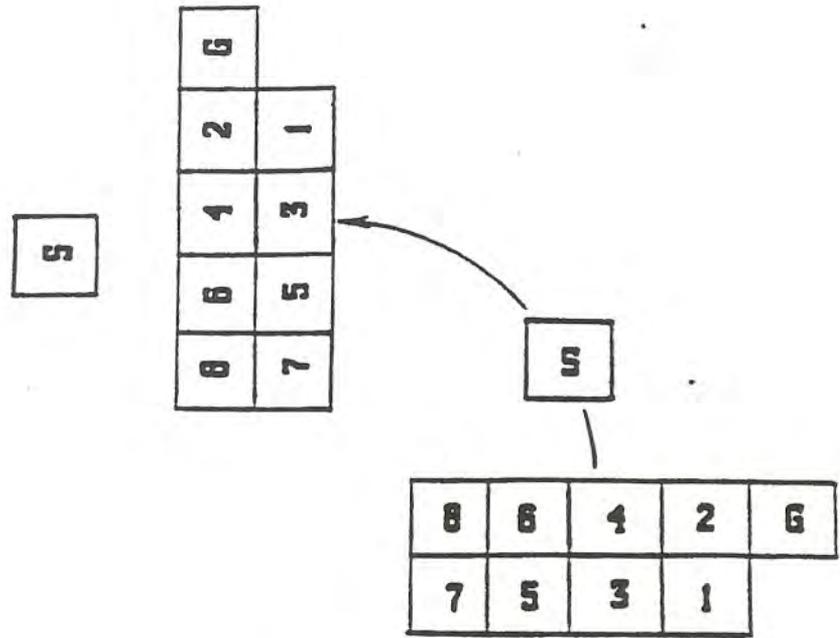
Each rank performs the wheel with the pivot man forming the arc of the circle, clearing the pivot by eighteen (18) inches. The outside cannoneer lengthens the step as much as possible, the other taking steps according to the position they occupy in the rank, touching with elbows toward the pivot. The cannoneers turn their heads slightly toward the pivot to keep property aligned.

The detachment being in line, at the halt or in march, to place it in position perpendicular to the existing front, the instructor commands: **Detachment, left (or right) wheel...**

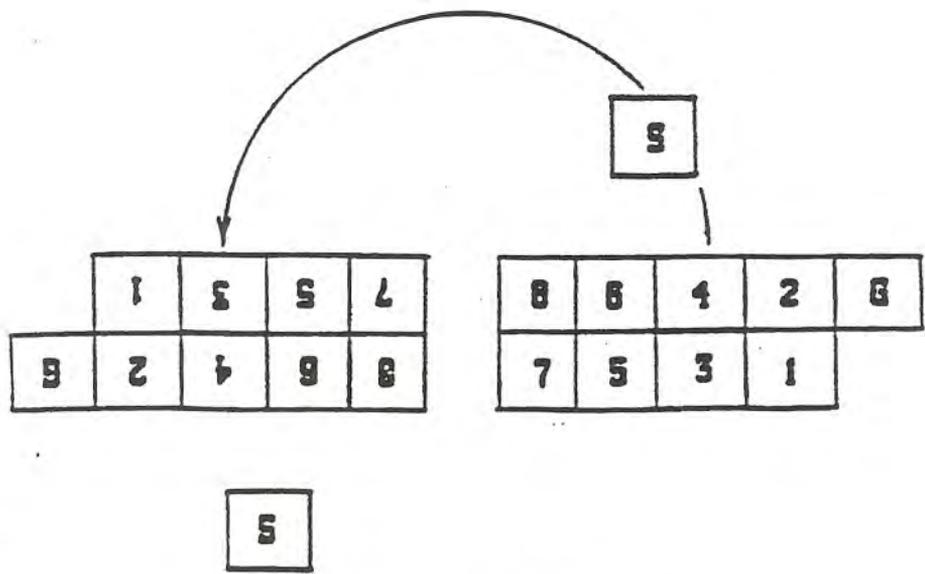
March! At the command **March**, the cannoneers perform the wheel in the direction indicated. At the command **Forward... March!**, the detachment marches forward in a straight line (Figure 2.8). Note: In the wheel to the right, when the gunner is on the pivot rank, he marks time in turning to the right on his own ground at the command **March**.

7.13 Guide Right (or Left)

The command **Guide right (or left)** means the detachment will focus its alignment to the right or left. In battery formations it not only tells which way to focus alignment, but who the guide is. In some instances, it is a command for the guidon to take proper place on the right or left for alignment purposes. The command could also be used to avoid simple obstacles in the oath of the march. For example Guide right around the tree at which time the guidon takes the appropriate movement and the unit alignment focusing on him until the obstacle is passed.



Wheels



To Change Direction of March 180°

[FIGURE 2.8]

School of the Battery

This part of the manual concerns movements of the Battery on the parade field. The movements of the battery while marching without the cannon are the same movements as the battery of horse drawn detachments with pieces.

Formation

The command to form the battery, the first sergeant would command:

(Battery's name)... Company formation!

or

(Battery's name)... Fall in!

Each gun detachment will form up as in the School of the Detachment in the Order in Line [FIGURE 3.1] touching each other, the battery centered on the first sergeant.

Inspection

To open and close ranks for inspection, the commands and procedures are identical to those as in the School of the Detachment.

