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ARTILLERY TACTICS

UNITED STATES ARMY,

ASSIMILATED TO THE

TACTICS OF INFANTRY AND CAVALRY.

NEW YORK:
D. APPLETON AND COMPANY,
1, 3, AND 5 BOND STREET.
1889.
HEADQUARTERS OF THE ARMY,
WASHINGTON, July 17, 1873.

GENERAL ORDERS, No. 6.

The following order, received from the War Department, is published for the information and guidance of the Army:

WAR DEPARTMENT,
WASHINGTON CITY, July 17, 1873.

The revision of Upton’s Infantry Tactics by the author, and the Tactics for Artillery and Cavalry [including the proceedings of the Board—Major-General Schofield, President—Instituted by General Orders No. 60, Headquarters of the Army, Adjutant-General’s Office, series of 1869], assimilated to the Tactics for Infantry, pursuant to instructions from the General of the Army, by—

Lieutenant-Colonel Emory Upton, 1st Artillery, Instructor of Tactics, U. S. Military Academy;

Captain Henry A. Du Pont, 5th Artillery, commanding Battery “F,” 5th Artillery;

Captain John E. Tourtelotte, 7th Cavalry, Colonel and Aide-de-Camp to the General;

Captain Alfred E. Bates, 2d Cavalry, Assistant Instructor of Cavalry Tactics, U. S. Military Academy;

having been approved by the President, are adopted for the instruction of the Army and Militia of the United States.

To insure uniformity, all exercises, evolutions, and ceremonies not embraced in these Tactics are prohibited, and those therein prescribed will be strictly observed.

WM. W. BELKNAP,
Secretary of War.

By command of General Sherman.

WILLIAM D. WHIPPLE,
Assistant Adjutant-General.
ARTILLERY TACTICS.

1. The movements explained in the following system of Artillery Tactics are confined as nearly as possible to those finding practical application in war.

2. Except in particular cases, the commands of the instructor will be given for the execution of the movements toward both the right and left flanks; the movements, however, will be explained toward but one flank, it being only necessary to substitute the word left for right, or the reverse, to have the explanation of the corresponding movements toward the other flank.

3. All movements which are not prescribed from a halt, or on the march, may be executed either at a halt or marching.

4. All movements on foot, not specially excepted, may be executed in double time. If the movement be from a halt, or when marching in quick time, the command double time precedes the command march; if marching in double time, the command double time is omitted.

5. All mounted movements not specially excepted, may be executed at a trot or gallop. To execute a movement
at a trot or gallop, when not marching at these gaits, the command trot or gallop precedes the command march; if marching at a trot or gallop, to execute a movement at the same gait, the command trot or gallop is omitted.

6. In mounted movements, the gait should be increased progressively, the trot being executed from a walk, and the gallop from a trot. When marching at a gallop, the gait will be decreased to the trot, and then to the walk, before halting; when marching at a trot the same rule applies, halting from a trot being considered an exceptional movement.

7. In those movements where the guide may be either right or left, the words "right or left," in the commands, are in parenthesis.

8. When for purposes of instruction any movement is divided into motions, or executed in detail, the last syllable of the command determines the prompt performance of the first motion, and the commands, Two, Three, etc., that of the other motions.

9. To execute movements in detail, the instructor first commands: By the numbers; all movements divided into motions are then executed as above explained until he commands: Without the numbers.

Commands.

10. There are two kinds.

The preparatory command, such as forward, which indicates the movement that is to be executed.

The command of execution, such as March, or Halt, or, in the manual of arms, the part of the command which causes the execution.

The preparatory commands are distinguished by italics, those of execution by small capitals.
The tone of command is animated, distinct, and of a loudness proportioned to the number of men under instruction.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a tone firm and brief.

In mounted movements, the preparatory commands are more or less prolonged to insure their being heard; the command of execution is always prolonged.

The trumpet will be used for giving commands whenever it can be done to advantage.
11. The object of this school being the individual and progressive instruction of recruits, the instructor never requires a movement to be made until he has fully explained and executed it. He accustoms the recruit to take by himself the proper position, rectifies it when necessary, and sees that no movements are performed carelessly, or with undue haste.

Each movement should be understood before passing to another. After they have been properly executed, in the order laid down, the instructor no longer confines himself to that order; on the contrary, he changes it, that he may judge of the intelligence of the men.

Position of the soldier.

12. Heels on the same line, and as near each other as the conformation of the man permits.

The feet turned out equally, and forming with each other an angle of about sixty degrees.

The knees straight, without stiffness.

The body erect on the hips, inclining a little forward.

The shoulders square, and falling equally.

The arms hanging naturally.

The elbows near the body.

The palms of the hands turned slightly to the front, the little fingers behind the seams of the trousers.

The head erect and square to the front.

The chin slightly drawn in, without constraint.

The eyes straight to the front, and striking the ground at about the distance of fifteen yards.
Remarks on the position of the soldier.

Heels on the same line. If one be in rear of the other, the shoulder on that side will be thrown back, and the position constrained.

Heels more or less closed. Men who are knock-kneed, or who have legs with large calves, cannot, without constraint, make their heels touch while standing.

Feet turned out equally, and not forming too large an angle. If one foot be turned out more than the other, the shoulders will be deranged, and, if both feet be too much turned out, it will be impossible to incline the upper part of the body forward without making the whole position unsteady.

Knees straight, without stiffness. If stiffened, constraint and fatigue will be unavoidable.

Body erect on the hips. This gives equilibrium to the position. The instructor will observe that many recruits have the bad habit of dropping a shoulder, or advancing a hip. These defects he will labor to correct.

Upper part of body inclining forward. Recruits are commonly disposed to the reverse, to project the belly and throw back the shoulders, which causes great inconvenience in marching. The habit of inclining forward the upper part of the body is so important to contract, that the instructor must enforce it from the beginning, particularly with recruits who have naturally the opposite tendency.

Shoulders square. If the shoulders be advanced beyond the line of the breast, and the back arched (the defect called round-shouldered), the man cannot align himself nor use his arms with address. Unless the coat fits easily about the shoulders and armpits, it will be difficult to correct this defect. The shoulders must not be thrown to
SCHOOL OF THE SOLDIER DISMOUNTED.

far back, as this will make the belly project, and curve the small of the back.

Arms hanging naturally; elbows near the body; palms of the hands turned slightly to the front; little fingers behind the seams of the trousers. These positions prevent the men from occupying unnecessary space in the ranks, and keep in the shoulders.

Head erect and square to the front; chin slightly drawn in, without constraint. If there be stiffness in these positions, it will be communicated to the upper part of the body, embarrass its movements, and give pain and fatigue.

Eyes straight to the front. This is the surest way of maintaining the shoulders in a line—an essential object to be insisted upon and attained.

To rest and dismiss the squad.

13. The instructor lets the men rest from time to time. For this purpose he commands: 1. Squad, 2. Rest.

At the command rest, the recruit is no longer required to preserve immobility, silence, or to remain strictly in his place. If the instructor commands, 1. In place, 2. Rest, the recruit is not required to preserve immobility or silence, but must always keep one of his heels in place.

14. To resume the attention, the instructor commands: 1. Squad, 2. Attention; at the second command, the recruit takes his position, remains motionless and fixes his attention.

15. To dismiss the squad, the instructor commands: 1. Break ranks, 2. March.

16. The following movements should be taught to not more than four recruits at a time, who at first are placed in single rank, two yards apart, and without arms.
Setting up.

17. As the importance of setting up cannot be overestimated, the following exercises must be often recurred to, and all soldiers will be frequently practised therein.

The instructor commands:

1. **First, 2. Exercise.**

Bring the hands to the front till the little fingers meet nails downward, arms horizontal. (Two.) Raise the hands in a circular direction over the head, the ends of the fingers touching, and pointing downward so as to touch the top of the forage-cap, thumbs pointing to the rear, the shoulders kept down, elbows pressed back. (Three.) Extend the arms upward to the full length, the palms of the hands touching; then force them obliquely back, and gradually let them fall to the position of the soldier.

1. **Second, 2. Exercise.**

Raise the arms from the sides, extended to their full length, till the hands meet above the head, palms of the hands to the front, fingers pointing upward, thumbs locked, right thumb in front, the shoulders pressed back. (Two.) Bend over till the hands, if possible, touch the ground, keeping the arms and knees straight. (Three.) Resume the position of the soldier.

1. **Third, 2. Exercise.**

Extend the arms horizontally to the front, the palms of the hands touching. (Two.) Throw the arms extended, well to the rear, inclining slightly downward; at the same time raise the body upon the toes. (Three.) Resume the position of the soldier.

The first and second motions of this exercise should be continued by the commands, one, two—one, two, till the re-
recruits, if possible, are able to touch the hands behind the back.

1. Fourth, 2. Exercise.

Raise the arms laterally until horizontal, palms of the hands upward. (Two.) Swing the arms circularly, upward and backward, from front to rear. (Three.) Resume the position of the soldier.

As soon as the recruits understand the various exercises, they are continued without dwelling upon the numbers, the instructor prefacing the exercise by the command continue the motion, and giving the command three, for the conclusion.

**Eyes right or left.**

18. The instructor commands: 1. Eyes, 2. Right (or left), 3. Front.

At the command right, turn the head gently, so as to bring the inner corner of the left eye in a line with the buttons of the coat, the eyes fixed on the line of the eyes of the men in, or supposed to be in, the same rank.

At the command front, the head resumes the habitual position.

The instructor takes particular care that the movement of the head does not derange the squareness of the shoulders, which will happen if the movement of the former be too sudden.

**Salutes.**

19. The instructor commands: 1. Right (or left) hand, 2. Salute.

Raise the right hand smartly, pointing in the same direction as the right foot, the palm of the hand down, the thumb close to the forefinger, the arm extended, and horizontal. (Two.) Bring the hand around till the point of
the thumb and side of the forefinger touch the lower edge of the cap or visor, at the same time turn the head a little to the left, look toward the person to be saluted, and retain this position till the salute is acknowledged. (Three.) Bring back the hand and arm to the position of the first motion, at the same time cast the eyes to the front. (Four.) Drop the arm quickly by the side.

Facings.

20. To the right or left. The instructor commands: 1. Right (or left), 2. Face. At the command face raise the right foot slightly, face to the right, turning on the left heel, the left toe slightly raised; replace the right heel by the side of the left and on the same line.

The facings to the left are executed upon the same heel as the facings to the right.


At the command about, turn on the left heel, bring the left toe to the front, carry the right foot to the rear, the hollow opposite to and three inches from the left heel, the feet square to each other.

At the command face, turn on both heels, raise the toes a little, face to the rear, and when the face is nearly completed, raise the right foot and replace it by the side of the left.

Parade rest.

22. To give the men rest, imposing both steadiness of position and silence, the instructor commands: 1. Parade, 2. Rest.

Carry the right foot three inches directly to the rear, the left knee slightly bent; clasp the hands in front of the centre of the body, the left hand uppermost, the left thumb clasped by the thumb and forefinger of the right hand.
To resume the position of the soldier, the instructor commands: 1. *Squad*, 2. *Attention*.

*Direct step.*

23. The length of the direct step, in common and quick time, is twenty-eight inches, measured from heel to heel; the cadence is at the rate of ninety steps per minute for common time, and one hundred and ten steps for quick time.

24. The principles of the direct step are taught by means of the *balance-step*; during its execution the instructor requires the recruits to keep the body, shoulders, arms, and hands in the position of the soldier.


At the command *forward*, bend slightly the left knee, and carry the left foot, without jerk, about fourteen inches to the front, the knee straightening as the foot is brought forward, the toe turned out and slightly depressed, the sole of the foot about three inches from the ground, the body balanced firmly on the right foot, and inclining slightly forward.

At the command *rear*, carry the left foot, without jerk, to the rear, the knee slightly bent, the toe on a line with the right heel, and inclining slightly downward.

The steps may be continued by alternating the commands, *forward* and *rear*.

At the command *halt*, given after the command *rear*, plant the foot by the side of the other.

The balance-step with the right foot is similarly executed.


At the command *forward*, advance the left foot as previously explained, and at the command *ground*, plant
it without shock, the foot advancing as the weight of the body is brought forward, the left heel twenty-eight inches from the right; the right foot is then advanced without command to the position of forward, and similarly planted at the command ground.

The movement is continued by the command ground, until the command halt, when the foot in advance is planted, and the one in rear brought to the side of it.

The command ground is at first given in very slow cadence, to allow each recruit to balance himself on the foot that is planted, and is afterward gradually increased to common time.

To march in the direct step.


At the command forward, throw the weight of the body upon the right leg without bending the left knee.

At the command march, move the left leg smartly, but without jerk, carry the foot straight forward twenty-eight inches from the right, measuring from heel to heel, the sole near the ground, the toe a little depressed, the knee straight and slightly turned out; at the same time throw the weight of the body forward, and plant the foot without shock, the weight of the body resting upon it; next, in like manner, advance the right foot, and plant it as above; continue the march, without crossing the legs or striking one against the other, keeping the face direct to the front.

The instructor indicates from time to time the cadence of the step by calling, one, two, three, four; or left, right, the instant the left and right foot, respectively, should be planted.
27. To arrest the march, the instructor commands: 1. Squad, 2. Halt.

At the command halt, given the instant either foot is brought to the ground, the foot in rear is brought up and planted by the side of the other without shock.

Common time is used preparatory to instruction in quick time, and is also employed to correct defects when marching in quick time. In other cases it is used only when specially directed.

28. To march in quick time, the instructor commands: 1. Forward, 2. March.


**Short step.**


At the second command the length of the step is reduced to fourteen inches, the squad resuming the full step at the commands: 1. Forward, 2. March.

**To mark time.**


At the second command, given the instant one foot is coming to the ground, continue the cadence and make a semblance of marching, without gaining ground, by alternately advancing each foot about half its length, and bringing it back on a line with the other.

To resume the direct step, the instructor commands: 1. Forward, 2. March.
To change step.

At the command march, given the instant the right foot comes to the ground, the left foot is advanced and planted; the hollow of the right is then advanced against the heel of the left, the recruit again stepping off with the left.

The change on the right foot is similarly executed, the command march being given when the left foot strikes the ground.

Side step.

33. Being at a halt, the instructor commands: 1. Side step to the right (or left), 2. March.
At the command march, carry the right foot six inches to the right, keeping the knees straight and the shoulders square to the front; as soon as the right foot is planted, bring the left foot to the side of it, and continue the movement, observing the cadence, until the commands, 1. Squad, 2. Halt.

The side step is always executed in quick time unless common time be specified.

Back step.

At the command march, step off smartly with the left foot fourteen inches straight to the rear, measuring from heel to heel, and so on with the feet in succession till the commands, 1. Squad, 2. Halt.
At the command halt, bring back the foot in front to the side of the one in rear.
To march to the rear.

35. Being in march, the instructor commands: 1. To the rear, 2. March.

At the command march, given as the right foot strikes the ground, advance and plant the left foot; then turn on the balls of both feet, face to the right about, and immediately step off with the left foot.

The double step.

36. The length of the double step is thirty-three inches; the cadence is at the rate of one hundred and sixty-five steps per minute.

To teach the principles of the double step, the instructor commands: 1. Double step, 2. March.

At the first command, raise the hands till the forearms are horizontal, fingers closed, nails toward the body, elbows to the rear.

At the command march, raise the left leg to the front, bending and elevating the knee as much as possible, the part of the leg between the knee and instep vertical, the toe depressed; replace the foot in its former position, and execute the same movement with the right leg.

The instructor, placing himself seven or eight yards in front of the recruit and facing him, indicates the cadence by the commands, one, two, given alternately as the left and right foot touch the ground, beginning at common time, and increasing gradually to double time. The alternate movement of the feet is continued till the commands, 1. Squad, 2. Halt.

At the command halt, bring the foot, which is raised, by the side of the other, drop the hands, and resume the position of the soldier.

37. The recruit being established in the principles of the

At the command *forward*, throw the weight of the body on the right leg; at the second command, raise the hands till the forearms are horizontal; at the command *march*, carry forward the left foot, the leg slightly bent, the knee somewhat raised, and plant the foot, the toe first, thirty-three inches from the right; then execute the same motion with the right foot; continue this alternate movement of the feet, throwing the weight of the body upon the foot in advance and allowing a natural swinging motion to the arms.

The double step under urgent circumstances may be increased to one hundred and eighty steps per minute. At this rate a mile can be passed over in ten or eleven minutes. The recruits are also exercised in running, the principles being the same as for double time.

In marching in double time and at the run, the men breathe as much as possible through the nose, keeping the mouth closed; experience has proved that, by conforming to this principle, men can go much farther with less fatigue.

38. When the recruits are well instructed in the foregoing principles, they are formed in larger squads, in single rank, elbow to elbow, to teach them the principles of alignment, marching with a guide, wheeling and turning.

**Alignments.**

39. The instructor first teaches the recruits to align themselves man by man, the better to comprehend the principles of alignment; to this end, he advances the two men on the right, three or more yards, and having aligned them, commands: 1. *By file*, 2. *Right* (or *left*), 3. *Dress*, 4. *Front*. 

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At the command dress, the recruits move up successively, in quick time, shortening the last step so as to find themselves about six inches behind the alignment, each recruit then moves on the line, which must never be passed, taking steps of two or three inches, casting his eyes to the right so as to see the coat-buttons of the second man from him, keeping his shoulders square to the front, and touching with his elbow that of the man on the right without opening his arms.

At the command front, given when the rank is well aligned, the recruits cast their eyes to the front and remain firm.

The recruits having learned to align themselves man by man, the instructor next aligns the squad by the commands, 1. Right (or left), 2. Dress, 3. Front.

At the command dress, the entire rank, except the men established as a basis, moves forward, and dresses up to the line, as previously explained. The instructor verifies the alignment by placing himself outside the right flank, and orders forward or back such files as may be in rear or in advance of the line; this done, he commands, front.

40. Alignments to the rear are executed on the same principles, the recruits stepping back a little beyond the line, and then dressing up, by short steps of two or three inches. The commands are: 1. By file, right (or left) backward, 2. Dress, 3. Front; or, 1. Right (or left) backward, 2. Dress, 3. Front.

To march in line.

41. The squad being correctly aligned, the instructor places a well-instructed man on the side on which the guide is to be, and commands: 1. Forward, 2. Guide, (right or left), 3. March.

At the command march, the recruits step off smartly
with the left foot, the guide marching straight to the front.

The instructor observes, in marching in line, that the men touch lightly the elbow toward the side of the guide; that they open out neither arm; that they yield to pressure coming from the side of the guide, and resist pressure coming from the opposite direction; that, shortening or lengthening the step, they gradually recover the alignment and touch of the elbow, if lost, and that they keep the head direct to the front, no matter on which side the guide may be.

The impulsion of the quick step having a tendency to make men too free and easy in their movements, the instructor impresses it upon them that the alignment can only be preserved in marching, by the uniformity of the step, both in length and swiftness, by the touch of the elbow, and the maintenance of the shoulders square with the line of direction.

To march by the flank.

42. Being at a halt, the instructor commands: 1. Right (or left) 2. Face, 3. Forward, 4. March.

If in march, the instructor commands: 1. By the right (or left) flank, 2. March.

At the command march, given as the right foot strikes the ground, advance and plant the left foot, then turn to the right and step off in the new direction with the right foot.

43. In the march by the flank the recruits cover each other, and keep closed to facing distance, that is, to such distance that in forming line the elbows will touch.

The march by the flank is habitually executed in quick time; if necessary to march in double time, the distance is increased to thirty-two inches.
44. A single rank faced to the right or left is called a column of files.

45. To halt the column of files, the instructor commands:
1. Squad, 2. Halt; and, to face it to the front, 3. Left (or right), 4. Face.

Marching in column of files, to march in line, the instructor commands: 1. By the right (or left) flank, 2. March, 3. Guide (right or left).

To change direction in column of files.

46. Being in march, the instructor commands: 1. Column right (or left); or, 1. Column half right (or half left), 2. March.

At the command march, the leading file faces to the right, or half right, and is followed by the other files, who face on the same ground.