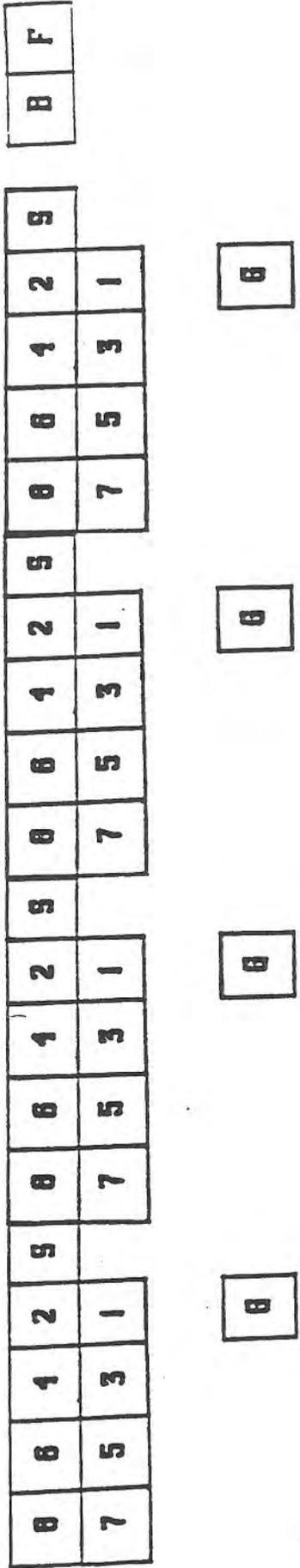
Being in Line to Form Column

There are two basic movements to go from a line into a column. The first incorporates a wheel, the second uses an oblique.

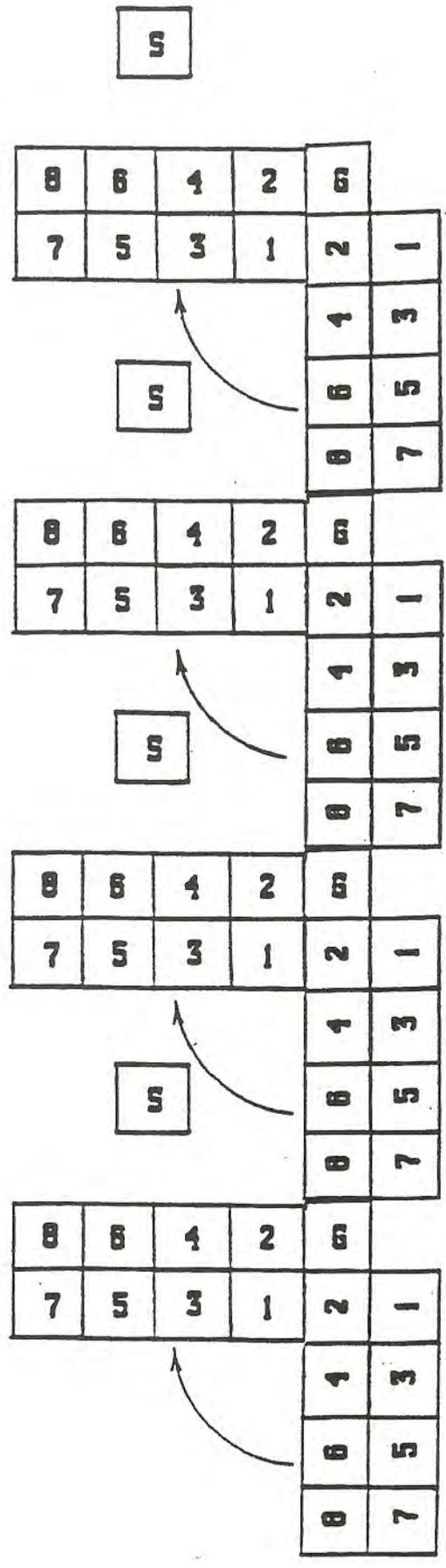
The first is to break into column to the left or right. The instructor or battery commander would command:

By detachments, left (or right) wheel... March!

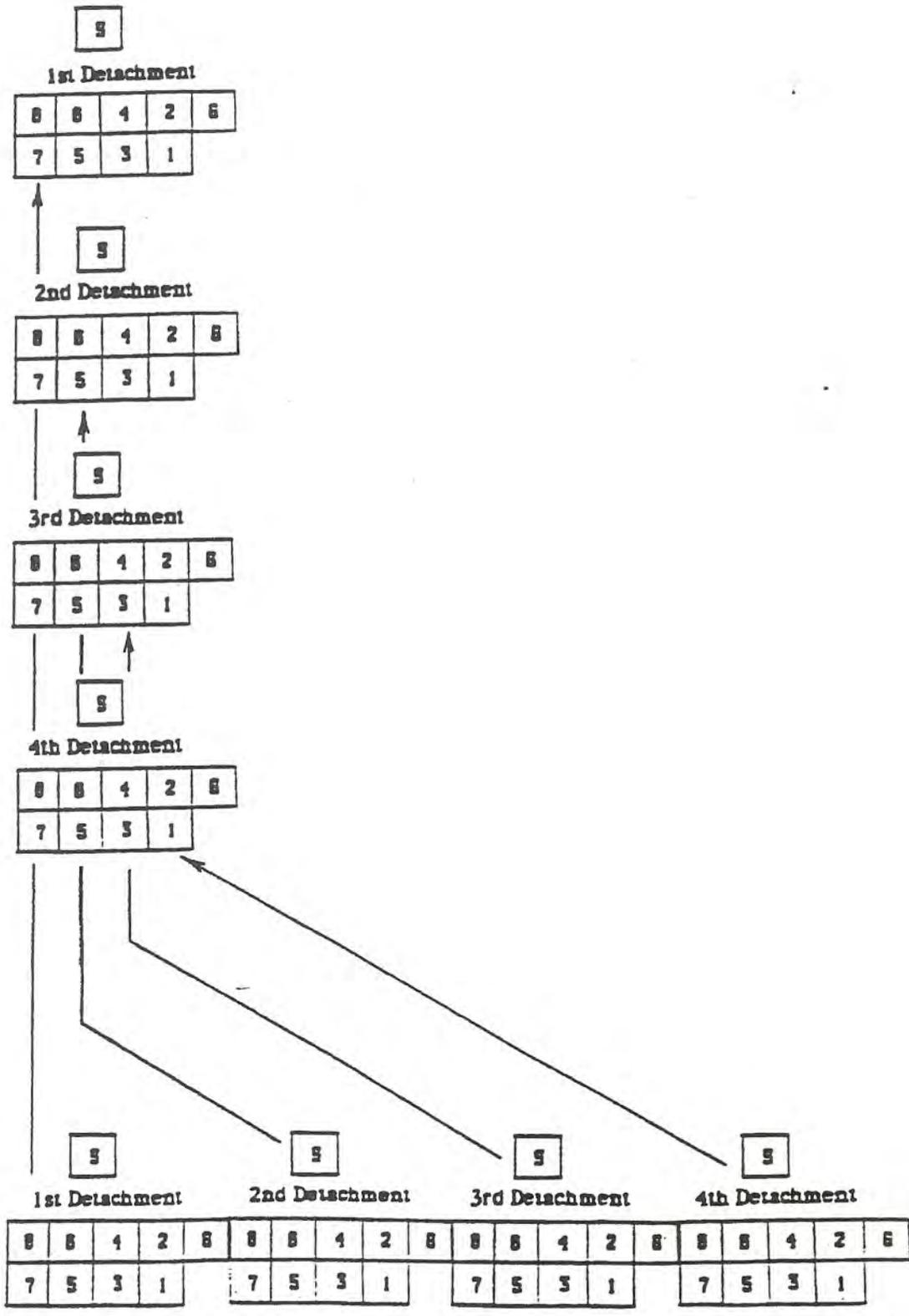
At the first command, the chief of piece (or gunner if the sergeant is absent) of each detachment steps briskly one yard to the front of the center of his detachment, his back to the detachment. He turns his head toward the right shoulder and commands:



Formation of the Battery by the First Sergeant
[FIGURE 3.11]



From Line to Column Breaking to the Right
[FIGURE 3.2]



From Line to Column Breaking to the Front

[FIGURE 3.3]

Left (or right) wheel...

Note: The command of execution, **March**, is given only by the instructor or battery commander. It is not repeated by the gunner. The detachment performs the wheel in accordance to the instruction in the School of the Detachment. Once the wheel has been completed, the instructor or battery commander could either give the command to halt or column, forward [FIGURE 3.2].

The second method is to form the column to the front, breaking from the right of left. The instructor or battery commander would command:

By detachments from the left, front into column... March!

At the first command, the chief of piece (or gunner if the sergeant is absent) of each detachment steps briskly one yard to the front of the center of his detachment, his back to the detachment. The chief of piece of the first detachment on the left would command:

Forward...

The other chiefs of piece would command:

Left oblique...

At the command **March**, the first detachment left would step off marching forward. The second and subsequent detachments would march on the oblique to the left until they are directly behind the first detachment. Once in position, the chief of piece would command **Forward** [FIGURE 3.3].

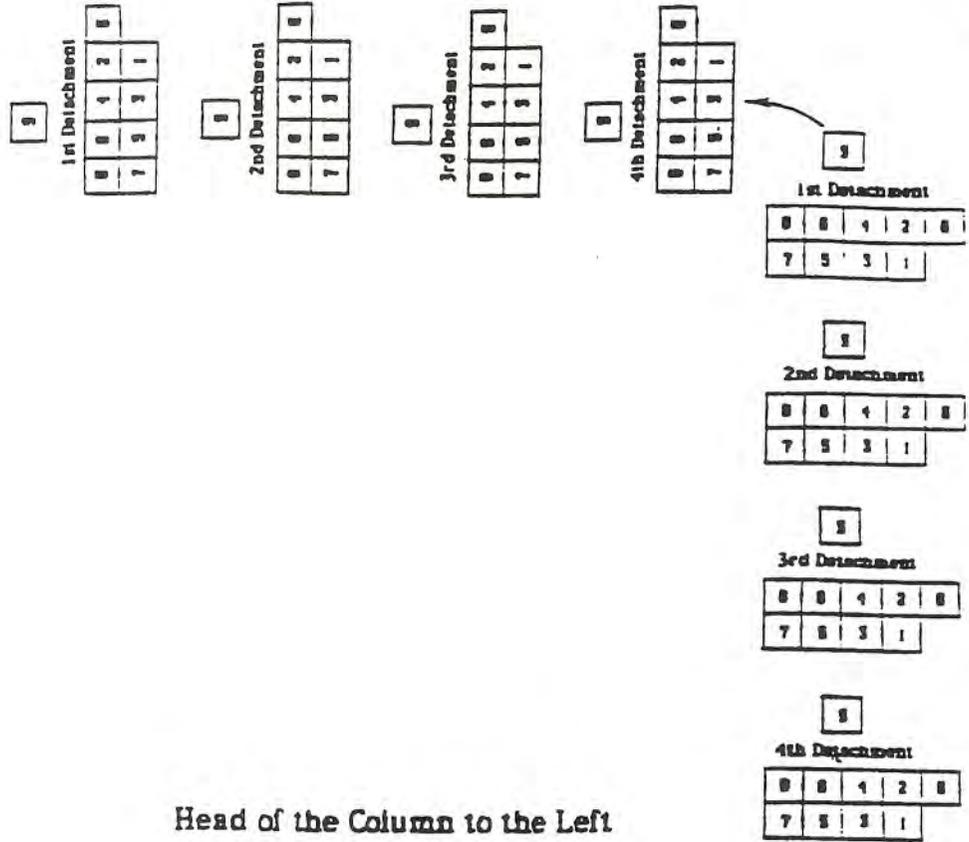
By detachments from the right, front into column is done in the same manner.