To oblique.

47. The recruits being well established in the principles of the direct march, are exercised in marching obliquely. The squad marching in line, the instructor commands: 1. Right (or left) oblique, 2. March.

At the command march, each man makes a half face to the right, and then marches straight in the new direction. As the men no longer touch elbows, they glance along the shoulders of the nearest files, toward the side to which they are obliquing, and regulate their steps so that their shoulders are always behind those of the next man on that side, and that his head conceals the heads of the other men in the rank. The men preserve the same length of pace and the same degree of obliquity, the line of the rank remaining parallel to its original position.

To resume the original direction, the instructor commands: 1. Forward, 2. March.
At the command *march*, each man makes a half face to the left in marching, and then moves straight to the front.

If the squad be at a halt, the men half face to the right at the command *right oblique*, and step off at the command *march*; on taking the direct march, the guide is announced.

If halted while obliquing, the men, after halting, face to the front without further command.

48. In the oblique march in line, the guide is always, without indication, on the side toward which the oblique is made. On resuming the direct march, the guide is, without indication, on the side it was previous to the oblique. *This rule is general.*

49. The squad in column of files obliques by the same commands and means as when in line, the leading file being the guide.

*To march backward.*


At the command *march*, the men move to the rear, taking steps of fourteen inches.

The back step is only used to gain a few steps to the rear, and is always executed in quick time.

*To march to the rear.*


*To march in double time.*


*To pass from quick time to double time, and the reverse.*

At the command _march_, given when the left foot strikes the ground, advance the right foot in quick time, and step off with the left foot in double time.

To resume quick time, the instructor commands: 1. _Quick time_, 2. _March_.

At the command _march_, given as either foot is coming to the ground, the squad takes the quick step.

**Wheelings.**

54. A _wheel_ is a circular movement, by which the front of a squad, gun-detachment, battery, etc., is placed at right angles to its original position, or changed ninety degrees.

55. An _about_ is a circular movement, by which the front of a squad, gun-detachment, battery, etc., is placed facing to the rear, or changed one hundred and eighty degrees.

56. Wheelings are of two kinds: on _fixed_ and on _movable_ pivots.

_Wheeling on a fixed pivot._

57. Being at a halt, the instructor places a well-instructed man on the marching flank and commands: 1. _In circle, right (or left) wheel_, 2. _March_.

At the command _march_, the men, except the pivot-man, step off with the left foot, turning at the same time the head a little to the left, the eyes fixed on the line of the eyes of the men to their left; the pivot-man marks time strictly in his place, gradually turning his body, to conform to the movement of the marching flank; the man who conducts this flank takes steps of twenty-eight inches, and, from the first step, advances the left shoulder a little, casts his eyes along the rank, and feels lightly the elbow of the next man toward the pivot, but never pushes him.

The other men touch with the elbow toward the pivot, resist pressure from the opposite side, conform to the move-
ment of the marching flank, and shorten their steps according to their distance from it.

After wheeling around the circle several times, the instructor commands: 1. Squad, 2. Halt.

At the command halt, the rank halts, and no man stirs. The instructor, going to the flank opposite the pivot, places the two outer men in the direction he wishes to place the squad, leaving just sufficient space between them and the pivot to contain the other men, the pivot conforming to this direction. He then commands: 1. Left, 2. Dress, 3. Front.


At the second command, the squad wheels to the right as just explained; at the fourth command, given when the squad is nearly at right angles to its original position, it halts, and at the sixth command, given immediately after, dresses up to the perpendicular.

To wheel the squad and move forward, the instructor commands: 1. Right (or left) wheel, 2. March, 3. Forward, 4. March, 5. Guide (right or left). The command forward is given in time to add march the instant the wheel is completed; at which all the men take the step of twenty-eight inches, and turn their heads square to the front.


The command halt is given when the marching flank has nearly completed the half circle; or, if the squad moves forward, the command march is given the instant the about is completed.
Wheeling on a movable pivot.

60. Being in march, to change direction, the instructor commands: 1. Right (or left) wheel, 2. March, 3. Forward, 4. March.

The first command is given when the squad is three yards from the wheeling-point.

At the command march, the wheel is executed as on a fixed pivot, except that the pivot-man, instead of turning in his place, takes steps of nine inches, and thus gains ground forward in describing a small curve, so as to clear the wheeling-point.

The command forward is given in time to add march the instant the wheel is completed; at which all the men retake the step of twenty-eight inches, and turn their heads square to the front.

In wheeling in double time, the man on the pivot takes steps of eleven inches.

The radius of the circle described by the pivot-man increases with the size of the squad, and is equal to nearly one-half of the front of the squad or subdivision.

During the wheel, the guide, without indication, is on the marching flank; upon the completion of the wheel, the guide, if not already there, is announced on the same flank as before the movement.

61. Wheelings on fixed or movable pivots being important movements, the instructor requires the men successively to act as pivots, and to conduct the marching flank.

62. The wheelings are repeated in double time as soon as the squad is able to execute them properly in quick time.
63. The recruits are now placed in double rank, and the
movements heretofore taught in single rank are repeated.
64. The distance between ranks, from back to breast, is
\textit{facing distance}; but, on rough ground, and when marching
in double time, it is increased to thirty-two inches; upon
halting, the rear rank closes to facing distance.
65. In alignments in double rank, the rear-rank men cast
their eyes to the side of the guide with the front-rank
men, and maintain the proper distance between the
ranks.
66. The double rank, faced by the flank, is called a \textit{column of files}, the same as a single rank. In marching in
column of files, each rear-rank man dresses on his front-
rank man, who is the guide of the file.
67. In changing direction in column of files, each file
wheels on a movable pivot.
68. In obliquing in line in double rank, each rear-rank
man follows the man next on the right or left, or the sec-
ond man on the right or left, of his front-rank man, accord-
ing as the rear rank is at facing distance, or at thirty-two
inches from the front rank.
69. In obliquing in column of files, the guide of each file
is the man of the rank toward which the oblique is
made, the guide of the column being the guide of the
leading file.
MANUAL OF THE SABRE.

70. The instruction under this head is given to four or more men, placed in single rank.

71. On foot, the sabre is habitually hooked up: if the sabre be drawn, the scabbard is hooked up.

72. The instructor points out, and names, the different parts of the sabre and sabre-knot: SABRE; Hilt (gripe, guard); Blade (back, edge, point); Scabbard (bands, rings, springs); SABRE-KNOT (tassel, strap, sliding-loops).

73. The right and left sides of the gripe are the right and left sides in the position of carry.

74. The hand is in tierce when it holds the gripe, back of the hand up; in quarte, when it holds the gripe, back of the hand down.

To open and close files.


At the first command, the recruits face to the right; at the command march, the leading file steps off, followed in succession by the others at the specified interval; the command halt is given when the last file has its interval.

76. To close files, the instructor commands: 1. Right (or left) close files, 2. March, 3. Right (or left), 4. Dress, 5. Front.

At the first command, the file on the right stands fast;
the other files face to the right, and at the command march, step off, successively halting and facing to the left upon closing to facing distance; the commands for dressing are given when the last file faces to the front.

77. During the first lessons, the files are opened to one yard's interval.

The manual of the sabre is taught in the following order, and by the following commands.

1. Draw, 2. Sabre.

78. At the command draw, unhook the sabre with the thumb and first two fingers of the left hand, thumb on the end of the hook, fingers lifting the upper ring; pass the right hand through the sabre-knot, and push the sliding loop up to the wrist with the left hand; grasp the scabbard with the left hand at the upper band, bring the hilt a little forward, seize the gripe with the right hand, and draw the blade six inches out of the scabbard, pressing the scabbard against the thigh with the left hand. At the command sabre, draw the sabre quickly, raising the arm to its full extent, at an angle of about forty-five degrees, the sabre in a straight line with the arm, and make a slight pause: hook up the scabbard with the thumb and first two fingers of the left hand, thumb through the upper ring, fingers supporting it; and drop the left hand by the side; at the
same time, bring the back of the blade against the hollow of the shoulder, the blade vertical, the arm nearly extended, the left side of the gripe with the thumb against the thigh, the little finger on the back of the gripe. This is the position of carry sabre dismounted.


79. Carry the sabre vertically to the front, raising the hand as high as the neck, and six inches in front of it, edge to the left, the thumb extended on the back of the gripe, little finger by the side of the others.

Resume the carry.

1. Inspection, 2. Sabre.

80. Take the position of present sabre. (Two.) Turn the wrist outward to show the other side of the blade, the edge to the right; make a slight pause, and then turn the wrist back. (Three.) Resume the carry.

1. Return, 2. Sabre.

81. At the command return, take the position of present sabre; at the same time unhook and lower the scabbard with the left hand, and grasp it at the upper band. At the command sabre, carry the right hand opposite
and six inches from the left shoulder; lower the blade and pass it across and along the left arm, the point to the rear; turn the head slightly to the left, fixing the eyes on the opening of the scabbard, and insert the blade six inches in the scabbard. (Two.) Return the blade, and free the wrist from the sabre-knot; turn the head to the front and drop the right hand by the side; at the same time hook up the sabre with the left hand, turning the sabre toward the body, guard to the rear, and drop the left hand by the side.

To rest, and to dismiss the squad.

82. Sabres being returned, or at a carry, the squad is rested as previously explained.

Being at a carry, to rest, imposing steadiness of position and silence, the instructor commands: 1. Parade, 2. Rest.

At the command rest, take the position of parade rest, dropping the point of the sabre in front of the left foot.

83. To resume the attention, the instructor commands: 1. Squad, 2. Attention.

At the command attention, resume the position of the soldier and come to the carry.

84. To dismiss the squad, the instructor first causes sabres to be returned, and then commands: 1. Break ranks, 2. March.
SABRE EXERCISE.

85. The squad is armed only with the sabre, and placed in single rank.

The object of the moulins is to give suppleness to the wrist, which increases the dexterity and confidence of the men. Each lesson is begun and ended with the moulins, executed with a quickness proportioned to the progress of the men, remembering that force is less necessary than skill. In teaching the sabre exercise on foot, special reference must be had to its application when mounted. To this end, recruits are not to lean to one side, which would derange their seats on horseback; nor direct the blade so as to strike the head or haunches of the horse, or the knees of the rider.

All cuts, when not executed by the motions, are terminated by a half moulinet, so as to bring the sabre to the position of guard.

The thrust requires less force, and its result is more prompt, sure, and decisive, than the cut.

The sabre is held in the full grasp, and in all motions in the sabre exercise, except right point and rear point, the thumb is extended along the back of the gripe, and pressed against the guard. During the first lessons the instructor takes care to rest the men from time to time, and to always give his explanations when the squad is at a carry, only keeping the arms extended long enough to correct faults.

Position of guard.

86. The files being opened to at least three yards' interval, and the sabres at a carry, the instructor commands:
Guard.

Carry the right foot about two feet to the right, heels on the same line; place the left hand, closed, six inches from the body, and as high as the elbow, fingers toward the body, little finger nearer than the thumb (position of the bridle-hand); at the same time place the right hand in tierce in front of and a little higher than the right hip, thumb extended on the back of the gripe, little finger by the side of the others, the point of the sabre inclined to the left, and two feet higher than the hand, which grasps the sabre without constraint.

87. To return to the carry, the instructor commands: 1. Carry, 2. Sabre. At the command sabre, the recruits resume the position of the soldier, and come to the carry.
88. The sabre exercise is taught in the following order, and by the following commands, all the movements being executed from guard.

The moulinets.


89. Extend the arm obliquely to the left and front to its full length, the hand in tierce and as high as the eyes, the point of the sabre to the front, and a little higher than the hilt. (Two.) Lower the blade, edge to the front, and make rapidly a circle around the hand, to the left of and near the horse’s neck, the blade passing close to the left elbow; return to the first position. (Three.) Resume the guard.


90. Extend the arm to the front to its full length, the hand in quarte, and as high as the eyes, the point to the front, and a little higher than the hilt. (Two.) Lower the blade, edge to the front, make rapidly a circle around the hand, to the right of and near the horse’s neck, the blade passing close to the right elbow; return to the first position. (Three.) Resume the guard.
91. To combine the execution of the two preceding moulinets,


Execute the left moulinet; turn the wrist without pausing, and then execute the right moulinet.


92. Raise the arm to the right and rear to its full extent, the point of the sabre upward, the edge to the right, the body slightly turned to the right. (Two.) Begin by moving the point of the sabre toward the left, and describe a circle in rear. (Three.) Resume the guard.

93. In executing the moulinets, the right arm is kept as steady as possible in position, the sabre being controlled by motions of the wrist and hand.

When the men execute the moulinets well, the instructor requires them to execute several in succession without pausing, until the command guard.
The points.

1. **Tierce, 2. Point.**

94. Raise the hand in tierce as high as the eye; throw back the right shoulder, carrying the elbow to the rear, the point of the sabre to the front, the edge upward. (Two.) Thrust to the front, extending the arm to its full length, edge up. (Three.) Resume the guard.

1. **Quarte, 2. Point.**

95. Lower the hand in quarte near the right hip, the point a little higher than the wrist. (Two.) Thrust to the front, extending the arm to its full length. (Three.) Resume the guard.

1. **Left, 2. Point.**

96. Turn the head and shoulders to the left, draw back the hand in tierce toward the right and near the right shoulder, the hand at the height of the neck, the edge of the blade upward, the point to the left and as high...
as the hand. (Two.)
Thrust to the left, extending the arm to its full length.
(Three.) Resume the guard.

1. Right, 2. Point.

97. Turn the head to the right, carry the hand in quarte near the left breast, the edge of the blade upward, the point to the right and as high as the hand. (Two.) Thrust to the right, extending the arm to its full length. (Three.) Resume the guard.

1. Rear, 2. Point.

98. Turn the head and shoulders to the right and rear, bring the hand in quarte near the left breast, the point to the rear and as high as the hand, the edge upward. (Two.) Thrust to the rear, extending the arm to its full length. (Three.) Resume the guard.

1. Against infantry, 2. Left, 3. Point.

99. Same as left point, except the
point is downward. (Two.) Thrust down in tierce. (Three.) Return to the position of guard.

1. Against infantry, 2. Right, 3. Point.

100. Same as quarte point, turning the head and shoulders to the right, inclining the point downward. (Two.) Thrust in quarte. (Three.) Resume the guard.


101. Bend well down to the right, extend the right arm well downward, the hand in rear of the thigh, the back of the sabre upward. (Two.) Thrust forward. (Three). Resume the guard.

The cuts: 1. Front, 2. Cut.

102. Raise Against infantry, Front Point.
the sabre, the arm half extended, the hand in front of the right shoulder, and a little higher than the head, the edge upward, the point to the rear, and higher than the hand. (Two.) Cut, extending the arm to its full length. (Three.) Resume the guard.

103. The first position of front cut is the position of raise sabre.

Being at raise sabre, to carry sabre, the instructor commands: 1. Carry, 2. Sabre.

1. Left, 2. Cut.

104. Turn the head and shoulders to the left, raise the sabre, the arm extended to the right, the hand in quarte and as high as the head, the point higher than the hand. (Two.) Cut diagonally to the left. (Three.) Resume the guard.

1. Right, 2. Cut.

105. Turn the head to the right, carry the hand opposite
the left breast, the point of the sabre upward, the edge to the left. (Two.) Extend the arm quickly to its full length, and give a back-handed cut horizontally. (Three.) Resume the guard.

106. The left and right cuts are used against infantry, inclining the body forward, and cutting at the necessary angle.

1. **Rear**, 2. **Cut**.

107. Throw the right shoulder well back, and execute the first motion of right cut. (Two.) Extend the arm quickly to its full length, and give a back-handed cut horizontally to the rear. (Three.) Resume the guard.

1. **Left in quarte and tierce**, 2. **Cut**.

108. Execute the first motion of left cut. (Two.) Execute the second motion of left cut. (Three.) Turn the hand in tierce and cut horizontally. (Four.) Resume the guard.

1. **Right in tierce and quarte**, 2. **Cut**.

109. Execute the first motion of right cut. (Two.) Execute the second motion of right cut. (Three.) Turn the hand in quarte, and cut horizontally. (Four.) Resume the guard.

1. **Rear in tierce and quarte**, 2. **Cut**.

110. Execute the first motion of rear cut. (Two.) Execute the second motion of rear cut. (Three.) Turn the hand in quarte, and cut horizontally. (Four.) Resume the guard.
The parries.
1. Tierce, 2. Parry.
111. Carry the hand quickly a little to the right, point of the sabre as high as the eyes, and opposite the right shoulder, edge to the right. (Two.) Resume the guard.

1. Quarte, 2. Parry.
112. Turn the hand in quarte, and carry it opposite the left breast, edge of the blade to the left, point to the front, as high as the eyes, and a little to the left of the left shoulder. (Two.) Resume the guard.

1. Left, 2. Parry.
113. Raise the hand above and six inches in front of the eyes, the elbow somewhat bent, edge of the blade to the left, point downward, and parry the blow aimed at the left side. (Two.) Resume the guard.

1. Left head, 2. Parry.
114. Raise the sabre quickly above the head, the right arm
vertical, edge upward, point to the left and about twelve inches below the guard. (Two.) Resume the guard.

1. Right head, 2. Parry.

115. Raise the sabre quickly above the head, edge up, point to the left and higher than the hand, the right forearm nearly vertical. (Two.) Resume the guard.


116. Turn the head and shoulders to the left, raise the
sabre, the arm extended upward to the front and left, the hand in tierce, back of the blade to the front, point upward. (Two.) Describe a circle quickly on the left, from front to rear, parallel to the horse's neck, the arm extended; turn aside the bayonet with the back of the blade, bringing the hand, still in tierce, above the left shoulder. (Three.) Resume the guard.


117. Turn the head to the right, throwing back the right shoulder, raise the sabre, the arm extending upward to the right and rear, the hand in tierce, edge of the blade to the left, point upward. (Two.) Describe a circle quickly on the right, from rear to front, the arm extended; turn aside the bayonet with the back of the blade, bringing the hand as high as the head, the point upward. (Three.) Resume the guard.
118. When the recruits begin to execute correctly the above cuts, thrusts, and parries, the instructor requires them to make application of them by combined motions, such as:

1. *In tierce point and front*, 2. *Cut.*
1. *In quarte point and front*, 2. *Cut.*
1. *Left point and right* (or *left*), 2. *Cut.*
1. *Right point and left* (or *right*), 2. *Cut.*
1. *Against infantry, right point and right*, 2. *Cut.*
1. *Against infantry, left point and left*, 2. *Cut.*
MANUAL OF THE PISTOL.

119. To draw pistol, the instructor commands:


At the command draw, unbutton the flap of the holster with the right hand, and grasp the stock, the back of the hand to the body. At the command pistol, draw and raise the pistol, the hand holding the stock with the thumb and last three fingers, the forefinger over the guard, guard to the front, barrel vertical, elbow near the body, the wrist as high as the right shoulder and six inches in front of it. This is the position of raise pistol.

120. When out of the holster, the pistol is habitually carried in the position of raise pistol.

121. To load and fire, the instructor commands:

Load.

Lower the pistol into the left hand, the barrel pointing to the left and front, and downward at an angle of forty-five degrees, half cock the pistol (cock it if necessary); grasp the stock with the right hand. (Two.) Open the chamber, if necessary eject the cartridge-cases, take a cartridge from the cartridge box with the right hand, and hold it near the chamber between the thumb and first two fingers. (Three.) Place the cartridge in the chamber, pressing it home with the thumb; continue to insert cartridges until the chambers are loaded; close the chamber, carry the right hand to the stock, and resume the position of raise pistol.
Ready.
122. Cock the pistol with the thumb of the right hand.

Aim.
123. Lower the pistol to the front, the arm about three-fourths extended, forefinger upon the trigger; close the left eye, and sight with the right.

Fire.
124. Press the forefinger against the trigger, fire, and take the position of *raise pistol*.
125. To return pistol, the instructor commands:


Drop the muzzle, insert the pistol in the holster, back of the hand to the body, button the flap, and drop the hand by the side.