Wheels

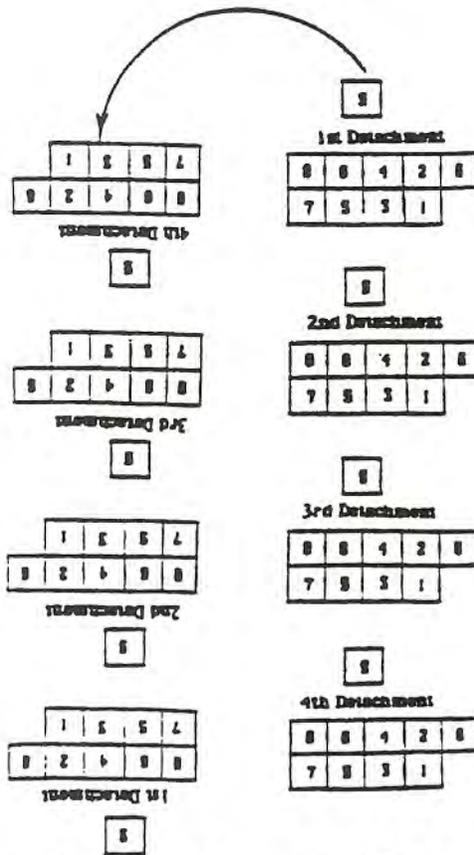
Wheels are used to change direction of the column while maintaining the same detachment in the front of the formation. They are executed in the same manner as in the School of the Detachment.

The column being at a halt or in march, to place it in position perpendicular to the existing front, the instructor commands:

Head of the column to the left (or right)... March!



Head of the Column to the Left
[FIGURE 3.4]



To Change Direction of March 180°

[FIGURE 3.5]

After the first command, the chief of piece of the lead detachment would command:

Left (or right) wheel...

On the command **March** issued by the instructor or battery commander, the first detachment performs the wheel in the direction indicated. The second and subsequent detachments continue marching forward until the chief of piece of each detachment reaches the position where the first command was issued [FIGURE 3.4]. The chiefs of piece would command:

Left (or right) wheel... March!

To start the movement forward again from a wheel, the instructor commands **Forward!** The leading detachment steps out forward, the other elements following.

The easiest way to reverse a column 180° is to give **Left (or Right) Wheel** and the command **Forward** at the desired point [FIGURE 3.5].

Being in Column to Form Line

There are three basic movements to go from a column into a line. The first two incorporates a wheel, the third uses an oblique. The first is to form a line to the left or right. The instructor or commander would command:

Left (or right) into line, wheel... March!

After the first command, all chief of piece would command:

Left (or right) wheel...

On the command **March**, all detachments would perform the wheel in the direction indicated. Once the wheels are completed, the commander could, either give:

Battery... Halt
or
Mark time... March.

With the latter, the battery should dress to the direction the wheel was performed [FIGURE 3.6].

The second method that incorporates a wheeling motion to the left or right varies from the first in that the wheel is done in succession. The effect is a "peeling off" of detachments from the front. The commander would issue the command:

On left (or right) into line... March!

(Note the difference in the preparatory command between the first and second method. The first has the word wheel at the end of the command, the second method begins with the word On and does not contain the word "wheel".)

At the first command, the chief of piece of the leading detachment commands:

Left (or right) wheel...

On the command **March** from the commander, the lead detachment performs the wheel in the direction indicated. The chief of piece marches the detachment forward until it un.masks the column, halts it, and commands:

Left (or right)... Dress!

and takes his place in line.

The other chiefs of piece wheel their detachments to the left (or right) as soon as they are opposite the right (or left) of the preceding one with the command:

Left (or right) wheel... March!

move them forward, halts them on the line, commands:

Left (or right)... Dress!

and take their place in line [FIGURE 3.7]. Once the battery is dressed, the commander would command:

Front!

The final movement is to form the line to the front of the column gaining ground to the left or right. To gain ground to the left [FIGURE 3.8], the commander would command:

Forward into line, left oblique... March!

At the first command, the leading chief of piece commands:

Forward...

and the others:

Left oblique...

At the command **March**, the leading detachment advances 18 yards, and is halted by the chief of piece, who commands:

Right... Dress!

and takes his place in line. The other detachments oblique until each is opposite its proper position, when its chief of piece commands:

Forward!

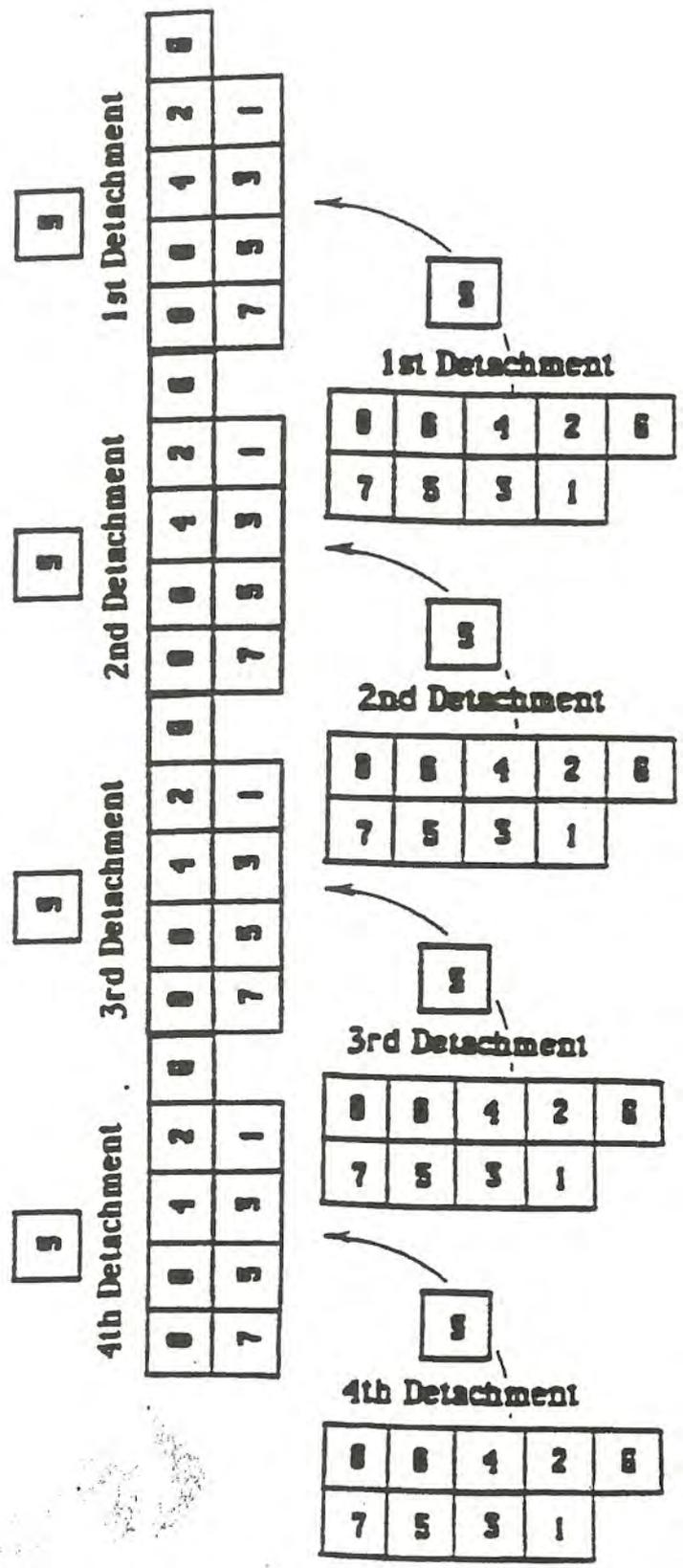
halts it abreast of the leading detachment, commands:

Right... Dress!

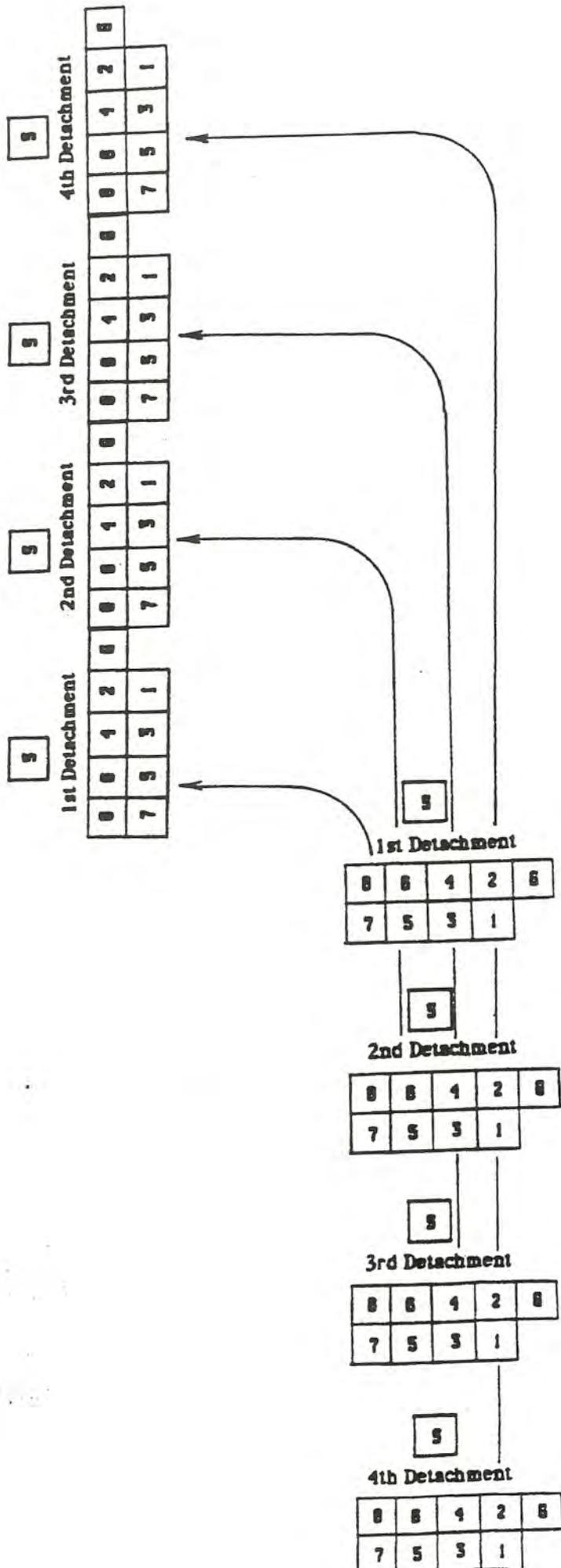
and takes his place in line. Once the battery is dressed, the commander would command:

Front!