126. The squad being in the position of *raise pistol*, the instructor commands:

1. *Inspection*, 2. *Pistol*, passes along the rank, and examines the pistols. To inspect the pistol minutely, he takes it in his hands, and then returns it to the recruit, who grasps it at the stock and takes the position of *raise pistol*. 
INSPECTION OF ARMS, DISMOUNTED.

127. The men, being armed with sabres and pistols, sabres at a carry, the instructor commands:

1. Inspection, 2. Arms.

Beginning on the right, the instructor inspects the sabres in succession. As he approaches the right, the first two men execute the first motion of inspection sabre; the first man, as the instructor comes in front of him, executes the second motion of inspection sabre; the second man, as the instructor comes in front of him, executes the second motion of inspection sabre, the first man at this instant executing the third motion, and the third man the first motion, and so on throughout.

The men armed with pistols, return their sabres as soon as inspected, and draw and raise pistol upon the approach of the instructor, who returns by the rear to the right; as soon as he has passed, they return pistol and draw sabre.

If the men be armed with the sabre only, the inspection is conducted by the commands and means just prescribed, omitting that part which refers to the pistol.
MANUAL OF THE PIECE.

128. Cannoneers are men assigned to the service of guns. The cannoneers, belonging to a single gun, formed in double rank constitute a gun detachment.

129. (Pl. 1.) The detachment is ordinarily composed of two corporals and seven privates; it is formed in double rank, and told off from the right as follows: No. 1 is on the right of the rear rank; No. 2 in front of No. 1; No. 3 on the left of No. 1; No. 4 on the left of No. 2, and so on; the even numbers in the front rank, and the odd numbers in the rear rank.

The senior corporal, who is the gunner, is on the right of No. 2; the junior corporal, who is the caisson corporal, is on the left of No. 6, covered by No. 7; when the detachment consists of more or less than eight men, the caisson corporal is the left man in the front rank.

130. For the elementary instruction of recruits, the caisson corporal is ordinarily dispensed with. No. 7 then steps into the front rank, and is covered by No. 5.

131. In actual service, the men are permanently assigned to the duties for which they are best fitted.

132. To tell off the detachment, the instructor commands: Call off, when each man, beginning with No. 1, pronounces his number in a loud and distinct tone.

_posts of cannoneers, piece unlimbered._

133. (Pl. 2.) The gunner is on the left of the trail hand-
spike, right leg nearly touching it, heels on a line with the end; Nos. 1 and 2 are about two feet outside of the wheels, No. 1 on the right, and No. 2 on the left, in line with the front part of the wheels; Nos. 3 and 4 are in line with the knob of the cascabel, covering Nos. 1 and 2; No. 5 is five yards in rear of No. 4, and covering him; No. 6 directly behind the limber-chest, and No. 7 two feet behind the left limber-wheel. All face to the front.

134. The caisson corporal, if present, is on the left of the caisson, in line with the front part of the limber-wheel and one yard outside of it; he faces in the direction in which the pole of the caisson points.

135. Supernumerary cannoneers, Nos. 8, 9, and 10, if present, are at the caisson, facing in the same direction as the caisson corporal; No. 8 is on the right, his post corresponding to that of the caisson corporal on the left; Nos. 9 and 10 are in line with the rear part of the limber-wheels, covering the caisson corporal and No. 8 respectively.
To take, and to replace, equipments.

136. The equipments (Par. 1100) are either in the limber-chest, or hanging on the neck of the cascabel. To distribute the equipments, the gunner commands: Take equipments. At this command, Nos. 3, 4, 5, and 7, approach the gunner, who hands Nos. 3 and 4, each, a primer-pouch, which they buckle round the waist, the pouch in front of the left side; and Nos. 5 and 7, each, a cartridge-pouch, which they sling over the left shoulder and under the right arm; the gunner then slings the hausse-pouch over his left shoulder and under his right arm. The primer-pouch contains friction-primers (Par. 1074), priming-wire (Par. 1106), lanyard and thumb-stall (which No. 3 puts on his left thumb). The hausse-pouch contains the hausse (Par. 1201).

Nos. 3, 4, 5, and 7, if at their posts at the command take equipments, resume them on receiving their equipments.

When the gunner commands: Replace equipments, the cannoneers take them off and hand them back to him. The gunner then makes such disposition of them as may be directed.

137. In instruction without horses, the gunner gives the commands for taking and replacing equipments upon receiving a caution to that effect from the instructor.

To load and fire.

138. The front of a piece limbered, of a limber, or of a caisson, is the direction in which the pole points; the front of a piece unlimbered is the direction in which the muzzle points.

139. The right or left of a piece, of a limber, or of a caisson, is the right or left of its actual front.

140. The piece is taken at the drill-ground, unlimbered, and prepared for action; the limber is in rear of the piece
and covering it, the end of the pole six yards from the end of the trail handspike. The instructor indicates the post of each number, and causes him to take it; he then calls the recruits to the front of the piece, tells them the meaning of the terms, *cannon* and *piece* (*Par. 1014, 1015*), points out and names the principal parts of the gun, gun-carriage, and limber (*Par. 1021, 1034, 1038*), and explains the uses of the various equipments and implements (*Par. 1100*). The instructor then directs the cannoneers to resume their posts.

141. The duties of the different men in loading and firing are taught in the following order: 1st, those of the gunner—*commanding and pointing*; 2d, those of No. 1—*sponging and ramming*; 3d, those of No. 2—*inserting the charge*; 4th, those of No. 3—*serving the vent*; 5th, those of No. 4—*firing*; 6th, those of Nos. 5, 6; and 7—*serving and preparing ammunition*.

The cannoneers at first take their posts in succession, and perform their respective duties *in detail*, while the rest of the detachment observe their motions. As the numbers are changed, the instructor repeats the nomenclature of the equipments, implements, and particular parts of the gun. If it be difficult to make a recruit take the correct position, the instructor places himself, or another man, in the desired position. As soon as the men get a general idea of their duties, two or more cannoneers, and then all the men, are drilled together.

142. To load and fire by the numbers, the instructor commands:

1. Load, (Two), (Three), (Four); 2. Sponge, (Two), (Three), (Four); 3. Ram, (Two), (Three), (Four); 4. Ready; 5. Fire.

The command *ready* is given as soon as the piece is pointed.
To discontinue the firing, the instructor commands:

1. **Cease**, 2. **Firing**.

143. When the recruits perform their duties well in detail, the instructor dispenses with the motions. To load and fire without the numbers, he commands:

1. **Load**, 2. **Fire**.

The gunner repeats the command *load*, and commands: *Ready* when the piece is pointed. At the command *load*, the cannoneers execute all that is prescribed at the commands *load, sponge, and ram*, in loading by the numbers. The instructor sees that the movements are not slighted, and returns to the execution in detail, should a want of precision appear. *The firing is discontinued as before prescribed.*

144. When the detachment becomes quite proficient in the manual of the piece, the instructor may intrust the gunner with the loading and firing. For this purpose, the instructor commands:

1. **Commence**, 2. **Firing**.


If the piece be loaded at the second command, the gunner commands: 1. *Ready*, 2. *Fire*, and then proceeds as before.

The firing is kept up until the instructor commands: 1. **Cease**, 2. **Firing**. At the second command, No. 1 sponges if the piece has not been sponged since firing; if the sponging has been begun, he completes it.

*Duties of the gunner—Commanding and pointing.*

145. The gunner sees that the other cannoneers perform their duties properly; he transmits to No. 6 the or-
orders as to the kind of projectile to be fired; if the fuses are to be cut, he sends No. 6 the distance, or time, for each round.

In actual firing, unless No. 6 be superintended by the chief of section, or the firing be exceedingly rapid, the gunner inspects each projectile before it is given to No. 2.

Load. The gunner takes hold of the handspike at the end with his right hand, and at the middle with his left; places his left knee against his left hand, bending over it, the right knee slightly bent; looks over the top of the piece and gives the general direction.

The gunner then steps to the breech, takes the housse from the pouch and places it on its seat, grasps the handles of the elevating screw with both hands, draws back his right foot, bends over his left knee, and gives the elevation, by sighting through the slit in the housse, and turning the screw.

The piece being loaded, and No. 3 at the end of the trail handspike, the gunner gives the exact direction, tapping the right of the trail for No. 3 to move it to the left, and the left of the trail for him to move it to the right.

As soon as the piece is pointed, the gunner raises both hands as a signal to that effect, removes the housse, takes his post, and replaces the housse in its pouch.

Ready. The gunner steps clear of the wheel to the side whence he can best observe the effect of the shot.

Fire. The gunner, unless otherwise directed, causes the piece, as soon as discharged, to be moved up to its former position.

Duties of No. 1—Sponging and ramming.

146. The instructor causes No. 1 to take the sponge-and-rammer staff, holding it about the middle with his right hand, and trailing it at an angle of forty-five degrees
or so that the rammer will not touch the ground, sponge up and to the front.

**Load.**

No. 1 faces to the left, steps obliquely to his right with the right foot, right knee bent, left knee straight; at the same time he brings the staff smartly to a vertical position, rammer resting on the right toe, the right hand as high as the elbow, which is kept close by the side.

(Two.) No. 1 steps obliquely to his left with the left foot, planting it about half-way between the piece and the wheel, and opposite the muzzle, left knee bent, right knee straight, brings the staff across his body, inclined at an angle of forty-five degrees; sponge to his left, the hand opposite the middle of the body.

(Three.) No. 1 steps to his right and front with the right foot, planting it about thirty inches from the left, heels on a line parallel to the piece, right knee bent, left knee straight; brings the staff to a horizontal position, the sponge against the face of the piece; the left hand, back down, grasping the staff near the sponge; the right hand, back up, grasping the staff toward the rammer, the right arm extended to its full length.

(Four.) No. 1 casts his eyes toward the vent to see that it is closed, inserts the sponge, drops the left hand behind the thigh, shoulders parallel to the piece, feet equally turned out, straightens the right knee, and, bending over the left, forces the sponge home.

**Sponge.**

No. 1, keeping the elbow as near the body as possible, turns the sponge twice from him, and twice back, taking great care to press it firmly against the bottom of the bore.

(Two.) No. 1 draws out the sponge, straightening his
left knee, and bending his right; seizes the staff near the sponge with his left hand, back down, and places the sponge against the face of the piece, body erect on the hips.

(Three.) No. 1 gives the staff a cant with the left hand, throwing the sponge over, and turning the right wrist so as to bring the staff horizontal; regrasps it with the left hand, back up, near the rammer, slipping the right hand as far as possible toward the sponge.

(Four.) No. 1 inserts the rammer in the muzzle and slides his left hand up to the right, casting his eyes to the front.

Up to the time of inserting the rammer in the muzzle, No. 1 watches the vent closely; if not closed at any time, he ceases his movement and calls out: *Stop vent.*

Ram.

No. 1 rams home, throwing the weight of his body with the rammer, bending over his left knee, and passing his left arm horizontally over the piece in the direction of the left trunnion, elbow slightly bent, and back of the hand up; the right shoulder thrown back, and the eyes cast toward the front until the cartridge is home.

(Two.) No. 1 jerks out the staff with his right hand, allowing it to slide through the hand as far as the middle, when he grasps it firmly, and seizes it close to the rammer with the left hand, back up; staff horizontal, body erect, knees straight, eyes on the muzzle.

(Three.) No. 1 inserts the rammer in the muzzle; pushes the projectile gently down to the cartridge with the right hand, assisted by the left if necessary; jerks out the staff and resumes his position as in the last motion, placing the rammer against the face of the piece, and casting his eyes to his own front.

(Four.) No. 1 brings the staff close to the body, ra:
ing it as high as the chin, and immediately springs back outside of the wheel, first with the right foot, then with the left foot in the same manner, so that, when the right foot is brought to it, he will be in the position he had after facing at the command load. As he brings the right foot to the left, he gives the staff a cant with his left hand so as to bring it to a vertical position in the right, the rammer resting on the right toe, and drops the left hand by the side.

With fixed ammunition, or with blank cartridges, the second motion is executed as just prescribed, except that No. 1 places the rammer against the face of the piece, and casts his eyes to his own front upon the completion of the motion; the third motion is omitted, and the fourth motion becomes the third.

**Ready.**

No. 1 breaks well off to his left with the left foot, bending the left knee, and straightening the right leg, heels on a line parallel to the wheel, body erect on the hips; lets his arms fall to their full extent, dropping the end of the staff into the left hand, which grasps it close to the sponge, back down, the staff horizontal; he then casts his eyes toward the muzzle.

**FIRE.**

No. 1, at the flash of the gun, springs back to his last position.

If the command load be repeated, he steps off with his right foot to the same point as before.


No. 1 faces to the front.

147. Remarks on the duties of No. 1. The position of the left foot is given as the usual one, and may be modi-
fied according to the calibre of the piece and height of
the man. The same remark will apply to the distance be-
tween the feet; they should be in such position, and at
such distance from each other, that the man can perform
his duties with the greatest ease and steadiness, and at the
same time exert his full strength, which will always be re-
quired after firing a few rounds, particularly with a new
sponge.

In loading it will be observed that the back of the hand
next to the sponge is always down; the back of that next
to the rammer, always up.

If the length of the piece require it, the sponge and
the rammer are pressed home in two motions, No. 1 ex-
tending his right hand to the end of the staff as soon as
it reaches the muzzle.

One object of joining the left hand to the right, and of
casting the eyes to the front while ramming, is to guard
No. 1 against fatal results in case of a premature dis-
charge, by refusing his right shoulder; for the same rea-
son, in ramming, the left hand is directed toward the left
trunnion.

**Duties of No. 2—Inserting the charge.**

148. The instructor points out and explains the follow-
ing objects: cartridge; shell; case-shot; canister; solid-
shot; fuse (Pars. 1052, 1058-'61, 1068).

Load. No. 2 faces to his right, and by two oblique
steps, corresponding to those of No. 1, the first with the
left, the second at the command two, with the right foot,
places himself near the muzzle of the piece. At the com-
mand three, he brings up his left foot by the side of the
other, faces to his right, brings his hands near each other,
and takes the round from No. 5 in front of the wheel, the
cartridge in the right, the projectile in the left hand.
soon as the sponge is withdrawn, he faces to his left, and, when the staff is canted, inserts the cartridge in the muzzle, taking care that the seam of the cartridge does not come under the vent, and that the choke enters the muzzle last. As soon as the rammer is withdrawn, he inserts the projectile, the base entering the muzzle first. He then springs back, beginning with the left foot, in a similar manner to No. 1, and takes a position outside of the wheel corresponding to that of No. 1 in the last motion of ram.

With fixed ammunition the round is inserted as soon as the staff is canted.

Ready. No. 2 breaks well off to his right with the right foot, bending the right knee, and straightening the left leg, heels on a line parallel to the wheel, the body erect on the hips, and casts his eyes toward the muzzle.

Fire. No. 2, at the flash of the gun, springs back to his last position.

If the command load be repeated, he steps off with his left foot to the same point as before.

1. Cease, 2. Firing. No. 2 faces to the front.

Duties of No. 3—Serving the vent.

149. The instructor points out the following objects: gunner's gimlet; vent-punch; gunner's pincers (Par. 1107), and explains their uses.

Load. No. 3 takes the priming-wire in his right hand, thumb through the ring, steps to his left, removes any obstruction from the vent, and wipes the vent-field with the thumb-stall, which he then presses upon the vent, keeping his elbow raised, fingers on the left side of the piece, so that the gunner can point over his thumb.

As soon as No. 1 has stepped back clear of the wheel, No. 3 jumps to the end of the trail handspike, seizes it with both hands, and stands ready to move it to the right
or left at a signal from the gunner. When the gunner raises both hands as a signal, No. 3 resumes his post.

**Ready.** No. 3 springs in close to the stock, pricks the cartridge with the priming-wire, taking care not to move the charge, and springs back to his post.

**Fire.** No. 3, at the flash of the gun, or at the command *load*, serves vent as before. He must be careful to keep the vent closed, from the time the sponge enters the muzzle until No. 1 has stepped outside of the wheel.

**Duties of No. 4—Firing.**

150. The instructor indicates the following objects: *lanyard* (*lanyard-hook, cord, toggle*); *friction-primer*, and explains their uses.

**Load.** No. 4 takes the lanyard from his pouch, unwinds the cord, engages from below the lanyard-hook in the ring of a primer, and stands fast.

**Ready.** No. 4 springs in close to the stock, inserts this primer in the vent, springs out to his post, toggle in right hand, and then breaks to the left and rear with his left foot, the left knee slightly bent, the eyes to the left and rear, the hand elevated and firm, the lanyard nearly taut, and capable of being stretched without moving the feet.

**Fire.** No. 4 pulls the lanyard briskly and firmly, passing the hand, back up, in a downward direction to the rear, so as to keep the primer from pulling out, and then resumes his post.

Should the primer fail to explode the charge, the gunner immediately commands: **Stand fast**, and waits a sufficient time to assure himself that the piece does not hang fire. He then commands: **Reprime**, when No. 2 steps inside the wheel, close to the axle, receives from No. 3, over the wheel, a priming-wire, and from No. 4 a primer with lanyard attached, pricks, primes, returns the priming-
wire to No. 3, and then resumes his post by facing to his left, making a side step to his left, and another to his right and rear.

1. **Cease.** 2. **Firing.** No. 4 winds up the cord and returns the lanyard to his pouch.

151. In the absence of No. 4, No. 3 faces about as soon as he has pricked, prepares and inserts a primer, springs to his left to the position he would have if he had faced about at his post, and then breaks to the right and rear with his left foot and fires, as prescribed for No. 4. He then resumes his post, puts up his lanyard, and serves vent as before.

**Duties of Nos. 5, 6, and 7—Serving and preparing ammunition.**

152. The instructor indicates the following objects: fuses; fuse-wrench (Par. 1108); fuse-block; fuse-cutter; fuse-gouge, and explains their uses.

**Load.** No. 5 runs to the limber-chest, receives from No. 7, or No. 6, a single round, takes it to No. 2, returns immediately for another round, and then halts at his post until the piece is fired. In actual firing, No. 5, unless otherwise directed, shows the projectile to the gunner before delivering it to No. 2. The round is ordinarily carried in the hands, but as a protection from rain, sparks of fire, etc., it may be put in the cartridge-pouch by No. 6, or 7, cartridge uppermost. In this case, when brought up, No. 5 holds open the pouch and No. 2 takes out the round with both hands. In rapid firing with solid shot or canister, Nos. 5 and 7 may alternate in delivering the charges to No. 2.

No. 6 issues the ammunition, and prepares the fuses, if necessary; should they require cutting (Par. 1070, 1072), he gives the time, or distance, to No. 5, with each projectile.
No. 6 sees that the limber-chest is not open unnecessarily.

No. 7 assists No. 6 in the performance of his duties.

1. Cease, 2. FIRING. If No. 5 has a round, he carries it back to No. 7, or No. 6, who carefully replaces in the chest all unexpended ammunition, No. 6 securing the lid.

Summary of duties of cannoneers executed in detail.

153. LOAD. The gunner takes hold of the trail handspike and gives the general direction; No. 1 faces, steps off obliquely with the right foot; No. 2 faces, steps off obliquely with the left foot; No. 3 steps in and serves vent; No. 5 runs for the round; No. 6 opens the chest and prepares the round; No. 7 assists No. 6.

(Two.) No. 1 steps in with the left foot, inclines the sponge-staff; No. 2 steps in with the right foot.

(Three.) No. 1 steps to his right and front with the right foot, rests the sponge against the face of the piece, and extends the right arm; No. 2 brings up the left foot, faces to his right, and receives the round.

(Four.) No. 1 inserts the sponge and forces it home.

Sponge. No. 1 sponges.

(Two.) No. 1 withdraws the sponge; No. 2 faces to his left.

(Three.) No. 1 cants the sponge; No. 2 inserts the cartridge.

(Four.) No. 1 inserts the rammer and joins hands near the sponge.

Ram. No. 1 rams.

(Two.) No. 1 withdraws the rammer; No. 2 inserts the projectile, and steps out.

(Three.) No. 1 inserts the rammer and pushes home the projectile.