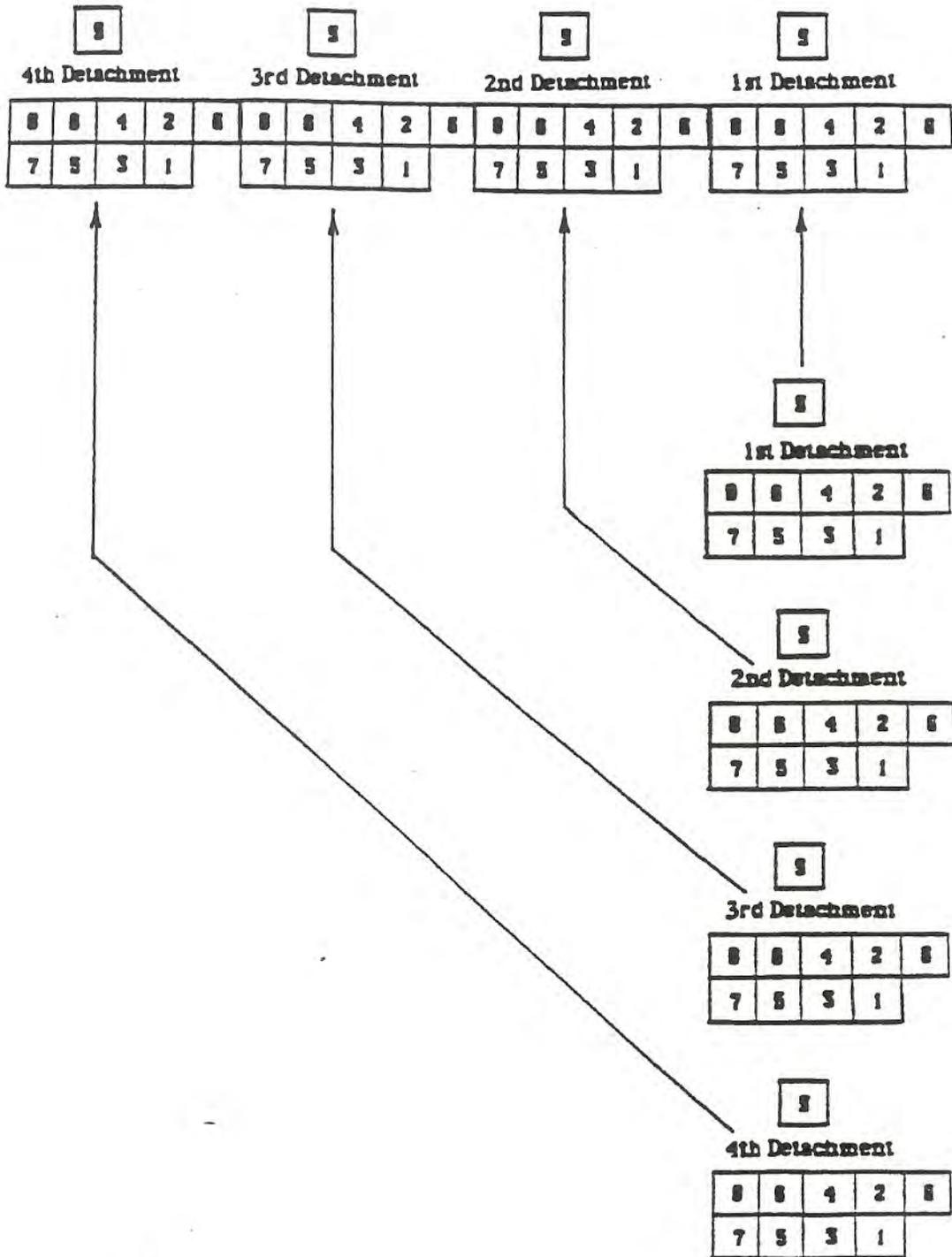
Forward into line, right oblique... March is performed in the same manner as above.



Left into Line, Wheel
[FIGURE 3.6]



On Left into Line
[FIGURE 3.7]



Forward into Line
 (FIGURE 3.8)

9.0 Breech Pressures . . .

The original 3 inch Ordinance Rifle firing a nine pound projectile with a full service load of 16 oz. was expected to generate pressure of 18,000 to 20,000 pounds per square inch in the breech area. Muzzle velocity was expected to be in the neighborhood of 950 feet per second. Remember: These pieces were designed without "safety factors" and were the limits of the piece. Exceeding the limit could cause structural damage to the tube and possible explosion of the piece on subsequent rounds.

The Matt Switlik conducted a test using the various types of black powder available today and published the results in an earlier issue of the *Artilleryman*. The results were obtained using a rifled 3" Ordinance Rifle. The table in the article have been consolidated for ease of comparison. (A total of twenty rounds were averaged to arrive at the figures for the 11 pound projectiles using GEOX, 10 pounds for the 9 pound projectiles using the Cannon GEOX, and 5 rounds for all other grades of powder.) Mr. Switlik emphasizes that **what is reported here is no way a recommendation for use.**

9.1 Results with Projectiles

3 " Ordinance Rifle

	Powder Charge Ounces	Average Projectile Weight Lbs/Oz	Average Internal Pressure Lbs/In2	Average Muzzle Velocity Ft/Sec
Cannon GEOX	16	11/5	18,762	898
Cannon GEOX	16	9/2	17,630	980
Fg Sporting	16	11/6	24,800	968
Pyrodex CTG	16	11/6	26,300	920
Class I Mil	16	11/6	21,300	904
2 FA	16	11/5	20,800	885
1 FA	16	11/6	13,500	810
Cannon GEOX	8	11/6	10,500	630
Fg Sporting	8	11/5	19,700	710
2 FA	8	11/4	10,500	620
1 FA	8	11/6	5,700	650
FG Sporting	8	4/8	8,500	990
Pyrodex CTG	8	4/8	6,500	975
lass I Mil	8	4/8	5,200	915

9.2 Results with Blanks

3" Ordinance Rifle

	Powder Charge Ounces	Wadding	Average Internal Pressure Lbs/In2
Fg Sporting	16	None	3,500
Fg Sporting	16	1 lb flour	7,500
FFg Sporting	16	None	5,200
Fg Sporting	8	1 lb flour	2,000
FFFg Sporting	10	None	2,800
FFFg Sporting	10	1 lb flour	3,800

The 4 most common artillery pieces used during the Civil War and by reenactors today are as follows:

1. M1857 12-pounder "Napoleon" – effective range using solid shot, exploding shell or case (shrapnel) was between 1600 and 2000 yards at a 5 degree elevation. Casualties incurred could range from 1-6 soldiers depending on how tightly packed the troops are. Effective range using 1 canister (27 balls per shot) was approximately 400 yards at a 0 degree setting. Canister rounds could cause anywhere from 4-10 casualties depending on how tightly formed the troops were. Double canister (54 balls per shot) was only used in dire situations when attacking infantry was within 100 yards of the piece and the gun risked being overrun. Double canister could shred units inflicting up to 15-20 casualties.
2. M1835 12-pounder Mountain Howitzer – effective range using solid shot, exploding shell or case (shrapnel) was approximately 1000 yards at a 5 degree elevation. Casualties incurred could range from 1-6 soldiers depending on how tightly packed the troops are. Effective range using 1 canister (27 balls per shot) was approximately 400 yards at a 0 degree setting. Canister rounds could cause anywhere from 4-10 casualties depending on how tightly formed the troops were. Double canister (54 balls per shot) was only used in dire situations when attacking infantry was within 100 yards of the piece and the gun risked being overrun. Double canister could shred units inflicting up to 15-20 casualties.
3. 10-pounder Parrott rifle – effective range using solid shot, exploding shell or case (shrapnel) was approximately 1850 yards at a 5 degree elevation. Casualties incurred could range from 1-6 soldiers depending on how tightly packed the troops are. Effective range using 1 canister (27 balls per shot) was approximately 400 yards at a 0 degree setting. Canister rounds could cause anywhere from 4-10 casualties depending on how tightly formed the troops were. Double canister (54 balls per shot) was only used in dire situations when attacking infantry was within 100 yards of the piece and the gun risked being overrun. Double canister could shred units inflicting up to 15-20 casualties.
4. 3-inch Ordnance Rifle - effective range using solid shot, exploding shell or case (shrapnel) was approximately 1850 yards at a 5 degree elevation. Casualties incurred could range from 1-6 soldiers depending on how tightly packed the troops are. Effective range using 1 canister (27 balls per shot) was approximately 400 yards at a 0 degree setting. Canister rounds could cause anywhere from 4-10 casualties depending on how tightly formed the troops were. Double canister (54 balls per shot) was only