(Four.) The gunner points; No. 1 steps out; No. 3 springs to the end of the trail handspike.
Ready. The gunner goes to the side to observe the effect of the shot; No. 1 breaks off to his left, No. 2 to his right; No. 3 springs in, pricks cartridge, and springs out; No. 4 inserts primer, springs to his post, and breaks to the left and rear.

Fire. No. 4 discharges the piece; all resume their posts.

To draw a load.

154. The gunner and No. 5, assisted by Nos. 3 and 4, raise the trail until the muzzle strikes the ground so as to cause a slight jar, which starts the projectile and cartridge in the bore. As soon as they slide down to the muzzle, No. 2 takes them and passes them to No. 5, who carries them back to the limber. If the cartridge will not come out, it is withdrawn by the worm.

To change posts of cannoneers, piece unlimbered.

155. Posts are changed so as to instruct each recruit in the duties of all the numbers at the piece; the instructor commands:


At the first command, the cannoneers on the right of the piece face about; No. 6 faces to the left; the numbers who have equipments lay them down; No. 1 rests the staff on the nave of the wheel. At the command march,

No. 1 takes the place of No. 3,
No. 3 " " No. 6,
No. 6 " " No. 7,
No. 7 " " No. 5,
No. 5 " " No. 4,
No. 4 " " No. 2,
No. 2 " " No. 1.
As soon as the men reach their new places, the staff and equipments are resumed, and all take their posts, No. 3 buckling on his primer-pouch after facing about. The gunner and the caisson corporal may be changed with any of the cannoneers at the discretion of the instructor, who gives special directions in each case.

If No. 1 be facing the piece at the first command, he faces to the left, and places the staff as before.

To move the piece by hand, piece unlimbered.

156. To the front. The instructor commands:


At the first command, the gunner seizes the end of the trail handspike with both hands; No. 1 raises the staff with the right hand and rests it on the right shoulder, sponge up, the staff inclined at an angle of 45°; breaks to the rear with the right foot, and seizes a spoke with the left hand; Nos. 2, 3, and 4 seize the spokes with both hands and break to the rear with the feet farthest from the wheel. At the command march, they move the piece forward, the gunner raising and guiding the trail. At the command halt, all resume their posts, No. 1 bringing the staff to its proper position with the right hand.

If No. 1 be facing the piece at the first command, he faces to the front and then executes the movement as before.

157. To the rear. The instructor commands:


At the first command, the gunner, facing about, seizes the trail handspike near the end with the left hand, and No. 5 takes hold with the right hand; No. 1 faces about,
passing the staff into the left hand, raises the staff with this hand, and rests it on the left shoulder, sponge up, staff inclined at an angle of 45°; breaks to his rear with the left foot, and seizes a spoke with the right hand; Nos. 2, 3, and 4, face about, and seize the spokes with both hands, breaking to their rear with the feet farthest from the wheels. At the command march, they move the piece to the rear, the gunner and No. 5 raising and guiding the trail. At the command halt, all resume their posts, No. 1 facing to his rear by the left, turning on both heels, and passing the staff into the right hand, which brings it to its proper position.

If Nos. 1 and 2 be facing the piece at the first command, the movement is executed as before, No. 1 facing to his left and No. 2 to his right.

To limber.

158. To the front. The instructor commands:

1. Limber, 2. Front.

At the command front, the piece is brought about, and the limber, inclining to the right, passes to its place in front.

To bring the piece about, the gunner and No. 5 spring to the right of the trail handspike; seize it with both hands, the gunner at the end, both facing to the left; then raise and carry it one hundred and eighty degrees to the left; Nos. 1 and 3, taking the position for by hand to the rear, bring the right wheel round, turning it toward the trail; Nos. 2 and 4, taking the position for by hand to the front, bring the left wheel round, turning it toward the muzzle.

The instant the piece is about, the trail is let down; No. 1 springs in between the muzzle and wheel; turns the
staff, seizing it with the left hand, back down; changes the
grasp of the right hand, so as to bring the back up, and
placing the staff on its hook, rammer to the rear, passes it
to No. 3, who receives the rammer, secures it against the
stop, and keys it up; the gunner takes out the trail hand-
spike, and passes it to No. 4, who puts it up; No. 2 goes
to the muzzle, No. 1 remaining there after putting up the
staff. To avoid accident, Nos. 3 and 4 remain within the
wheels at the axles, and No. 5 and the gunner step directly
in front of them respectively.

As soon as the limber is in front of the piece, the gunner
commands: 1. Limber, 2. Halt. At the second command,
the limber halts; Nos. 1 and 2 each place one hand on the
muzzle, the other on the axle-body; Nos. 3 and 4 spring out-
side the wheels, and seize the spokes with both hands, break-
ing to their rear with the feet farthest from the wheel; No.
5 and the gunner spring to the trail-handles, and raise the
trail; all then run the piece forward and place the lunette
upon the pintle-hook, when the gunner puts in the key,
and all take their posts at the piece limbered.

159. If the piece be not horsed, the limber, when moved,
is drawn by Nos. 6 and 7, who take hold with both hands
near the end of the pole. If the piece be heavy, or the
ground bad, the instructor may direct Nos. 6 and 7 to
assist in moving the piece. These rules are general.

160. To the right. The instructor commands:

1. Limber, 2. Right.

The trail is carried ninety degrees to the right; the
limber inclines to the right, and takes its place by a right
wheel. The piece is limbered as before, the gunner and
No. 5 going to the left of the trail handspike and facing to
the right; Nos. 1 and 3 taking the position of by hand to
the front, and turning their wheel toward the muzzle; and
Nos. 2 and 4 taking the position of *by hand to the rear*, and turning their wheel toward the trail.

161. *To the left.* The instructor commands:

1. *Limber, 2. Left.*

Executed as *limber front*, the trail being carried only ninety degrees to the left, and the limber inclining to the left and taking its place by a left wheel.

162. *To the rear.* The instructor commands:

1. *Limber, 2. Rear.*

Executed as *limber front*, the piece not being brought about, and the limber inclining to the right, and taking its place by two successive wheels to the left.

*Posts of cannoneers, piece limbered.*

163. (*Pl. 3.*) Nos. 1 and 2 are in line with the muzzle; Nos. 3 and 4 in line with the knob of the cascabel; the gunner and No. 5 in line with the rear part, and Nos. 6 and 7 in line with the front part, of the limber-wheels. All face to the front, and cover each other in lines one yard outside of the wheels, the gunner and even numbers on the right, the odd numbers on the left.
164. The caisson corporal and supernumerary cannoniers, if present, have the same posts as when the piece is unlimbered.

_Posts of the gun detachment at the piece limbered._

165. _In front._ The detachment is in line facing to the front, its rear and centre two yards from the end of the pole, or from the heads of the lead horses.

_In rear._ The detachment is in line facing to the front, its front and centre two yards from the muzzle.

_To form the gun detachment at the piece limbered._

166. _To the front._ The instructor commands:

1. _Detachment front, 2. March._

At the first command, the gunner steps to his right and commands: 1. _Forward._ At the command _march_, repeated by the gunner, the even numbers and gunner move directly to the front, the rear men closing up; the odd numbers close on the even numbers when clear of the piece. The gunner commands: 1. _Column left, 2. March_, and, after the proper distance has been passed over: 1. _Detachment, 2. Halt, 3. Right, 4. Face, 5. Right, 6. Dress, 7. Front._

The caisson corporal moves directly forward and takes his place in the detachment.

167. When a gun detachment takes post at the piece limbered, the gunner, before commanding _right dress_, takes such a position that the detachment, when aligned on him, will be at its post. _This rule is general._

168. _To the rear._ The instructor commands:

1. _Detachment rear, 2. March._

At the first command, the gunner steps to his right and commands: 1. _Detachment, 2. About, 3. Face, 4. Forward._
At the command *march*, repeated by the gunner, the odd numbers and gunner move directly to the rear, the rear men closing up; the even numbers close on the odd numbers. The gunner changes direction to the left, halts the detachment when the proper distance has been passed over, faces it to the left, and dresses it to the right, the caisson corporal taking his proper place.

*To change the post of the gun detachment at the piece limbered.*

169. *From front to rear.* The detachment being at its post in front of the piece, to post it in rear, the instructor commands:


At the first command, the gunner commands: 1. *Detachment*, 2. *About*, 3. *Face*, 4. *Forward*, and repeats the second command. At the command *march*, the gunner and Nos. 1, 2, 3, and 4, oblique sufficiently to their left, and Nos. 5, 6, 7, and the caisson corporal, sufficiently to their right, to move along the sides of the piece, reunite in a similar manner as soon as they have passed it, are halted, faced about, and dressed to the right by the gunner.

170. *From rear to front.* The instructor commands:


At the first command, the gunner commands: 1. *Forward*. At the command *march*, repeated by the gunner, the cannoneers oblique, the gunner and Nos. 1, 2, 3, and 4, to the right, Nos. 5, 6, 7, and the caisson corporal, to the left, pass the piece, reunite in front, and are halted and dressed to the right by the gunner.
To post the cannoneers at the piece limbered.

171. The detachment being at its post, in front or in rear, the instructor commands:


At the first command, No. 7, if in the front rank, steps back into the rear rank, No. 5 closing in to the right.

172. In front. At the first command, the gunner commands: 1. Right, 2. Face, 3. To your posts. At the command march, repeated by the gunner, the leading man in each rank changes direction to the right; the rear rank opens out from the front, each rank directing itself toward its own side of the piece, and marching along it; when each man arrives at his place, he halts and faces about.

173. In rear. At the first command, the gunner commands: 1. Left, 2. Face, 3. To your posts. At the command march, repeated by the gunner, the cannoneers move in a similar manner to their posts, each man halting when he arrives at his proper place.

To change posts of cannoneers, piece limbered.

174. The instructor commands:


At the first command, the even numbers face about; the numbers who have equipments lay them down. At the command march,

No. 1 takes the place of No. 3,
No. 3 " " No. 5,
No. 5 " " No. 7,
No. 7 " " No. 6,
No. 6 " " No. 4,
No. 4 " " No. 2,
No. 2 " " No. 1,
No. 6, in changing with No. 4, passes outside of the gunner.
As soon as the men reach their new places the equipments are resumed, No. 4 buckling on his primer-pouch after facing about. The gunner and caisson corporal may be changed with any of the cannoneers at the discretion of the instructor, who gives special directions in each case.

To move the piece by hand, piece limbered.

175. To the front. The instructor commands:


At the first command, Nos. 6 and 7 seize the end of the pole with both hands; the gunner and No. 5 facing from the pole, grasp the splinter-bar with one hand, and the pole with the other; Nos. 3 and 4 take hold of the spokes of the hind-wheels with both hands, and Nos. 1 and 2 apply one hand at the muzzle and the other at the axle-body. At the command march, all, acting together, move the piece forward. At the command halt, all resume their posts.

176. To the rear. The instructor commands:


At the first command, all face to the about; Nos. 6 and 7 seize the end of the pole with both hands; the gunner and No. 5 take hold of the spokes of the limber, and Nos. 1, 2, 3, and 4, those of the hind-wheels. At the command march, all, acting together, move the piece to the rear, Nos. 6 and 7 keeping it straight by means of the pole. At the command halt, all resume their posts.

To unlimber and prepare for firing.

177. To the front. The instructor commands:

At the command *front*, the gunner takes out the pintle-key, and seizes the trail-handle on his own side; No. 5 seizes the other trail-handle; they then raise the trail from the pintle-hook, when the gunner commands: *Drive on*; Nos. 1, 2, 3, and 4, seize the spokes with both hands, Nos. 2 and 4 first facing about, and all breaking to their rear with the feet farthest from the wheel. At the command *drive on*, the limber executes a left about, proceeds to the rear, and executes another left about, so as to be directly in rear of the piece, with the end of the pole, or heads of the lead horses, six yards from the end of the trail handspike. As soon as the limber moves off, the piece is brought about; the gunner and No. 5, without lowering the trail, carry it round one hundred and eighty degrees, so that the limber passes the muzzle, Nos. 1 and 3 turning their wheel toward the trail, and Nos. 2 and 4 turning theirs toward the muzzle.

As soon as the piece is brought about, the gunner and No. 5 let down the trail; No. 4 takes off the trail handspike and passes it to the gunner, who fixes it in the pointing rings; No. 1 takes off the sponge-and-rammer, No. 3 unkeying it; all then take their posts.

178. *To the right.* The instructor commands:


Executed like *action front*, except that Nos. 1 and 3 face about before seizing the spokes instead of Nos. 2 and 4, that the trail is carried ninety degrees in the opposite direction, and that the limber wheels to the left and takes its place in rear by a left about.

179. *To the left.* The instructor commands:


Executed like *action front*, except that the trail is car-
ried round ninety degrees instead of one hundred and eighty, and that the limber wheels to the right and takes its place in rear by a right about.

180. To the rear. The instructor commands:

1. Action, 2. Rear.

Executed like action front, except that, as soon as the limber moves off, the trail is let down and the piece prepared for action; the limber moves directly forward at the command drive on, and takes its place by a reverse.

To fix prolonge.

181. The piece being unlimbered, the instructor commands:

1. Fix, 2. Prolonge.

At the command prolonge, the limber inclines to the right and takes its place as in limbering to the rear, halting four yards from the trail. No. 5 uncoils the prolonge and passes the toggle to the gunner, who fixes it in the trail by passing it upward through the lunette, while No. 5 fastens the other end to the limber by passing the ring over the pintle-hook and putting in the key.

To coil prolonge.

182. To detach the prolonge from the limber, and coil it up, the instructor commands:


At the command prolonge, the gunner takes out the toggle, and No. 5 takes off the ring and coils the prolonge, first passing the ring over the upper prolonge-hook.

183. To coil prolonge, and limber to the rear, the instructor commands:

The prolonge is detached and coiled as before; the piece is run toward the limber, which is backed toward it at the command **back**, of the gunner.

184. To limber to the front, right, or left, the instructor commands:

1. **Coil**, 2. **Prolonge**, 3. **Limber**, 4. **Front (right, or left)**.

Executed as already prescribed; the gunner commands: **Drive on**, as soon as the prolonge is detached.

**To mount the cannoneers.**

185. The piece is taken limbered, and in front of its caisson. The instructor, after pointing out and naming the principal parts of the caisson (**Par. 1041**), explains that the gunner and even numbers mount from the right side of the piece, and the caisson corporal and odd numbers from the left, and that the cannoneers, when mounted, are seated on the chests, facing to the front; the gunner, Nos. 5 and 6 on the limber-chest of the piece, the gunner on the right, and No. 5 on the left; Nos. 1, 2, and 7, on the limber-chest of the caisson, No. 2 on the right, No. 1 on the left; Nos. 3, 4, and the caisson corporal, on the middle-chest of the caisson, No. 4 on the right, and No. 3 on the left.

The instructor then commands:

1. **Cannoneers**, 2. **Prepare to mount**, 3. **Mount**.

At the second command, the cannoneers run to their respective places and stand facing the chests which they are to mount; the gunner and Nos. 2 and 3 who mount respectively on the right side of the limber-chests of the piece and caisson, and on the left side of the middle-chest of the caisson, grasp the chest-handles with the right hand, and place the left foot on the stock; Nos. 5, 1, and 4, who
mount respectively on the left side of the limber-chests of
the piece and caisson, and on the right side of the middle-
chest of the caisson, grasp the handles with the left hand
and place the right foot on the stock; the men who grasp
opposite handles of the same chest clasp hands, to help each
other in springing up.

At the command mount, all spring into their seats, the
men on the limber-chests facing immediately to the front,
by throwing their legs outward over the wheels, No. 6
stepping on the stock with his left foot, and grasping the
chest-handle with his right hand, and No. 7 stepping on
the stock with his right foot, and grasping the chest-hand-
dle with his left hand, spring up, step over the chests and
take their seats, placing their hands on the shoulders of
the men already seated, so as to steady themselves. The
caisson corporal takes his seat by stepping on the stock
with his left foot, and clasping right hands with No. 4 who
helps him up, assisted by No. 3 if necessary.

When the poles of the piece and caisson face each other,
the numbers who run to the caisson chests, cross over be-
fore taking their places preparatory to mounting.

186. If the instructor command: 1. Cannoneers, 2. Mount,
the men execute at the command mount all that has been
prescribed at the commands prepare to mount and mount,
except that the caisson corporal springs into his seat at
once without waiting for Nos. 3 and 4.

187. Supernumerary cannoneers, Nos. 8, 9, and 10, may
be mounted on the rear-chest of the caisson, facing to the
rear, No. 8 behind No. 4, and No. 9 behind No. 3.

188. When there are cannoneers’ seats on the axles be-
tween the cheeks and the wheels, the cannoneers, except
the caisson corporal, may be mounted on the piece, its
limber, and the off horses, as follows: Nos. 1 and 2 each
on the cannoneer’s seat nearest him; the gunner and Nos.
3 and 5 on the limber-chest, the gunner on the right, No. 5 on the left; Nos. 4, 6, and 7, on the off-wheel, off-swing and off-lead horses respectively.

189. The cannoneers may also be mounted on the cannoneers' seats and the chests, without putting men on the off horses. In this case, Nos. 1 and 2 mount on the seats as just prescribed; Nos. 3 and 4 take the places of Nos. 1 and 2, respectively, on the limber-chest of the caisson; the other numbers mount as before explained.

*To dismount the cannoneers:*

190. The instructor commands:

1. **Cannoneers**, 2. **Prepare to dismount**, 3. **Dismount**.

At the second command, the cannoneers stand up in their places except the gunner and No. 5, who face to the rear, by throwing their legs outward over the wheel. At the command *dismount*, all jump off and run to their posts.

191. If the instructor command: 1. **Cannoneers**, 2. **Dismount**, the men execute at the command *dismount* all that has been prescribed at the commands *prepare to dismount* and *dismount*.

192. If the commands, *action front* (right, left, or rear) be given when the cannoneers are mounted on the chests, they immediately dismount and run to their posts.

*Service of the piece with diminished numbers.*

193. The men are drilled in serving the piece with diminished numbers, that each may know the duties he has to perform in such cases.

Disabled men are replaced by the highest numbers, or if men be selected to replace them, the highest numbers
are reduced to fill the vacancies thus created. In action, No. 2 may occasionally be changed with No. 1, to relieve his fatigue.

<table>
<thead>
<tr>
<th>NUMBERS RETAINED</th>
<th>DISTRIBUTION OF DUTIES</th>
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<tbody>
<tr>
<td></td>
<td>Gunner.</td>
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<tr>
<td></td>
<td>1</td>
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<tr>
<td>G. 1</td>
<td>G. 3,4</td>
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<tr>
<td>G. 1,2</td>
<td>G. 3,4</td>
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<tr>
<td>G. 1,2,3</td>
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<tr>
<td>G. 1,2,3,4</td>
<td>G.</td>
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<tr>
<td>G. 1,2,3,4,5</td>
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<td>G. 1,2,3,4,5,6</td>
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SERVICE OF THE MITRAILLEUR.

194. The modifications in the Manual of the Piece, incident to the mitrailleur, are alone given; in other respects the mitrailleur is handled like an ordinary field-piece, the composition, formation, and manœuvres of the detachment, being the same.

195. There are no equipments to be distributed, except the cartridge-pouch, with which No. 4 is equipped.

To load and fire.

196. The piece being unlimbered, the instructor ex-
plains the mechanism of the mitrailleur, points out and names its principal parts, and explains the uses of the various implements (Pars. 1023, 1111). He then commands: 1. Load, 2. Ready, 3. Commence, 4. Firing.

The gunner repeats the command load. The command ready is given when the piece is pointed. The firing begins at the fourth command, and is kept up without intermission until the instructor commands: 1. Cease, 2. Firing.

197. If instead of load, the instructor commands: 1. Commence, 2. Firing, at the second command, the gunner commands: 1. Load, 2. Ready, 3. Commence, 4. Firing. The firing begins at the fourth command of the gunner; it ceases at the same commands as before.

Duties of the gunner.

198. The gunner sees that the other cannoniers perform their duties properly; he transmits to No. 6 the orders as to the kind of ammunition to be fired, removes disabled locks, and attends to the traversing apparatus.

To ungear the traversing apparatus, he makes the arrow of the locking-block coincide with the point upon the locking-bolt case, and then forcing down the handle of the traversing fork in its stop, and turning it to the right.

Load. The gunner gives the general direction as in the Manual of the Piece; he then steps to the breech, adjusts the rear sight at the required elevation, takes hold of the handles of the elevating screw, draws back his right foot, bends over his left knee, and gives the elevation by sighting through the notch in the rear sight and turning the elevating screw. No. 3, being at the end of the trail handspike, the gunner then gives the exact direction as in the Manual of the Piece.

Ready. The gunner steps clear of the wheel, to the side whence he can best observe the effect of the fire.
199. In loading with the half-inch mitrailleur, the gunner steps over the trail with his right foot, and sits down upon the stock-seat in giving the elevation and exact direction, rising a little when the trail is to be moved.

**Duties of No. 1.**

200. The instructor commands: 1. **Load.** No. 1 faces about and places himself quickly, at the crank, facing to the front.

**Ready.** No. 1 releases the crank from its stop, and seizes the handle with the right hand, ready to turn the barrels.

1. **Commence,** 2. **Firing.** No. 1 turns the crank with a moderate uniform motion, allowing ample time for the cartridges to drop from the feed-cases into the carrier-block, and avoiding all sudden movements or lateral wrenching. He keeps his eyes on the hopper to see that the cartridges are feeding properly, and may rest his arm from time to time by turning the crank with the left hand.

1. **Cease,** 2. **Firing.** No. 1 ceases to turn the crank, makes it fast by the stop, and returns to his post outside of the wheel.

**Duties of No. 2.**

201. **Load.** No. 2 faces about and places himself quickly in rear of the axle, between the piece and left wheel, facing to the right; receives a filled feed-case from No. 4, and inserts it in the hopper.

1. **Commence,** 2. **Firing.** No. 2 keeps his eyes on the hopper to see that the cartridges are feeding properly, the projectiles to the front; calls: **Case** as the feed-case in the hopper is nearly empty, when No. 4 hands him another filled feed-case; holds this case ready in his right hand, withdrawing the empty feed-case with his left hand the instant the last
cartridge has passed, and at once inserting a filled feed-case, passes the empty feed-cases over his left shoulder to No. 4, and thus keeps up a continuous fire.

1. Cease, 2. Firing. No. 2 removes the feed-case from the hopper, and returns to his post outside of the wheel.

If the firing is not to be resumed, No. 2, upon an intimation from the instructor, lifts up the hopper and removes the cartridges from the carrier-block, No. 1 reversing the crank.

Duties of Number 3.

202. Load. No. 3 goes to the end of the handspike, and assists the gunner in pointing, as in the Manual of the Piece.

If, during the firing, a cartridge remains in one of the barrels, and it is necessary to use the ejecting-rod, No. 3 steps to the front, unkeys it, and, under the direction of the gunner, pushes out the metallic case by forcing it backward, just before an entire revolution of the barrel is completed.

Duties of Number 4.

203. Load. No. 4 faces to the right, and as soon as No. 5 hands him a filled feed-case, passes it to No. 2.

1. Commence, 2. Firing. No. 4 takes the filled feed-cases from his cartridge-pouch, hands them to No. 2, as called for, receives back the empty feed-cases, and gives them to No. 5.

1. Cease, 2. Firing. No. 4 faces to the front.

Duties of Number 5.

204. Load. No. 5 runs to the limber-chest, receives four (five with the half-inch mitrailleur) filled feed-cases from
No. 7 or 6, takes them to the piece, handing one to No. 4 and placing the others in No. 4’s cartridge-pouch, open ends to the rear, projectiles down; returns immediately for four (five) more filled feed-cases, and then halts at his post.

1. **Commence.** 2. **Firing.** No. 5 keeps the cartridge-pouch of No. 4 supplied with filled feed-cases, and returns the empty feed-cases to Nos. 7 or 6.

Nos. 6 and 7 supply No. 5 with filled feed-cases, and return the empty feed-cases to the limber-chest.
In very rapid firing No. 7 may assist No. 5 in carrying cases.

1. **Cease.** 2. **Firing.** No. 5 carries back to Nos. 6 and 7 the empty and the filled feed-cases, and resumes his post.

Nos. 6 and 7 put them away in the limber-chest, arranging the trays so that the top ones contain filled feed-cases only. No. 6 then secures the lid.

**Remark.**

205. If the locks be removed to prevent unnecessary snapping of the springs, the cartridges, when run through the hopper, fall unexploded to the ground. This affords the means of teaching the practical use of the mitrailleur without expenditure of ammunition.

**Service of the mitrailleur with diminished numbers.**

206. With a detachment of six men, or less, the gunner uses the ejecting-rod instead of No. 3.

With a detachment of five men, or less, the empty feed-cases are dropped on the ground if necessary, being picked up and carried back to the limber by the cannoneer who brings up the full feed-cases.
<table>
<thead>
<tr>
<th>NUMBERS RETAINED</th>
<th>DISTRIBUTION OF DUTIES (WITH FEED-CASES)</th>
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<tbody>
<tr>
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<td>G. 1</td>
<td>G.2,4,5</td>
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<td>G. 1,2</td>
<td>G.5,6,7</td>
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<td>G. 1,2,3</td>
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<td>G. 1,2,3,4</td>
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<td>G. 1,2,3,4,5</td>
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<td>G. 1,2,3,4,5,6</td>
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</table>
MECHANICAL MANŒUVRES.

207. For purposes of instruction the full number of men prescribed for each manœuvre will be employed, and care must be taken that they do not overstrain themselves.

To change wheels.

208: The piece being unlimbered, and the limber in front of its caisson, the instructor commands:

1. Prepare to change right (or left) wheel, 2. Change Wheel.

Right wheel with spare wheel. At the first command, Nos. 6 and 7, and the caisson corporal, dismount the spare wheel; No. 6 runs it near and parallel to the disabled wheel, leaving room for the latter to be taken off; No. 1 places his staff upon the ground in front of the piece and then steadies the wheel in front; No. 6 takes hold of the disabled wheel in front, and No. 3 removes its linch-pin and washer. The gunner takes off the spare handspike and places it under the axle close to the shoulder; the gunner and No. 2 standing between the handspike and piece, facing the wheel, take hold of the handspike with both hands, near the axle; Nos. 4 and 5 take hold of the ends of the handspike with both hands, No. 5 assisting the gunner.

At the command change wheel, the side of the carriage is raised; Nos. 6 and 3 take off the disabled wheel, No. 6 runs it to the rear; Nos. 1 and 3 put on the spare wheel, No. 3 taking hold in rear; No. 3 then replaces the washer and linch-pin, the gunner the spare handspike, and No. 1 re-
su nes his staff. The disabled wheel is placed on the spare-wheel axle by Nos. 6 and 7, and the caisson corporal.

The men at the handspike must raise the end of the axle high enough to throw the weight on the other wheel, and those taking the wheel off, must lift it, and not add to the weight of the carriage by letting the wheel slide along the axle-arm.

Left wheel with spare wheel. At the first command, No. 4 unkeys the spare sponge-and-rammer staff, and No. 2 takes it off and places it on the ground in front of the piece; the manœuvre is then executed as prescribed for the right wheel, except that the gunner and No. 1, assisted by Nos. 5 and 3, respectively, man the handspikes; Nos. 6 and 4 take off the disabled wheel; No. 2 steadies the spare wheel; Nos. 2 and 4 put it on, No. 4 taking hold in rear; No. 4 attends to the linch-pin and washer; and Nos. 2 and 4 replace the spare sponge-and-rammer staff.

Right wheel with either limber-wheel. No. 6 removes the linch-pin and washer of the limber-wheel; the gunner and caisson corporal, assisted by Nos. 5 and 7, respectively, raise the side of the limber, the gunner in front, and the caisson corporal in rear of the axle; Nos. 3 and 6 take off the wheel, No. 6 taking hold in rear; No. 6 runs it forward. The axle is lowered gently to the ground, observing that, when the piece is horsed, the team must be first unhitched. As soon as the limber-wheel is put on the piece, the piece-wheel is put on the limber by the same men who took off the limber-wheel, No. 6 attending to the linch-pin and washer. No. 3 replaces the linch-pin and washer of the piece-wheel before returning to the limber-wheel.

Left wheel with either limber-wheel. Executed as the preceding manœuvre, No. 4 performing the duties just prescribed for No. 3.
To dismount a piece.

209. The piece being unlimbered, the instructor commands:

1. Prepare to dismount piece, 2. Dismount piece.

At the first command, Nos. 1, 2, 3, and 4, remove the implements and place them on the ground outside of their respective wheels—the bucket, sponge-and-rammer, and spare handspike, on the right; the worm, spare sponge-and-rammer, and trail handspike, on the left. Nos. 1 and 2 then press upon the muzzle, and Nos. 3 and 4, after removing the cap-squares, station themselves at the rear end of the cheeks, and, with one hand on the wheel and the other on the knob of the cascabel, stand ready to raise the breech. The gunner takes out the trail handspike, if in the pointing-rings, and passes it to No. 4, turns the elevating screw to its greatest height, and then takes hold of the left trail-handle; No. 5 takes hold of the right trail-handle; Nos. 6 and 7, if necessary, chock the wheels, in front or in rear, according to the slope of the ground, No. 7 the left wheel; they then go to the trail to assist in raising it.

At the second command, Nos. 1 and 2 bear down upon the muzzle; the gunner and Nos. 5, 6, and 7, raise the trail until the muzzle comes against the ground, No. 5 holding the lock-chain to prevent the trail from falling over to the front; Nos. 3 and 4 push against the cascabel to raise the breech, and when the piece is vertical, run around to assist Nos. 1 and 2 to keep it in that position. The carriage is next moved a few inches to the rear, when the trail is let down; the carriage is then run back, and the piece dropped on the ground, vent upward; as soon as the carriage halts, the gunner runs down the elevating screw.

In dismounting a piece, the greatest care must be taken
not to bend, or otherwise injure, the front sight, or the seat for the pendulum hausse.

210. Pieces will not be dismounted, as an exercise at drill, when the carriages are horsed.

To mount a piece.

211. The piece being on the ground, vent upward, the instructor commands:


At the first command, the gunner and No. 2 take handspikes; No. 2 inserts his in the bore, and, assisted by No. 1, raises the chase, so that the gunner may put his handspike under the piece, a little in rear of the trunnions. This done, No. 2 withdraws his handspike from the bore and places it under the knob of the cascabel, so that the larger ends of the handspikes are on opposite sides of the piece; Nos. 1, 3, and 4, assist at the handspike of No. 2, and Nos. 5, 6, and 7, at that of the gunner—Nos. 1, 2, 5, and the gunner, being at the ends. The gunner then commands: Heave, when the men, acting together, raise the piece upright, and Nos. 1, 2, 3, and 4, steady it in that position. The gunner and No. 5 go to the trail, and, assisted by Nos. 6 and 7 at the wheels, run the carriage forward to within a foot of the piece; Nos. 6 and 7 chock the wheels, if necessary, as in dismounting a piece; they then go to the trail to assist the gunner and No. 5 in raising it.

At the second command, the trail is raised, No. 5 holding the lock-chain to prevent the trail from falling over to the front; Nos. 1 and 2 push gently against the piece so as to bring the trunnions in the beds of the trunnion-plates; the trail is then lowered carefully to the ground, when the wheels are unchocked, the implements replaced, and the cap-squares secured, by the same numbers who chocke
the wheels and removed the implements and cap-squares, in dismounting the piece.

The piece may also be easily raised by means of a rope, without the use of handspikes. The gunner fixes the middle of the rope to the knob of the cascabel by an artificer's knot (two half-hitches), and Nos. 1, 2, 3, 4, 5, and 6, man the ends, Nos. 1 and 2 being nearest the cascabel. By hauling upon the rope at the command heave, the piece is raised; it is then mounted as before.

**To carry a piece.**

212. The piece being on the ground, vent upward, the instructor commands:


At the first command, Nos. 6 and 7 back the limber over the breech until the pindle-hook is just above the trunnions; No. 2 inserts a handspike in the bore to raise the piece, and Nos. 1, 3, and 4, stand near to help him; the gunner, assisted by No. 5, passes the prolonge round the piece, in front and rear of the trunnions, the chase being raised for this purpose; Nos. 6 and 7 then raise the pole; and Nos. 1, 2, 3, and 4, the chase; the gunner places the prolonge-ring over the pindle-hook, and, pulling on the free end, tightens the prolonge, which he passes over the pindle-hook and under the limber to No. 5, who receives it at the splinter-bar, and makes a turn with it round the fork. The pole is then lowered, and Nos. 1 and 2 press upon the muzzle to elevate the breech. The gunner, assisted by No. 5, lashes the knob of the cascabel to the splinter-bar, or fork, fastening the end of the prolonge by half-hitches. The piece, when slung, should be horizontal and as far above the ground as possible.
At the second command, the cannoneers prepare to move the limber forward; at the third, they move it off.

*To dismount a gun-carriage.*

213. The piece being dismounted, the instructor commands:


At the first command, Nos. 3 and 4 remove the linch-pins and washers; Nos. 1, 2, 3, and 4, step inside the wheels, and take hold of the carriage, Nos. 1 and 2 turning up the sponge-hooks.

At the second command, Nos. 1, 2, 3, and 4, lift the carriage; Nos. 5 and 7 take off the right wheel, and No. 6 and the caisson corporal the left, Nos. 5 and 6 taking hold in front, and No. 7 and the caisson corporal in rear; the parts are then lowered to the ground.

*To dismount a limber.*

214. A limber is dismounted in the same manner as a gun-carriage, the different numbers taking hold in corresponding positions, and performing the same relative duties.

*To mount gun-carriages and limbers.*

215. The method of mounting carriages and limbers corresponds to that of dismounting them.

*To mount and to dismount a mitrailleur.*

216. A mitrailleur is mounted and dismounted by means of a gin; when absolutely necessary, it may be mounted and dismounted as a field-piece, care being taken to place a block of wood to receive the gun-frame, and to prevent injury to the front sight, or to the barrels.
SCHOOL OF THE BATTERY DISMOUNTED.

217. The School of the Battery Dismounted includes that of the Platoon Dismounted, Section Dismounted, and Gun Detachment Dismounted; it also comprises the Manœuvres of two or more Gun Detachments, Dismounted.

218. A section dismounted comprises all the men belonging to a single piece and its caisson; it consists of one sergeant, who is chief of section, two corporals, the cannoneers of the piece, and the drivers of the piece and caisson, together with such artificers, wagoners, and privates, as may be assigned to it for convenience of administration.

The men are permanently attached to sections, and are only transferred by order of the captain; they may be temporarily attached to sections not their own to equalize subdivisions at drill or other duty.

219. A platoon dismounted, consists of two sections dismounted.

220. A battery dismounted, consists of two or three platoons dismounted.

221. The guides of a battery, platoon, or section, are the non-commissioned officers posted on its right and left. The guides of a gun detachment, are the gunner and the front-rank man on the opposite flank.

222. Chiefs of platoon and of section repeat or give commands only when prescribed; in manœuvring by section, the chiefs of platoon do not repeat or give commands.

223. The manœuvres of a platoon dismounted are identical with those of a battery dismounted, the command platoon being substituted for battery.
224. The manoeuvres of a section and of a gun detachment dismounted, are analogous to those of a battery dismounted, the command section or detachment replacing that of battery.

Formation of the battery dismounted.

225. The battery is formed in double rank, the sections arranged from right to left in the order of their permanent numbers, the 1st section on the right. The men in each section fall in according to height; in the right half-battery, the tallest men are usually on the right; in the left half-battery, they are usually on the left.

226. Sections have permanent numerical designations for purposes of administration; platoons are also permanently designated as Right (1st and 2d sections), Centre (3d and 4th sections), and Left (5th and 6th sections). If there be but two platoons, they are designated as Right and Left, the left platoon consisting of the 3d and 4th sections.

During the manoeuvres, sections are temporarily numbered, first, second, third, etc., from the right when in line and from the head when in column; and the sections of a platoon in line are designated right and left, according to their relative positions in the platoon.

With reference to their actual positions, platoons are temporarily designated in line as right, centre, and left; and in column as leading, centre, and rear.

As the relative positions of platoons and sections change, the provisional designations of these subdivisions change.

Posts of officers, non-commissioned officers, etc.

227. (Pls. 1, 2, and 3.) The captain, in line, is four yards in front of the centre of the battery; in column, on the side of the guide, or on the side toward which the su
divisions are dressed, four yards from the flank of the column and opposite its centre. As instructor, he goes wherever his presence is necessary.

The senior lieutenant takes post with the right platoon; the next in rank with the left platoon, and the third in rank with the centre platoon. Each lieutenant is the chief of the platoon with which he is posted, and in line, and in column of platoons, is two yards in front of the centre of his platoon; in column of sections, each is on the side of the guide, or on the side toward which the subdivisions are dressed, two yards from the flank of the column and opposite the centre of his platoon; in column of files, each is as if he had faced with the battery from line, except the chief of the leading platoon, who takes post at the side of the leading guide.

The junior lieutenant is chief of caissons. In line, he is four yards in rear of the centre of the battery; in column of platoons, and of sections, on the side opposite the guide, or on the side opposite to which the subdivisions are dressed, four yards from the flank of the column and opposite its centre; in column of files, he is as if he had faced with the battery from line.

The first-sergeant, in line, is on
the right of the battery, aligned on the front rank, and one yard from it; in column of platoons, and of sections, on the same side as the chiefs of platoon, aligned on the front rank of the nearest subdivision, and one yard from it; in column of files, he is as if he had faced with the battery from line.

The **quartermaster-sergeant**, in line, is on the left of the battery, aligned on the front rank, and one yard from it; in column of platoons, and of sections, on the same side as the chiefs of platoon, aligned on the front rank of the nearest subdivision, and one yard from it; in column of files, he is as if he had faced with the battery from line.

Each **chief of section**, in line, and in column of platoons, is on the right of the front rank of his section; in column of sections, one yard in front of the centre of his section; in column of files, each is as if he had faced with the battery from line.

Each **gunner**, in line, and in column of platoons, is one yard in rear of the right file of his section; in column of sections, on the right of the
front rank of his section; in column of files, each is as if he had faced with the battery from line.

Each caisson corporal, in line, and in column of platoons, and of sections, is on the left of the front rank of his section; in column of files, each is as if he had faced with the battery from line.

The guidon, in line, and in column of platoons, and of sections, is the left file of the front rank of the third section; if there be but two platoons, he is the left file of the front rank of the second section.

The trumpeters, in line, are in one rank on the right of the first-sergeant, and two yards from him; in column of platoons, and of sections, they wheel to the side indicated, and are either four yards in front of the centre of the leading subdivision, or four yards in rear of the last subdivision, according as the column has been formed toward their flank of the battery, or the flank opposite; in column of files, they are as if they had faced with the battery from line, and the one in rear stepped to the right or left of the other, according as the right or left is in front.

228. The terms right and left, in the preceding paragraph, refer to the right and left in the original forma-
tion. When the battery faces to the rear in line, the first-sergeant, quartermaster-sergeant, and trumpeters, face about, but do not change to the other flank.

229. In column of platoons, and of sections, the chief of caissons, first-sergeant, quartermaster-sergeant, and, in column of sections, the chiefs of platoon, change to the opposite flank of the column, unless otherwise directed, whenever the guide is changed.

230. In all changes of formation, as soon as the movement permits, the officers and non-commissioned officers, whose posts are changed, go by the shortest route to their posts in the new formation.

231. The officer, non-commissioned officers, and privates acting as such, posted in rear of the line, are the file-closers; it is their duty to rectify mistakes and insure steadiness and promptness in the ranks.

232. Chiefs of platoon and the chief of caissons, when absent, are replaced by the first-sergeant, quartermaster-sergeant, and senior chiefs of section. The first-sergeant, if performing the duties of an officer, and the quartermaster-sergeant, are not replaced. Gunners replace absent chiefs of section, caisson corporals absent gunners, and privates selected for efficiency, absent caisson corporals.