used in dire situations when attacking infantry was within 100 yards of the piece and the gun risked being overrun. Double canister could shred units inflicting up to 15-20 casualties.

Supplemental Information:

Ammunition

Ammunition came in wide varieties, designed to attack specific targets. A typical Union artillery battery (armed with six 12-pounder Napoleons) carried the following ammunition going into battle: 288 shot, 96 shells, 288 spherical cases, and 96 canisters. ^[11]

Shot (or bolt)

Shot was a solid projectile that included no explosive charge. For a smoothbore, the projectile was a round "cannonball". For a rifled gun, the projectile was referred to as a **bolt** and had a cylindrical or spherical shape. In both cases, the projectile was used to impart kinetic energy for a battering effect, particularly effective for the destruction of enemy guns, limbers and caissons, and wagons. It was also effective for mowing down columns of infantry and cavalry and had psychological effects against its targets. Despite its effectiveness, many artillerymen were reluctant to use solid shot, preferring the explosive types of ordnance. With solid projectiles, accuracy was the paramount consideration, and they also caused more tube wear than their explosive counterparts.

Shell

Shells included an explosive charge and were designed to burst into a number of irregular fragments in the midst of enemy infantry or artillery. For smoothbores, the projectile was referred to as "spherical shell". Shells were more effective against troops behind obstacles or earthworks, and they were good for destroying wooden buildings by setting them on fire. A primary weakness of shell was that it typically produced only a few large fragments, with fragment count increasing with caliber of the shell.

Spherical shell used time fuses, while rifled shell could be detonated on impact by percussion fuses. Fuse reliability was a concern; any shell that buried itself into the earth before detonating had little anti-personnel effectiveness.

Case (or shrapnel)

Case shot (or "spherical case" for smoothbores) were anti-personnel projectiles carrying a

smaller burst charge than shell, but designed to be more effective against exposed troops. While shell produced only a few large fragments, case was loaded with lead or iron balls and was designed to burst above and before the enemy line, showering down many more small but destructive projectiles on the enemy. The effect was analogous to a weaker version of canister. With case the lethality of the balls and fragments came from the velocity of the bursting projectile itself—the small burst charge only fragmented the case and dispersed the shrapnel. The spherical case used in a 12-pounder Napoleon contained 78 balls. The name shrapnel derives from its inventor, Henry Shrapnel.

The primary limitations to case effectiveness came in judging the range, setting the fuse accordingly, and the reliability and variability of the fuse itself.

Canister

Canister shot was the deadliest type of ammunition, consisting of a thin metal container loaded with layers of lead or iron balls packed in sawdust. Upon exiting the muzzle, the container disintegrated, and the balls fanned out as the equivalent of a shotgun blast. The effective range of canister was only 400 yards (370 m), but within that range dozens of enemy infantrymen could be mowed down. Even more devastating was "double canister", generally used only in dire circumstances, where two containers of balls were fired simultaneously.

Cole, Philip M. *Civil War Artillery at Gettysburg*. New York: Da Capo Press, 2002. ISBN 0-306-81145-6.

The principal guns widely used in the field are listed in the following table.

Field artillery weapons								
Name	Tube	Projectile (lb)	Charge (lb)	Velocity (ft/s)	Range (yd at 5°)			
	Material	Bore (in)	Len (in)	Wt (lb)				
M1857 12-pounder "Napoleon"	bronze	4.62	66	1,227	12.3	2,500	1,440	1,619

M1835 12-pounder Mountain Howitzer	bronze	4.62	53	788	8.9	.05	1,054	1,005
10-pounder Parrott rifle	iron	2.9 or 3.0	74	890	9.5	1.00	1,230	1,850
3-inch Ordnance Rifle	wrought iron	3.0	69	820	9.5	1.00	1,215	1,830

The effective range decreases each degree the barrel is dropped so that at 0 degrees, the effective range might be reduced 2/3.

Testimonials:

The Effects of Artillery Fire

The following excerpts are not for the squeamish. They are included at the Civil War Artillery site because we believe it is important to remember that the artillery was not created as an abstraction for our study, but as an instrument of war. War means fighting, and fighting means killing.

Death Four Ranks Deep

As we returned a Yankee battery of eight guns had full play on us in the field, and our line became a little confused; we halted, every man instantly turned and faced the battery. As we did so, I heard a thud on my right, as if one had been struck with a heavy fist. Looking around I saw a man at my side standing erect, with his head off, a stream of blood spurting a foot or more from his neck. As I turned farther around, I saw three others lying on the ground, all killed by this cannon shot. The man standing was a captain in the 42nd Va. Regt., and his brains and blood bespattered the face and clothing of one of my company, who was standing in the rear. This was the second time I saw four men killed by one shot. The other occurred in the battle of Cedar Run, a few weeks earlier. Each time the shot struck as it was descending - the first man had his head taken off, the next was shot through the breast, the next through the stomach, and the fourth had all his bowels torn out.

From the diary of Pvt. John H. Worsham, 21st Va.