233. If it be not intended to manoeuvre by platoon, chiefs of platoon, when absent, are not replaced; in this case, if the chief of caissons be absent, as his services as file-closer are always needed, the captain may direct a chief of platoon to perform his duties.

To form the battery dismounted.

234. At the sounding of the assembly, the first sergeant, facing the battery and six yards in front of the centre, commands:

At the command *fall in*, the chiefs of section place themselves on the line facing to the right, at sufficient distance for the formation of their sections; the men of each section fall in, facing to the right, the front rank men covering their chief; the signal having ceased, the first-sergeant causes the sections to close up if necessary.

At the command *face*, the men face to the left.

At the command *call rolls*, the chiefs of section step out two yards in front of the centres of their sections, face toward them, call the rolls, and resume their places in ranks.

At the command *report*, the chiefs of section stand fast, and report in succession from right to left, the results of their roll-calls; the first-sergeant then faces about, salutes the captain, or battery officer of the day, reports the result of the roll-calls, and takes his post in line.

235. *Sections* are equalized for foot-drill: for other purposes, movements in column of files are ordinarily sufficient.

To equalize the sections, the first-sergeant usually orders all the non-commissioned officers, and privates detailed to act as such, into the line of file-closers; closes the battery toward either flank; counts the number of men in ranks; assigns the same number of files to the sections, leaving vacancies, if necessary, in the second file from the left of one or more of the rear ranks; causes the sections to side step and halt, to make intervals for the non-commissioned officers whom he orders to retake their posts in line. The men left over cannot exceed five for a battery of three platoons, or three for a battery of two platoons. If there be any left over, the first-sergeant causes them to change places, if necessary, with others in ranks,
so as to choose the most efficient men, and details these as file-closers; each file-closer thus detailed takes post one yard in rear of the left file of the section to which he is assigned.

236. In formations under arms, the men fall in with sabres in the scabbard. As soon as the first-sergeant has reported, the captain commands:

1. Draw, 2. Sabre.

When the ranks are to be opened before moving off, sabres are not drawn until the battery is at open order.

237. In drawing or returning sabre at close order, the rear rank marches backward two yards at the first command, closing to its proper distance on the completion of the movement.

To open ranks.

238. Being in line, at a halt, the captain commands:


At the first command, the chiefs of section and the caisson corporal of the section on the left step briskly three yards to the rear, to mark the new alignment of the rear rank; the captain goes to the right flank and sees that these non-commissioned officers are on a line parallel to the front rank.

At the command march, the chiefs of platoon step forward one yard so as to be three yards in front of the battery; the front-rank men dress to the right; the rear-rank men cast their eyes to the right, step backward, halt a little behind the alignment, and then dress to the right on the line established by the non-commissioned officers who have stepped back; the gunners step to the rear and place themselves three yards from the rear rank; the chief of
caissons steps to the rear and places himself six yards from the rear rank.

The captain superintends the alignment of the chiefs of platoon and of the front rank, and the first-sergeant, or in his absence the chief of the section on the right, that of the rear rank; the captain verifies the alignment of the rear rank and of the file-closers; the chiefs of platoon and the file-closers cast their eyes to the front as soon as their alignment is verified.

At the command *front*, the non-commissioned officers who have stepped back resume their places in the front rank, and the men cast their eyes to the front; the first-sergeant returns to his post, and the captain places himself six yards in front of the centre of the battery.

*To close ranks.*

239. Being at a halt, the captain commands:


At the command *march*, the chiefs of platoon face about and resume their posts in line; the rear rank closes to facing distance, each man covering his front-rank man; the file-closers move forward with the rear rank and take their posts in line; the captain resumes his post in line.

*Alignments.*

240. Being in line, at a halt, with the ranks open, the captain establishes two or four men as a basis for each rank, at first in parallel and afterward in oblique directions to the front of the battery. He then commands:

Each rank is aligned as explained in the School of the Soldier Dismounted, the rear rank remaining parallel to the front rank.

The ranks being closed, the alignments are repeated in the same manner.

In all alignments, the file-closers preserve their distances from the rear rank.

*Manual of the sabre and sabre exercise.*

241. The ranks are opened for instruction in the manual of the sabre; for instruction in the sabre exercise, the ranks and files are both opened.

During the instruction, the captain may direct the chiefs of platoon to face about, and assist in correcting faults.

In opening files, the chiefs of platoon, first-sergeant, quartermaster-sergeant, and file-closers, face to the side indicated at the first command, step off at the second, and, when opposite their proper places, halt and face to the front.

*Present and carry sabre* are executed with the ranks opened or closed; *inspection sabre* is only executed at open order.

Non-commissioned officers always execute *draw* and *return sabre*; in rendering honors, they execute *present* and *carry sabre*. They execute the other movements of the manual of the sabre and of the sabre exercise only when specially directed.

*To rest.*

242. Being at a halt, the captain commands:


To resume the attention, he commands:

To dismiss the battery.

243. Being in line, at a halt, if sabres be drawn, the captain commands:

1. Return, 2. Sabre.

He then directs the first-sergeant: *Dismiss the battery.* The officers fall out, and the first-sergeant commands: 1. *Break ranks,* 2. *March.*

To march in line.

244. The battery being at a halt, and correctly aligned, the captain commands:


At the command *forward,* the guide selects two points on a line passing through him and perpendicular to the front of the battery; at the command *march,* the men step off with life; the guide observes with the greatest care the length and cadence of the step, marches on the two points he has chosen, and selects others in advance on the same line before reaching the first; the file-closers keep at their proper distances from the rear rank.

To halt the battery and to align it.

245. The captain commands:


To march in the short step; to mark time; to change step; to side step; to march backward; to oblique in line; to pass from quick time to double time, and the reverse.

246. Executed as explained in the School of the Soldier Dismounted, substituting in the commands, *battery for squad,* wherever the latter occurs.
247. In the oblique march, the ranks remain parallel to their former position.

248. In marching in double time the left hand, instead of being raised, steadies the scabbard; the sabre, if drawn, is held in a vertical position in the right hand.

**To wheel the battery.**

249. Being in line, at a halt, the captain commands:

1. Right (or left) wheel, 2. March, 3. Battery, 4. Halt,
5. Left (or right), 6. Dress, 7. Front.

At the command *march*, the battery wheels to the right on a fixed pivot; the left guide conducts the marching flank; the right guide marks time in his place, and conforms his movements to those of the marching flank; the chiefs of platoon face about at the first command, step backward at the second, and superintend the movements of their platoons, resuming their positions at the command *front*; the captain hastens by the shortest line to place himself directly in front of the pivot-guide, and at a distance from him equal to the length of the battery front, and faces to the late rear.

At the command *halt*, given when the left guide is three yards from the perpendicular, the battery halts; the left guide of the battery advances quickly, places his left elbow lightly against the breast of the captain, who establishes him on the line.

At the command *dress*, the men dress up to the line of the guides.

To continue the march upon the completion of the wheel, the captain, without placing himself in front of the pivot-guide, commands: 3. *Forward*, 4. *March*, 5. *Guide (right or left)*. The third command is given when the guide on the marching flank is three yards from the
perpendicular; the fourth, the instant the wheel is completed; and the fifth immediately after.

250. Marching in line, the captain commands:


At the second command, the battery wheels to the right on a movable pivot. The command forward is given when the guide is three yards from the perpendicular, and the fourth command at the instant the change of direction is complete.

251. In wheeling on a movable pivot; the command forward is given in sufficient time to add march the instant the wheel is completed. This rule is general.

252. Marching in line, to effect a slight change of direction, the captain cautions:

Incline to the right (or left).

The guide advances gradually the left shoulder, and marches in the new direction; all the files advance the left shoulder, and conform to the movements of the guide, lengthening or shortening the step, according as the change is toward the side of the guide, or the side opposite.

To march by the flank.

253. Being in line, at a halt, the captain commands:

1. Right (or left), 2. Face, 3. Forward, 4. March.

If marching, the captain commands:

1. By the right (or left) flank, 2. March.

254. The march in column of files is usually in quick time; if necessary to march in double time, the distance between files is increased to thirty-two inches, and, upon halting, the files close to facing distance.
255. To halt the battery, and form it in line, the captain commands: 1. Battery, 2. Halt, 3. Left (or right), 4. Face; or, to form line and continue the march: 1. By the left (or right) flank, 2. March, 3. Guide (right or left).

To oblique, and to change direction in column of files.

256. Executed by the commands and means prescribed in the School of the Soldier Dismounted.

To form column of subdivisions to the right or left.

257. Being in line, at a halt, the captain commands:

1. Platoons (or sections) right (or left) wheel, 2. March.

At the first command, each chief of subdivision, if not already there, steps briskly in front of the centre of his subdivision, and cautions: Right wheel.

At the command march, each subdivision wheels to the right on a fixed pivot, its right guide marking time in his place, and conforming his movements to the marching flank, which is conducted by the left guide; each chief hastens to the point where the left of his subdivision is to rest on the completion of the wheel, faces to the late rear, and when the marching flank approaches him, commands:


At the command halt, the non-commissioned officer on the left places his left arm against the breast of his chief, who then aligns the subdivision, and takes his post in column of subdivisions, after commanding front.

If marching, the movement is executed as just explained, the pivot guides halting at the command march, and marking time in their places.

258. To form column of subdivisions to the right or left
and continue the march, instead of halting, the captain commands:


The movement is executed as before, except that each chief remains in front of the centre of his subdivision, and that the subdivisions move straight forward at the fifth command. The leading guide prolongs accurately his line of march by choosing successive points in advance; the other guides preserve with care the trace, step, and wheeling distance.

*To put the column of subdivisions in march, and to halt the column.*

259. The captain commands:


*To oblique in column of subdivisions.*

260. The captain commands:

1. Right (or left) oblique, 2. March.

During the oblique, the subdivisions preserve their parallelism; the guide of each subdivision on the side toward which the oblique is made is the guide of the subdivision; the guide of the leading subdivision is the guide of the column. The guides keep on a line parallel to the original direction.

To resume the direct march, the captain commands:

The guide is, without indication, on the side it was previous to the oblique.

If the oblique be executed from a halt, the guide is announced upon taking the direct march.

To change direction in column of subdivisions.

261. Being in march, the captain commands:

1. Column right (or left), 2. March.

At the first command, the chief of the leading subdivision commands, Right wheel; at the command march, which he repeats, his subdivision wheels to the right on a movable pivot, the chief adding: 1. Forward, 2. March, upon the completion of the wheel; the other subdivisions march squarely up to the wheeling point, and change direction by command of their chiefs, as explained for the first.

In wheeling on a movable pivot, as the dress is always toward the marching flank without command, whenever a wheel is executed toward the side of the guide, each chief, upon its completion, cautions his subdivision, guide right, or guide left, according as the guide was right, or left, before the wheel.

In changing direction, each chief of subdivision faces his subdivision while wheeling, and sees that the guide takes steps of twenty-eight or thirty-three inches, and the pivot, steps of nine or eleven inches, according to the gait.

262. Column half-right (or half-left) is similarly executed, each chief giving the preparatory command right (or left) half wheel.

263. To make a small change of direction, the captain cautions:
Incline to the right (or left).

The leading guide advances his left shoulder and takes two points a little to the right of those upon which he was marching, the men conforming to the new direction of the guide.

264. To put the column of subdivisions in march and change direction at the same time, the captain commands:

1. Forward, 2. Guide (right or left), 3. Column right (or left), 4. March.

To face the column of subdivisions to the rear, and to march it to the rear.

265. The captain commands:

1. Platoons (or sections), right (or left) about, 2. March, 3. Battery, 4. Halt.

At the command march, the subdivisions execute an about on a fixed pivot; at the command halt, each chief goes to the left, dresses his subdivision to the left, commands: Front, and then takes his post.

To march to the rear, the captain commands:


To march the column of subdivisions by the flank.

266. If at a halt, the captain commands:

1. Right (or left), 2. Face, 3. Forward, 4. March, 5. Guide (right or left).

If marching:

1. By the right (or left) flank, 2. March, 3. Guide (right or left).
The non-commissioned officers at the heads of subdivisions dress on the non-commissioned officer who conducts the subdivision on the side of the guide, and preserve the proper interval.

267. To resume the original direction, the captain commands:

1. By the left (or right) flank, 2. March, 3. Guide (right or left).

To halt and face in the original direction, the captain commands:


268. To march a short distance, the subdivisions may be faced so as to bring the rear rank in front; the guides then step into the rear rank, now the front. The original direction is resumed by again passing to the flank march, or at once by the commands: 1. To the rear, 2. March; or, if at a halt, 1. Battery, 2. About, 3. Face; the guides in either case return to the front rank.

To form column of files from column of subdivisions.

269. Being at a halt, the captain commands:


At the command face, all face to the right; at the command march, each subdivision column changes direction, and closes upon the one which precedes it.

If marching, the captain commands:

1. By the right (or left) flank, 2. Platoons (or sections), 3. Column left (or 3. Column right), 4. March.
At the command *march*, each subdivision column faces to the right in marching, changes direction, and closes upon the one which precedes it.

*To form column of subdivisions from column of files.*

270. The captain commands:


At the command *march*, the leading guide of each subdivision moves straight to the front; all the files oblique to the right until opposite their places in line, when each marches to the front.

The leading guide of each subdivision moves forward until the command *halt*, which is given when he has advanced five yards; the other men halt on arriving in line; each guide in rear places himself on the right of the front rank upon the arrival of the last file; the leading guide having halted, each chief dresses his subdivision to the left, and commands: *Front* when the last file is aligned.

If the command be *double time*, the captain commands: *Guide left* (or *right*), immediately after the command *march*; the leading guide of each subdivision moves forward in quick time; the other men oblique in double time, each taking the quick step and dressing to the left upon arriving in line; the rear-rank men then close to facing distance.

This movement is not executed when marching in double time.

The captain's command is *right* (or *left*) *front into line*, according as the column of files is left, or right, in front.

271. The column of files is *right in front* when the front-rank men are on the left of their rear-rank men; it is
left in front when the front-rank men are on the right of
the rear-rank men.

Route step.

272. Marching in column of subdivisions, to march at
route step, the captain commands:


At the command march, the rear rank falls back to
thirty-two inches from the front rank; the men are not
required to preserve silence, nor to keep the step, but each
man covers the file in his front.

To resume the attention, the captain commands: 1. Battery, 2. Attention. At the second command, the rear
rank closes to facing distance, and all the men take the
step.

273. The battery may be also marched at route step in
column of files, the distance between files being increased
to thirty-two inches. On resuming the attention, the lead-
ing file takes the short step until the other files close to
facing distance.

274. The battery in route step changes direction by the
same commands as when in cadenced step.

To form line to the right or left from column of sub-
divisions.

275. (Pl. 4.) Being at a halt, the captain commands:

1. Right (or left) into line wheel, 2. March, 3. Battery,

At the command march, the pivot-guides mark time in
their places, and the subdivisions wheel to the right on a
fixed pivot; at the command halt, given when the march-
ing flanks arrive near the line, the subdivisions halt; the captain places himself, facing to the right, on the prolongation of the line of the pivot-guides at the point where the marching flank of the leading subdivision is to rest; at the command dress, the battery dresses up to the line established by the pivot-guides and captain, the left guide of the leading subdivision touching the breast of the captain with his left arm; the captain superintends the alignment, and gives the command front upon its completion.

If marching, the movement is executed as just explained, the pivot-guides halting at the command march, and marking time in their places.
276. To form line and continue the march, the captain commands: 3. Forward, 4. March, 5. Guide (right or left); if manoeuvring by section, at the command forward, the chiefs of section and gunners return to their posts in line; the fourth command is given the instant the wheel is completed.

To form line on the right or left from column of subdivisions.

277. (Pl. 5.) Being at a halt, the captain commands:

1. On right (or left) into line, 2. March, 3. Front.

At the first command, the chief of the leading subdivision commands: 1. Right wheel; the other chiefs of subdivisions command: 1. Forward, 2. Guide right. At the command march, repeated by all the chiefs of subdivision, the leading subdivision wheels to the right on a movable pivot; its chief commands: 1. Forward, 2. March, on the completion of the wheel, and adds: 3. Platoon
(or section), 4: Halt, 5: Right, 6: Dress, when his subdivision, after completing the wheel, has advanced fourteen yards in the new direction. The other subdivisions move forward, and each, when nearly opposite the left of the preceding subdivision, is wheeled to the right, moved forward, halted, and dressed, as just explained.

If marching, before giving the commands, the captain orders the guide, if not already there, to the flank toward which the movement is to be executed, and the chiefs of subdivision in rear of the first omit the commands forward, guide right; the movement is then executed as before.

The captain superintends the alignment from the right flank, and gives the command front upon its completion.

**To form line to the front from column of subdivisions.**

278. (Pl. 6.) Being at a halt, the captain commands:

1. Right (or left) front into line, 2. March, 3. Front.

At the first command, the chief of the leading subdivision commands: 1. Forward, 2. Guide left; the other chiefs command: Right oblique. At the command march, repeated by all the chiefs, the leading subdivision advances eighteen yards, when its chief commands: 1. Platoon (or section), 2. Halt, 3. Left, 4. Dress; the other subdivisions oblique to the right until opposite their places in line, when their chiefs command: 1. Forward, 2. March, 3. Guide left, adding, as they arrive near the line: 3. Platoon (or section), 4. Halt, 5. Left, 6. Dress. The captain superintends the alignment from the left flank, and gives the command front upon its completion.

If marching in quick time, the movement is executed as just explained, the chief of the leading subdivision commanding Guide left, if the guide be not already there.

If marching in quick time and the command be double
time, the captain commands: Guide left immediately after the command march; the chief of the leading subdivision cautions it to advance in quick time, and repeats the command for the guide; each of the other chiefs repeats the command double time, and, when his subdivision is about to arrive in line, commands: 1. Quick time, in time to add:
2. **March**, the instant it arrives abreast of the leading subdivision.

If marching in **double time**, the chief of the leading subdivision commands: **Quick time**, at the first command, and repeats the other commands; the other subdivisions complete the movement as before.

*To face the line to the rear, and to march it to the rear.*

279. To form faced to the rear and halt, the captain commands:

1. **Platoons (or sections) right (or left) about**, 2. **March**, 3. **Battery**, 4. **Halt**, 5. **Left (or right)**, 6. **Dress**, 7. **Front**.

At the command **march**, each subdivision executes the about on a fixed pivot; the command **halt** is given when the marching flanks have nearly completed their half-circles. The chief of caissons, and the chiefs of platoon when the about is by section, pass between the nearest subdivisions as soon as there is room.

To march to the rear, the captain commands:

3. **Forward**, 4. **March**, 5. **Guide (right or left)**.

The fourth command is given the instant the half-circles are completed, when all step off together in the new direction.

**MANOEUVRES OF TWO OR MORE GUN DETACHMENTS DISMOUNTED.**

280. The manoeuvres of two or more gun detachments dismounted, are similar to those of a battery or platoon dismounted the words **detachment** and **detachments** being substituted in the commands for the designation of one or more subdivisions.

281. If, on special occasions, the chiefs of platoons and chief of caissons be present, they occupy the same relative
positions with respect to gun detachments, as to sections in the manoeuvres of the battery dismounted.

282. The chiefs of section, when present, take post in line on the right of the front rank, the gunners stepping back, and covering them in the rear rank; in column of detachments the chiefs of section are on the side of the guide, one yard from the front rank; in column of files, they are as if they had faced with the detachment from line. The chiefs of section, when present, do not repeat or give commands.

283. Each gunner, in line, and in column of detachments, is on the right of the front rank of his detachment, except when displaced by the chief of section, as just prescribed; in column of files, each gunner is as if he had faced with the detachment from line.

284. Gunners command their detachments without leaving their places on the right; when a detachment is aligned to the left at the command of its gunner, the men dress on the left file of the front rank.

To march the gun detachments to the park.

285. The battery being formed for drill, the first-sergeant forms the gun detachments, and closes them in upon each other.

The detachments are marched to the park in column of files, or in column of detachments. The column enters the park by the left, if marching right in front; by the right, if marching left in front.

The instructor directs the column so as to approach the park parallel to its front, and either in front or in rear of the pieces, the flank of the column being at such distance from the poles, lead-horses, or muzzles, that the detachments, when formed in line near the pieces, can be readily established in their proper positions by the gunners.
To post the gun detachments with their pieces.

286. The column having arrived at the park, the instructor commands:

**Detachments opposite your pieces.**

**Column of files.** As each detachment arrives opposite its piece, the gunner halts it, and commands, according as the right or left is in front: 1. *Left* (or *right*), 2. *Face*, 3. *Right*, 4. *Dress*, 5. *Front*.


To serve the pieces.

287. The instructor causes the cannoneers to call off, and posts them at the pieces; the paulins, and in mitrailleur batteries the gun-covers, being taken off, folded up, and strapped on the lids of the chests, the instructor exercises the cannoneers in the manual of the piece, the word *detachments* being substituted for *detachment* in the commands for forming the gun detachments and in changing their posts at the pieces.

Firings.

288. The pieces being in battery, the captain commands.

Load.

At this command, repeated by the chiefs of platoon and section, the pieces are loaded as explained in the School of the Soldier Dismounted.

To fire by piece. The captain commands: 1. *Fire by piece*, 2. *Right* (centre, or *left*) *platoon*, *right* (or *left*) *piece*, 3. *Fire*. 
To fire by platoon. The captain commands: 1. Fire by platoon, 2. Right (centre, or left) platoon, 3. Fire.

To fire by battery. The captain commands: 1. Fire by battery, 2. Battery, 3. Fire.

In firing by piece, by platoon, and by battery, the chiefs of platoon repeat the first commands, the second and third are not repeated; in firing by platoon, as soon as the chiefs have repeated the first command, they designate the platoons with which they are respectively posted as right, centre, and left platoon.

289. In the firings of a single platoon, the instructor commands: 1 Fire by piece, 2. Right (or left) piece, 3. Fire; and, 1. Fire by platoon, 2. Platoon, 3. Fire.

290. To fire each piece continuously without reference to the others, the captain commands: 1. Commence, 2. Firing.

The chiefs of platoon and of section repeat the commands, and the firing is conducted as explained in the School of the Soldier Dismounted.

291. When ammunition is used, the captain commands: *With cartridges (canister, shell, etc., specifying the particular kind), before commanding load, or commence, firing.*

292. In a mitrailleur battery, to fire by piece, or by platoon, the commands commence, firing, are substituted for the command fire; to fire by battery, the commands commence, firing, replace the commands, battery, fire.

In the firings of a single platoon of a mitrailleur battery, the commands are similarly modified.

293. To discontinue the firing, the captain commands: 1. Cease, 2. Firing.

The chiefs of platoon and of section repeat the commands which are executed as explained in the School of the Soldier Dismounted; the loaded pieces are discharged by special direction, or the loads drawn.
To discontinue the firing of a single platoon, the same principles apply.

294. A piece should not be limbered while loaded. In exceptional cases where the cartridge or round of fixed ammunition cannot be readily extracted, it may be left in the bore, the gunner causing No. 3 to thrust his priming-wire through the cartridge before limbering, and to let it remain in the vent until the piece can be fired or the load drawn; when this is done, the charge will be rammed home before firing.

295. The sponge must never be wet except for the purpose of cleaning the gun after the firing has ceased.

*To leave the park.*

296. The detachments are marched from the park in column of files, or in column of detachments.


At the command *face*, all face to the right; at the command *march*, the right detachment stands fast, the others step off until they have closed up, when they are halted by their gunners.


At the second command, each detachment wheels to the right and is halted and dressed to the left by its gunner; at the third command, the gunner of the leading detachment cautions it to stand fast; at the fifth command, all the detachments in rear of the first step off, and each is halted by its gunner when at wheeling distance from the preceding detachment.
SCHOOL OF THE SOLDIER MOUNTED.

299. The object of this school being the instruction of recruits in horsemanship, the instructor’s first efforts are directed to giving them the desired seat and teaching them to ride.

As soon as the men have gained confidence at a walk, he causes them to take the slow trot in the riding-school. To make them good horsemen, about an hour daily of this exercise should be given for at least two months, the drill being varied by combinations of the simple movements executed without the saddle.

Elementary instruction should be carefully imparted to recruits individually, or at most to four at a time.

The recruits fall in without sabres or spurs, and are provided with watering-bridles, surcingles, and blankets; they take their horses either in the stalls or at the picket-line; the instructor cautions them against any abuse of the animals, and explains the general principles of their treatment.

Quiet and well-trained horses are chosen for the first lessons, each recruit being required to change his horse from day to day.

300. All mounted exercises are begun and ended at a walk. This rule is general.

EQUIPMENT OF THE HORSE.

To fold the saddle-blanket.

301. The blanket, after being shaken, is folded into six thicknesses, as follows—Hold it well up by two corners,
the long way up and down, and double it lengthwise, the
double corner in the right, the folded corner in the left
hand; let go with the right hand, and seize the folded
edge, the back of the hand to the body, just below the left
hand; slip the left hand down the folded edge, and seize
it near the other end; raise the left hand, extend the arms
horizontally, the middle of the folded edge under the chin;
then fold again in three equal parts, by first closing the
left arm over the breast, and then the right, which is
brought under the left and grasps the corner thus folded;
reverse the blanket, bringing it in front of the body, and even
the folds; hold the blanket between the chin and neck,
slip the hands half-way down, and there grasp the blanket;
let the upper part fall forward; the hands then hold the
folded blanket, thus doubled, by each new upper corner,
the right hand at the part which will go toward the croup,
the left hand at the part which will go over the withers;
then flirt the outer part of the blanket over the right fore-
arm. This is the position in which the blanket is held just
before placing it on the horse.

**To put on the blanket and surcingle.**

302. The instructor commands: **Blanket.**

Approach the horse on the near (left) side, with the
blanket folded and held as just prescribed; place it on his
back, sliding it once or twice from front to rear to smooth
the hair, and carefully removing any locks of the mane;
pass the buckle end of the surcingle over the middle of the
blanket, and buckle it on the near side, a little below the
edge of the blanket.

The blanket should lie well up on the withers, and ex-
tend down equally on the sides.
To put on the watering-bridle.

303. The instructor indicates the parts of the halter, and watering-bridle, and commands: Bridle.

Take the reins in the right hand, the bit in the left; approach the horse on the near side, slip the reins over the horse's head and let them rest on his neck; reach under and put the toggle of the bridle through the right halter-ring, insert the left thumb into the side of the horse's mouth above the tushes, and press open the lower jaw; insert the bit and pass the toggle through the left halter-ring. The bit should hang so as to touch, but not draw up, the corners of the mouth.

The hitching-strap is passed around the horse's neck and tied securely, or is unbuckled and left at the manger or picket-line.

304. The horse is unbridled by passing the reins over his head and taking the toggles out of the halter-rings.

To saddle.

305. The saddle being at hand, stirrups, girth, and surcingle crossed over the seat, and blanket folded and laid upon them, the instructor indicates the different parts of the saddle, and commands: Saddle.

Place the blanket on the horse as previously explained; seize the pommel with the left hand, and the cantle with the right, and place the saddle on the horse's back, well forward on the withers, bringing it from the direction of the croup in order not to frighten him; let down the girth and right stirrup; pass by the head of the horse to the off side; see that the stirrup and girth are properly adjusted, and the blanket smooth; return by the front to the near side. Take the girth-stryaps with the right hand, reach under the horse for the girth with the left, pass the end
of the strap through the ring from below, and through
the upper ring from the inside; seize the end of the strap
with the left hand, turn the right side to the horse, place
the right hand on the strap near the upper ring, and press
well down. Retain the end of the strap with the left hand,
and pass the right between the strap and side of the horse,
to smooth the hair and wrinkles of the skin; reseize the
strap with the right hand, and pass the end through the
buckle with the left, and buckle tight; pass the surcingle
over the saddle, buckling it less tightly than the girth, and
let down the left stirrup.

To unsaddle.

306. The instructor commands: UNSADDLE.

Unbuckle and remove the surcingle, throw over the
left stirrup, unbuckle the girth, step to the right side, pass-
ing by the head, throw over the girth and the right stirrup,
and return to the left side, passing by the head; seize the
pommel with the left hand, the cantle with the right;
remove the saddle and place it on the ground in front of
the horse, pommel to the front; take off the blanket, double
it, and lay it on the saddle, folded edge to the front. In
the stable, hang the saddle on its peg as soon as taken off
the horse.

To put on the curb-bridle.

307. The instructor indicates the parts of the bridle and
explains their uses; he then commands: BRIDLE.

Take the reins in the right, the crown-piece in the left
hand, approach the horse on the near side, passing the
right hand along his neck; slip the reins over his head,
and let them rest on his neck; take the crown-piece in
the right hand, the left side of the bar of the bit resting on
the first two fingers of the left hand; bring the crown-
piece in front of and slightly below its proper position, in-
sert the thumb of the left hand into the side of the mouth above the tushes; press open the lower jaw; insert the bit by raising the crown-piece, pass the left hand under the brow-band, draw the ears gently under the crown-piece, beginning with the right ear; arrange the forelock, secure the throat-lash, and then the curb-strap, taking care not to make them set too closely. There should be at least three fingers' breadth between the throat-lash and the jaw, and one finger's breadth between the curb-strap and jaw. The bit should hang so as to touch, but not draw up, the corners of the mouth. In no case should the top of the mouth-piece touch the palate.

At the discretion of the instructor, the halter may be taken off before bridling, the reins being first passed over the neck; if the bridle be put on over the head-stall, the hitching-strap, if not left at the manger or picket-line, will be tied round the neck as before explained, or attached to the left saddle-ring. The hitching-strap may be also arranged as follows: loop it two or three times through the ring, so that the loop may be about eight inches long; wind the strap several times around the loop, and draw the end of the strap tightly through it.

**To unbridle.**

308. The instructor commands: **Unbridle.**

Loose the curb-strap and throat-lash, slip the reins with the right hand over the ears, letting them fall into the bend of the left arm; then with both hands carefully disengage the ears, and let the bit drop out of the mouth by lowering the crown-piece along the forehead.

If the horse have no halter on, after losing the curb-strap and throat-lash, the bit can be taken out of his mouth, and the bridle pushed back over his neck until the halter is replaced.
ORDER OF INSTRUCTION.

Position of stand to horse.

309. The horses being equipped with blankets and watering-bridles, the instructor commands: STAND TO HORSE.

At this command, each recruit stands faced to the front, on the near side of the horse, his breast on a line with the lower jaw, takes the position of the soldier dismounted, except that his right hand, nails down, grasps both reins, six inches from the bit.

To lead out.

310. The recruits standing to horse, to leave the stable or picket-line, the instructor commands: LEAD OUT.

At this command, each man holding his right hand well up, and firm, conducts his horse, without looking at him, to the place designated by the instructor.

The horses are formed in line from right to left, and each man STANDS TO HORSE.

311. Until further directions, intervals of three yards are taken between the horses.

312. When necessary to align the horses, the instructor commands: 1. Right, 2. Dress, 3. Front.

At the command dress, the men look along the line, and move their horses forward or back as required; at the command front, they resume the position of stand to horse.

To mount in line with intervals (horse unsaddled).

313. The recruits standing to horse, the instructor commands: PREPARE TO MOUNT.

At this command, face to the right, dropping the right rein from the hand; take two side-steps to the right, sliding
the hand along the left rein; then take both reins with
the right hand, aided by the left, place the right hand on
the withers, thumb to the left, fingers to the right, holding
the reins short enough to feel lightly the horse’s mouth;
place the left hand on top of the neck and grasp a lock of
the mane, the lock coming out between the thumb and
forefinger.

The instructor then commands: Mount.

At this command, spring lightly from the ground, and
raise the body on the wrists, keeping it erect, and supporting
the weight by the arms; carry the right leg extended,
over the horse’s back without touching it, the weight still
borne by the arms, and sit down gently on the horse; take
one rein in each hand.

**Position of the soldier mounted (horse unsaddled).**

314. The buttocks bearing equally upon the horse’s
back, and as far forward as possible.

The thighs turned upon their flat side without effort,
embracing the horse equally, and stretched only by their
own weight and that of the legs.

The knees bent without stiffness.

The legs and feet free, and falling naturally, the feet
parallel to the horse.

The body erect and unconstrained.

The shoulders equally thrown back.

The arms free, the elbows falling naturally.

The head erect, square to the front, and without con-
straint.

One rein in each hand, the rein coming into the closed
hand on the side of the little finger, and passing out over
the first finger, on which the thumb is pressed, the bight
(end) of the reins falling to the front and between the
right rein and the horse’s neck; the hands as high as the
elbows, and six inches apart; the fingers turned toward each other.

Remarks on the position of the soldier mounted.

Buttocks bearing equally upon the horse's back. If they do not support equally the weight of the body, its steadiness will be impaired.

As far forward as possible. That the thighs may readily clasp the horse.

Thighs turned upon their flat side, without effort, embracing the horse equally. The more the thighs adhere to the horse, the greater is the stability of the rider; if they do not clasp the horse equally, the seat will be deranged.

Stretched only by their own weight, and that of the legs. If they do not fall naturally, they can only be extended by an effort, which will cause constraint.

Knees bent without stiffness. To give facility in carrying the legs more or less to the rear, without deranging the position of the thighs.

Legs and feet free, and falling naturally; feet parallel to the horse. Stiffness in the legs will impair their action; if the feet be parallel to the horse, the thighs will be in proper position.

Body erect and unconstrained. This gives ease, and enables it to conform with suppleness to the motions of the horse.

Shoulders equally thrown back. If thrown forward, the back will be curved, and the breast contracted; if not thrown back equally, the position of the body will be distorted.

Arms free, and elbows falling naturally. That they may contribute to the steadiness of the seat, and not stiffen the shoulders or forearms.

Head erect, square to the front, and without constraint.
If not erect, the body will incline to one side; if there be stiffness, it will be communicated to the upper part of the body, and prevent the head from moving with freedom.

To lengthen the rein.

315. The instructor commands: 1. Lengthen, 2. Left (or right) rein.

At the second command, bring the hands toward each other without turning them in; grasp the left rein with the thumb and forefinger of the right hand one inch from the left thumb. (Two.) Half open the left hand and allow the left rein to slip until the thumbs touch; close the left hand and replace the hands.

To shorten the rein.

316. The instructor commands: 1. Shorten, 2. Left (or right) rein.

At the second command, bring the hands toward each other without turning them in; grasp the left rein with the thumb and first finger of the right hand, so that the thumbs touch. (Two.) Half open the left hand, raise the right, slipping the left hand along until the thumbs are one inch apart; close the left hand and replace the hands.

To dismount in line with intervals (horse unsaddled).

317. The instructor commands: 1. Prepare to dismount.

At this command, pass the right rein into the left hand; then seize both reins with the right hand in front of the left, and place the right hand on the withers, thumb to the left, fingers to the right, the reins coming into the hand between the thumb and forefinger; let go with the left hand, place it on top of the neck, and grasp a lock of the mane, the lock coming out between the thumb and forefinger.
The instructor then commands: 2. Dismount.

At this command, raise the body on both wrists, carry the right leg extended over the horse's back without touching it; bring the right leg near the left, and come lightly to the ground, bending the knees a little; make a left face, drop the right rein, step to the front, sliding the right hand along the left rein, and assume the position of stand to horse.

To rest.

318. Being in line with intervals (or in line), the instructor dismounts the recruits, and commands: 1. Squad, 2. Rest.

Executed as on foot, except that the recruits retain hold of the reins, and keep their horses in place.

319. To resume the attention, the instructor commands: 1. Squad, 2. Attention.

At the command attention, each man assumes the position of stand to horse. This rule is general.

To file off.

320. To return the horses to the stables or picket-line, the instructor commands: 1. By the right (or left), file off, 2. March.

At the command march, the recruit on the right leads his horse four yards to the front, the hand high and firm, turns to the right, and then marches to the stable or picket-line. Each man executes successively the same movement when the one who precedes him has moved four yards to the front.

To dismiss the squad.

321. The squad having filed off, the instructor, or senior non-commissioned officer, causes the men to fall in, marches
them to the company parade-ground, and dismisses them as prescribed in the School of the Soldier Dismounted.

Before causing the men to fall in, the instructor, or senior non-commissioned officer, sees that the horses are secured and the equipments taken off and put in place. He is also responsible that the men take proper care of their horses and observe the precautions required on their return from exercise.

Use of the reins and legs.

322. Preparatory to the movements, the instructor mounts the squad and explains the use of the reins and legs.

The reins serve to prepare the horse for the movements, to guide and to halt him; their action should be gradual and in harmony with that of the legs. In using them, the arms should be moved with ease, and from the wrist to the shoulder. In riding, the hand should be kept steady; and ought not to move with the body; at the same time it must be kept light, for the bit causes pain if pressed constantly on the mouth, destroys its sensibility, and makes the horse hard-mouthed.

The legs serve to urge the horse forward, to support him, and to guide him in executing changes of direction and of gait; when closed without pressure, they tend to steady the horse in his position; when both legs are closed equally, pressing the horse, they tend to move him forward; when closed, the right more to the rear than the left, they tend to turn him to the right; when closed, the left more to the rear than the right, they tend to turn him to the left.

To gather the horse. Close both legs lightly, and raise the hands gently until the horse feels the bit.

This serves to attract the attention of the horse, pre
pares him for the movement, and prevents its execution being too abrupt or too slow.

To open the right rein. Carry the right hand to the right.
To open the left rein. Carry the left hand to the left.

To wheel the horse to the right (or left). Open the right (or left) rein and close the right (or left) leg, pressing slightly with the left (or right) knee, the right (or left) leg more to the rear than the other.

To march.

323. The squad is drilled at a walk until taken to the riding-school; it will be halted upon the completion of each movement after marching a few yards.

Being in line, at a halt, the instructor commands: 1. Forward, 2. March.

At the command forward, gather the horse; at the command march, lower the hands slightly, and close the legs equally, increasing their pressure by degrees until the horse steps out, when the hands are gradually replaced and the legs relaxed.

At the command march, the hands are lowered first to let the horse move forward with freedom, and the legs closed equally to make the horse move straight to the front, and by degrees to cause him to obey without irregularity.

To halt.

324. Marching in line, the instructor commands: 1. Squad, 2. Halt.

At the command squad, gather the horse without slackening the gait. At the command halt, raise the hands by degrees, move them toward the body until the horse obeys, holding the legs near to keep him straight and prevent him from backing; then replace the hands gradually and relax legs.
To march by the flank from line with intervals.

325. The instructor commands: 1. By the right (or left) flank, 2. March.

(Pl. 1.) At the first command, gather the horse; at the command march, open the right rein and close both legs, the right leg a little more to the rear than the other; wheel to the right by moving the horse over a quarter-circle whose radius is two yards; when the wheel is nearly ended, diminish the effect of the right rein and leg, using the left rein and leg to straighten the horse; when the wheel is completed, close both legs and move off at right angles to the original direction.

326. The squad having been marched by the flank, is now in column of files, with the distance of one yard from the head of each horse to the croup of the one before him. Each recruit should so conduct his horse, that the man who immediately precedes him may hide all the other men in his front.

327. To halt the column of files, and to resume the march, the instructor commands: 1. Squad, 2. Halt; and, 1. Forward, 2. March.

Since each horse with his rider occupies a space of three yards in length by one in breadth, the squad, if again marched by the flank, is brought back to its original position in line with intervals of three yards between the files.

To march to the rear.

328. Being in line with intervals, or in column of files, the instructor commands: 1. Right (or left) about, 2. March.
(Pl. 2.) Executed as the march by the flank, except that each recruit, instead of wheeling, describes a half-circle whose radius is two yards, and then moves off in the new direction.

To halt upon the completion of the about, the instructor commands: 1. **Squad**, 2. **Halt**.