"A Cannonball in the Wilderness"

At one point," remembered Oliver Wendell Holmes, Jr., a young Sixth Corps aide, "General Sedgwick's . . . headquarters were very accurately shelled from the left - one struck within a yard of quite a number of

us who were sitting on horseback & bounced under the horses." Another staff aide, Thomas Hyde, was standing near the corps commander when a stray cannonball decapitated a New Jersey private a few yards away. The bloody head struck Hyde full in the face, momentarily blinding him and filling his mouth with brains and gore. Friends moved to help the shaken aide to his feet, finding to their astonishment that he was otherwise untouched. "I was not much use as a staff officer for fully fifteen minutes," Hyde later recalled with a shudder.

Noah Andre Trudeau, *Bloody Roads South*, page 66.

Col. Wise on the Effect of Artillery

"We often hear the sneering criticism that at such and such a battle but 1 or 2 per cent of the enemy's loss was due to the fire of artillery. Any such test is entirely erroneous. Not only do the guns exert a tremendous moral effect in support of their infantry, and adverse to the enemy, but they do far more. They often actually preclude heavy damage from the enemy by preventing him from essaying an assault against the position the guns occupy. Then, again, by forcing the enemy to seek cover, they eliminate their antagonists to that extent...Let us hear no more of artillery efficiency as measured by the number of its victims."

Paddy Griffith, *Battle Tactics of the Civil War*, 1989, p.171

Jan. 5, 1863: The Aftermath of Murfreesboro

.....Nationals and Confederates, young, middle-aged, and old, are scattered over the woods and fields for miles. Poor Wright, of my old company, lay at the barricade in the woods which we stormed on the night of the last day. Many others lay about him. Further on we find men with their legs shot off; one with brains scooped out with a cannon ball; another with half a face gone; another with entrails protruding; young Winnegard, of the 3rd, has one foot off and both legs pierced by grape at the thighs; another boy lies with his hands clasped above his head, indicating that his last words were a prayer. Many Confederate sharpshooters lay behind stumps, rails, and logs shot in the head. A young boy, dressed in the Confederate uniform, lies with his face turned to the sky, and looks as if he might be sleeping. Poor boy! what thoughts of home, mother, death, and eternity, commingled in his brain as the life-blood ebbed away! Many wounded horses are limping over the field. One mule, I heard of, had a leg blown off on the first day's battle; next morning it was on the spot where first wounded; at night it was still standing there, not having moved an inch all day, patiently suffering, it knew not why nor for what.

John Beatty, *The Citizen Soldier or, Memoirs of a Volunteer*, 1879, p.211

"We bury our dead"

At five p.m., Bate led the six hundred men of the 37th GA, 20th TN, and the 4th GA Battalion of

Sharpshooters into the Poe field. For an instant, perhaps, the Confederates could see in the fading daylight the black outline of cannon barrels trained on them from across the field. Then came the brilliant orange flashes, followed by the report of twenty guns simultaneously, and the field was blanketed in smoke and blood. Bate's horse was torn to pieces by canister. The Tennessean mounted another and kept on. It too was cut down. Both regimental commanders were struck and Maj. T.D. Caswell fell at the head of his sharpshooters, nearly half of whom were killed or wounded. For three, maybe four minutes, the Confederates withstood the pounding. Men fell at the rate of nearly one every second. Finally, after 180 had been hit, Bate led the rest back into the woods. Ambrose Bierce watched the slaughter from behind the batteries: "Nothing could be heard but the infernal din of their discharge, and nothing seen through the smoke but a great ascension of dust from the smitten soil. When all was over and the dust cloud had lifted, the spectacle was too dreadful to describe. The Confederates were still there -- all of them, it seemed -- some almost under the muzzles of the guns. But not a man of all those brave fellows was on his feet, and so thickly were all covered with dust that they looked as if they had been reclothed in yellow. 'We bury our dead,' said a gunner grimly."

Peter Cozzens, *This Terrible Sound: The Battle of Chickamauga*, 1992, pp.256-257.

[Canister is packed in sawdust; the resulting smoke is bright yellow and even thicker than the clouds of smoke from the black powder charges.]

**ARMIES OF TENNESSEE
ARTILLERY SAFETY INSPECTION**

EVENT _____ DATE _____ TIME _____
UNIT NAME _____ SERVICE (US/CS) _____
UNIT CMNDR _____ CHIEF OF PIECE _____
TYPE OF GUN _____ BORE SIZE (IN.) _____ CHARGE (OZ.) _____
GUN NO. ASSIGNED _____ BATTERY ASSIGNED _____

GUN INSPECTION

Gun Tube

- Tube clean and free of rust/corrosion
- No apparent defects (cracks, bulges)
- Bore appears smooth
- No damage to bore (lodgments, bulges)
- Liner (if any) secure
- Vent clear and correct size (not over .25")
- Trunions correct (no bends or cracks)
- Trunion caps snug and keyed
- Tube rotates freely on trunions

Carriage and Limber

- Wheels tight and free of rot / infestation
- Wheels greased and move freely
- All wood free of rot / infestation
- Lynch pins not gouging wheel hubs
- No parts missing, cracked or broken
- Elevation screw works properly
- All ironwork tight
- Limber lid fits securely, locks

Comments

Inspecting Officer

EQUIPMENT AND DRILL INSPECTION

Equipment

- Sponge bucket
- Two sponges in good condition, fit bore
- Rammer head tight
- Worm prongs sharp and unbent
- 2 pairs heavy gloves (1&2)
- Thumb stall or heavy glove
- Lanyard appropriate length
- Gimlet / other extraction tool
- Vent brush
- Limber interior free of loose powder
- Gunner haversack free of loose powder

Drill

- Satisfactory normal operation
- Satisfactory misfire operation
- Satisfactory vent and tube flood drill
- No. 1 & 2 use coats and gloves
- Hearing protection
- Crew age appropriate (minimum ages -
1&2 = 18 yrs, 3&4 = 16 yrs, 5-7 = 14 yrs)

Comments

Battery Commander