**To oblique.**

329. Being in line with intervals, or in column of files, the instructor commands: 1. **Right** (or left) **oblique**, 2. **March**.

(Pl. 3.) Executed as the march by the flank, except that each recruit makes a half-wheel to the right, describing the eighth of a circle, whose radius is two yards, and then moves off in the new direction.

To resume, or to take, the direct march, the instructor commands: 1. **Forward**, 2. **March**. At the command **march**, the recruits half-wheel to the left, and then move forward.

330. In obliquing, the movement may be arrested for the purpose of correcting faults by the commands, 1. **Squad**, 2. **Halt**; and the oblique march resumed by the commands, 1. **Squad**, 2. **March**.

This rule is general, the command, detachment, section, battery, etc., being substituted for **squad**.

**To change direction marching in column of files.**

331. The instructor commands: 1. **Column right** (or left), or, 1. **Column half-right** (or half-left), 2. **March**.
At the first command, the leading recruit gathers his horse; at the command march, he executes the wheel, or half-wheel, to the right as just explained, and moves off in the new direction; the others execute in succession the same movement upon arriving on the same ground.

To rein back.


At the command backward, gather the horse. At the command march, keep a firm seat; hold both legs close; raise the hands so that the horse steps backward to regain his balance, then replace the hands gradually; when he stops backing, raise the hands; when he steps back, lower them; continue this movement until the command halt, which should be given when a few steps backward have been taken.

If the horse throw his haunches to the right, ease the left leg and close well the right leg; if to the left, ease the right leg and close well the left leg. If this be not sufficient to put the horse in proper position, open the rein on the side toward which he throws his haunches, supporting him at the same time with the other rein.

If the horse bring his legs too much under him, the recruit closes the legs well and then lowers the hands to make him regain his balance forward.

The legs are always closed before the hands are raised, so that the horse will not throw his weight on his hind-legs before he begins to move.

Alignment.

833. To give a general alignment to the squad, the instructor orders any recruit to move forward or rein back so as to be in line with the other men.
Remark.

334. For the sake of convenience, the instructor may cause the recruits, upon leading out, to form line with horses one foot apart, and teach them to mount and to dismount in line, to march by the flank from line, and to form line from column of files, only employing these movements to begin and end the drill, the interval of three yards being maintained as before during the instruction.

To mount in line (horse unsaddled).

335. The instructor causes the men to call off from right to left, and commands: 1. Prepare to mount, 2. Mount, 3. Form, 4. Rank.

At the first command, the odd numbers, stepping off, with the left foot, lead their horses four yards to the front, keeping opposite their intervals, and regulating by the right; all then prepare to mount; at the second command, they mount; at the fourth, the even numbers move up in the intervals without jostling or precipitation.

To march by the flank from line.

336. Being at a halt, the instructor commands: 1. By file, 2. By the right (or left) flank, 3. March.

At the second command, the man on the right gathers his horse; at the command march, he wheels to the right and moves forward in the new direction. The second man from the right gathers his horse as soon as the first begins to move, wheels to the right, and follows him at the distance of one yard from head to croup. The movement is executed in succession by the other files as explained for the second.

If marching, all halt at the command march, except the
man on the right. The movement is then executed as before.

_To form line to the right or left, from column of files._

337. The instructor commands: 1. _Left_ (or _right_) into _line_, 2. _March_, 3. _Squad_, 4. _Halt._

At the first command, the leading recruit gathers his horse, and, at the command _march_, wheels to the left and moves forward, halting at the fourth command, given at any time after his horse is in the new direction. The others move forward until nearly opposite their places in line, when each wheels to the left, closes in to the man who preceded him, and halts on the line.

_To dismount in line (horse unsaddled)._ 

338. The instructor commands: 1. _Prepare to dismount_, 2. _Dismount_, 3. _Form_, 4. _Rank._

At the first command, the odd numbers gather their houses and move forward four yards, and all prepare to dismount; at the second command, they dismount; at the fourth, the even numbers move up in the intervals.

_The riding-school._

339. If there be no riding-hall, a rectangular track is laid out 100 yards long, and 33 yards wide. The entrance is at the middle of one of the sides.

The instructor may now unite eight recruits. Two corporals or instructed men, designated conductors, are placed one on the right, the other on the left; the conductors may use saddles and stirrups.

The instructor explains that all changes of direction are made toward the interior of the riding-school; and that the recruits, when on the track, march _to the right_
hand, or to the left hand, according as their right or left sides are toward the interior.

To enter the riding-school.

340. The squad being mounted, is marched into the riding school in column of files; when the leading conductor is within two yards of the opposite side, the instructor commands: 1. Column right (or left), 2. March.

The conductor takes a free and even gait and keeps the track, changing direction exactly at the corners without command. The recruits follow, preserving their distances and recovering them by degrees when lost; just before arriving at a corner, each gathers his horse and executes the wheel correctly. The instructor, placing himself on the inside of the track, superintends the movements of the men and corrects their positions.

If, in marching to the right hand, the horse bear his shoulders to the right, open the left rein a little, and bring the right leg near; if he throw his haunches to the right, close the right leg in rear of the girth, and feel lightly the right rein.

To change hands.

341. (Pl. 4.) The instructor commands: 1. Column right (or left), 2. March, when the leading conductor is marching on one of the sides; and, 3. Column left (or right), 4. March, when he arrives within two yards of the opposite side.

Or, 1. Column half-right (or half-left), 2. March, when the leading conductor enters one of the long sides; and, 3. Column half-left (or half-right), 4. March, when he nearly reaches the opposite side.

Or, as soon as the last man is upon one of the long sides, 1. Right (or left) oblique, 2. March; adding, 3. For-
ward, 4. March, when the recruits arrive near the opposite side.

Plate 4.

Or, 1. By the right (or left) flank, 2. March, when the column is marching on one of the long sides; and, 3. By the left (or right) flank, 4. March, when the line arrives within two yards of the opposite side.

In marching in line, each recruit regulates his horse by that of the conductor who last led in column of files.

To trot.

342. Being at a walk upon one of the long sides, the instructor commands: 1. Trot, 2. March.

At the command trot, gather the horse; at the command march, lower the hands a little and close the legs by degrees, until the horse obeys, when the hands are gradually replaced and the legs relaxed.

The gait is slow at first, and the instructor sees that the recruits feel lightly their horses' mouths without bearing upon the reins, and explains that the necessary ease and stability are acquired by sitting well down on the horse (or saddle) and partially relaxing the body, thighs, and legs.
343. The movements already taught at open intervals at a *walk*, are repeated at a *trot*, care being taken to give the commands when the squad is marching on one of the long sides of the track, or when two yards from it. In wheeling by recruit, to the right or left, the instructor sees that the trot is neither slackened nor increased.

*To pass from the trot to the walk.*


At the command *walk*, gather the horse; at the command *march*, raise the hands by degrees, and hold the legs close to prevent the horse from coming to a halt; as soon as he walks, replace the hands gradually and relax the legs.

*To pass from the head to the rear of the column.*

345. Being at a walk, to teach the recruits to control their horses, and to use the reins and legs, the instructor commands: 1. *First file from front to rear*, 2. *March*.

At the first command, the leading man gathers his horse; at the command *march*, he leaves the column by a right or left about, according as he is marching to the right or left hand, moves parallel to the column, and enters it again at the rear by another about.

346. *To pass from the rear to the head of the column.* Being at a walk, the instructor commands: 1. *Last file from rear to front*, 2. *Trot*, 3. *March*. At the command *trot*, the recruit in rear gathers his horse; at the command *march*, he leaves the column by an oblique, takes the trot, moves parallel to the column, enters it again at the head by another oblique, and resumes the walk.

347. The instructor repeats the commands until all the files have passed in succession from front to rear, or from rear to front.
To increase and diminish the rapidity of the trot.

348. Being at a slow trot, on one of the long sides, the instructor commands: Trot-out.

At this command, lower the hands, and close the legs by degrees until the horse increases the gait to a fast trot. As soon as the proper gait is attained, the instructor sees that the horses are kept up to it, and pays particular attention to the positions of the recruits; if their seats become too much deranged, he brings the squad to a slow trot, or to a walk.

349. To resume a moderate trot, the instructor commands: Slow-trot.

At this command, raise the hands by degrees until the horse moderates the gait, closing the legs to prevent história taking the walk.

To pass from a halt to the trot.


At the command forward, gather the horse; at the command march, pass at once to the trot as explained from a walk.

To halt from a trot.


Executed as explained from a walk; the recruits stop their horses together, but not abruptly.

To march in circle.

352. The leading conductor being on one of the long sides and seventeen or more yards from a corner, the instructor commands: 1. Circle to the right (or left), 2. March.

At the first command, the conductor gathers his horse;
at the command *march*, he describes a circle between the two tracks; the other men follow, each gathering his horse before entering upon the circle, keeping him on it by the inner rein, and supporting him by the leg on that side.

353. (*Pl. 5.*) While circling, the recruits may pass from a *walk to a trot*, and the reverse, may be *halted in column*, and *put in march*, as when marching on the track. To change hands, the instructor commands: 1. *Column right* (or *left*), 2. *March*; the command *march* being given when the leading conductor is on the track. The squad passes over the diameter of the circle, and circles in the opposite direction by the commands: 1. *Column left* (or *right*), 2. *March*, the command *march* being given when the conductor is two yards from the circumference.

354. To march again on a straight line, the instructor commands, as soon as the leading conductor arrives on the track of the long side: 1. *Forward*, 2. *March*; the conductor, followed by the recruits, then takes the track and moves forward.

*Instruction of large squads.*

355. From twelve to sixteen recruits may now be
united in the squad. The instructor repeats the exercises already prescribed, still paying more attention to the horsemanship of the men than to the accuracy of the drill. Four conductors are needed, one being placed on each flank, and two in the middle. The instructor halts the rear half of the column headed by a conductor, directing him to move off again as soon as the conductor of the front half of the column arrives at the corresponding point of the opposite side of the riding-school. The conductors are to arrive at the same time at the diagonal angles, the rear column regulating by the other. In changing hands in column, the columns pass each other to the right; in changing hands in line, the recruits pass each other by the right, and keep their legs close in passing through the intervals of the opposite division to prevent the horses from slackening the gait.

To take the reins in one hand.

356. To relieve the constraint of the arms by changing their position, as well as to prepare the recruits for the use of the curb-bridle, the instructor commands: 1. In left (or right) hand, 2. Take reins.

At the second command, bring the left hand opposite the middle of the body; half open the hand and place in it the part of the rein that was in the right hand, holding both reins as explained for the left rein; close the left hand and drop the right hand by the side.

To adjust the reins.

357. Seize the bight with the thumb and forefinger of the right (or left) hand; partly open the left (or right) hand so as to let them slide through it; raise the right (or left) hand until they bear equally; close the left (or
right) hand upon them, letting the bight fall between the right rein and the horse's neck; drop the right (or left) hand by the side.

To retake the reins in both hands.

358. The instructor commands: 1. In both hands, 2. Take reins.

At the second command, half open the left (or right) hand, seize with the right (or left) hand the part of the right (or left) rein which is in the left (or right) hand, and hold the reins as before described.

To mount (horse saddled).

359. The horses being equipped with saddles and curb-bridles, are habitually formed in line. The recruits standing to horse, the instructor causes them to call off, and commands: 1. Prepare to mount.

At this command, the odd numbers lead out as previously explained. All the recruits then face to the right, dropping the right rein from the hand, take two side-steps to the right, sliding the hand along the left rein, make a half face to the left so as to bring the right side toward the horse's flank; carry the right foot three inches to the rear; take the reins with the right hand aided by the left, and place the right hand on the pommel, the reins coming into the hand between the thumb and forefinger, and held so as to feel lightly the horse's mouth. (Two.) Each recruit places a third of the left foot in the stirrup, with the assistance of the left hand if necessary, and supports it against the forearm of the horse; rests upon the ball of the right foot; places the left hand on top of the neck, well forward, and grasps a lock of the mane, the lock coming out between the thumb and forefinger.
The instructor then commands: 2. Mount.

At this command, spring from the right foot, holding firmly to the mane, and keeping the right hand on the pommel; bring the heels together, the knees straightened and resting against the saddle, the body erect. (Two.) Pass the right leg extended over the croup of the horse without touching him; let the body come gently down into the saddle; let go the mane, insert the right foot in the stirrup, pass the reins into the left hand and adjust them.

At the commands, 3. Form, 4. Rank, the even numbers move up as before explained.

360. If the instructor command: 1. Squad, 2. Mount, the men execute at the command mount all that has been just prescribed at the commands prepare to mount and mount.

**Position of the soldier mounted.**

361. (Pl. 6.) Same as previously explained, with the following exceptions—Buttocks bearing equally upon the saddle, and as far forward as possible; the reins coming into the left hand on the side of the little finger, and leaving it between the thumb and forefinger; the little finger between the reins, the other fingers closed, the thumb pressing the reins firmly on the second joint of the forefinger; the left forearm horizontal, the fingers six inches from the body and turned toward it; the little finger somewhat nearer the body than the upper part of the hand; the right hand behind the thigh, the arm falling naturally, the feet inserted one-third of their length in the stirrups, the heels slightly lower than the toes.

**Stirrups.**

362. The stirrups should support the weight of the legs only, and be of such length that, when the soldier rises in
them, there should not be a space of more than four or five inches between his crotch and the saddle.

To dismount (horse saddled).

363. The instructor commands: 1. Prepare to dismount.
At this command, the odd numbers move forward four yards, regulating by the right. All the recruits then seize the reins with the right hand, in front of and near the left; place the right hand on the pommel; let go with the left hand; place it on top of the neck; grasp a lock of the mane, the lock coming out between the thumb and forefinger, and take the right foot out of the stirrup, keeping the body erect.

The instructor then commands: 2. Dismount.

At this command, rise upon the left stirrup; pass the right leg extended over the croup of the horse without touching him; bring the right heel to the side of the left; descend lightly to the ground; remove the left foot from the stirrup, and place it by the side of the right, keeping the body erect; let go the mane; pass the end of the reins over the pommel of the saddle with the right hand, which then seizes the left rein. (Two.) Face to the left, take two short steps, left foot first; slip the right hand along the left rein, and take the position of stand to horse.

At the commands, 3. Form, 4. Rank, the even numbers lead up as before explained.

364. If the instructor command: 1. Squad, 2. Dismount, the men execute at the command dismount all that has been just prescribed at the commands prepare to dismount and dismount.

Use of the curb-bridle.

365. The general principles of the use of the reins and legs, already explained for the watering-bridle, apply to the management of the horse with the curb-bridle, except that the bridle-hand is moved instead of both hands. In all movements of the hand, the arm should act freely and without constraint to the body; and, as the bit of the curb-
bridle is much more severe than that of the watering-bridle, it
must be applied gradually and more gently, particularly in
halting and in reining back.

To wheel the horse to the right (or left). Carry the
hand a little forward, and to the right (or left), so that the
left (or right) rein bears on his neck.

Spurs.

366. The spurs are used to punish the horse when he will
not obey the legs, and to quicken his pace if lagging; they
should be used vigorously, and at the moment the horse
commits the fault. To apply the spurs, hold firmly to the
horse with the legs, turn the toes a little out, give the reins
slightly, and press firmly with the spurs behind the girth,
without moving the body, until the horse obeys. The spurs
must never be used unless absolutely necessary, and then
both are to be applied at the same moment.

Instruction with saddle, curb-bridle, and spurs.

367. The movements already prescribed are repeated.
The instructor at first causes the recruits to use the saddle
and watering-bridle, and does not give them the curb-bridle
and spur until they have confidence in their seats, and are
able to ride fairly.

The instructor frequently directs that the stirrups be
crossed over the horses’ necks, the left stirrup above the
right. The men mount and dismount, with stirrups crossed,
as if the horses were unsaddled, placing the right hand on
the pommel instead of on the withers. Stirrups must be
taken again during the first lessons at the gallop.

Principles of the gallop.

368. A horse gallops on the right foot when the right
fore and hind legs move in advance of the left fore and hind legs; he gallops on the left foot when the left fore and hind legs are in advance. He gallops true when he gallops on the right foot in marching to the right hand, or on the left foot in marching to the left hand; and gallops false if, in marching to the right hand, he gallops on the left foot, or conversely. A horse is disunited when he gallops with the near fore-leg, followed by the off hind-leg, or the off fore-leg, followed by the near hind-leg: in either case, his centre of gravity is deranged, and his strength impaired. When the horse gallops on the left foot, the rider feels a sensible movement in his position from left to right; when he gallops on the right foot, the movement of the rider is from right to left; when the horse is disunited, the rider experiences irregular movements.

To gallop.

369. The instructor will not at first dwell upon the mechanism of the gait, but lets each man accommodate himself to the motion of the horse without losing his seat.

The recruits marching at a trot to the right hand, on one of the long sides, the instructor causes them to increase to three yards the distances from head to croup, and commands: 1. Gallop, 2. March.

At the command gallop, gather the horse, keeping him perfectly straight; at the command march, carry the hand slightly forward, and to the left, to enable the right shoulder to move in advance of the left; close the legs behind the girth so as to urge the horse forward, causing him to feel the left leg most. When the horse obeys, keep the hand light, that the gallop may be free and regular, and hold the legs close, to keep him at the gait.

To keep a horse true, the rider must accommodate himself to all his motions, particularly in changing direction at
the corners. When a horse gallops false, or is disunited, his rider is ordered to leave the column, come to the trot, and pass to the rear of the column, taking care not to interfere with the other men; arrived at the rear, he resumes the gallop, the instructor explaining how to keep the horse true. The gallop to each hand will be kept up only once or twice around the riding-school, the recruits being brought to the trot in order to change hands.

The men must keep their horses steady; when able to manage them properly at a gallop, the distance of one yard from head to croup is gradually resumed.

370. When the squad has been sufficiently exercised at the gallop on straight lines, it is marched in circle, and wheeled to the right and left by recruit at a gallop, the instructor taking care that the wheels are not made too short, and that the recruits keep their horses true and do not derange their positions. During these exercises the stirrups will sometimes be crossed.

To pass from the gallop to the trot.


At the command trot, gather the horse; at the command march, raise the bridle-hand by degrees, and hold the legs close; as soon as the horse trots, replace the hand gradually and relax the legs.

To passage.

372. Being upon a long side, the recruits are marched by the flank and halted, head to the wall or track, when they arrive near the opposite side. The instructor then commands: 1. Right (or left) passage, 2. March, 3. Squad, 4. Halt.

At the first command, gather the horse and incline him to the right, by carrying the bridle-hand slightly to...
the right, and closing the right leg; at the command *march*, carry the bridle-hand well to the right, close the left leg behind the girth without leaning to the left, so that the haunches may move last, and hold the right leg near to support the horse and moderate his movement. The horse having obeyed, keep up the passage by a gentle application of the same means.

At the command *halt*, given after a few steps have been taken, replace the bridle-hand and left leg by degrees, and then straighten the horse by carrying the bridle-hand slightly to the left and closing the left leg.

During the first lessons, the movement is executed by the recruits in succession.

In passaging, the movement of the horse’s shoulders always precedes that of his haunches. To facilitate this, the horse is held inclined to the side toward which the passage is to be made.

If the horse oblique too much, the recruit carries the hand a little to the left, and increases the effect of the left leg. If the horse step too quickly to the side toward which he passages, diminish the effect of the reins and left leg, carrying the bridle-hand to the left, and holding the right leg close. If the horse back, bear his shoulders well toward the side toward which he should passage, diminish the effect of the reins, and increase that of the legs: a horse usually backs on account of the constraint he feels when his haunches have begun to move before his shoulders.

*The passage in column* is executed on the same principles.

**To leap the ditch and the bar.**

378. For this exercise, the height of the bar should be, at first, one foot, and the width of the ditch three feet. As the men and horses become used to jumping, the height
of the bar is gradually increased to three feet, and the width of the ditch to five feet.

The instructor forms the squad in line thirty yards from the obstacle, and causes the recruits to move toward it in succession from either flank. Upon receiving an indication, each man moves off at a walk; when he has passed over one-third of the distance, he takes the trot and then the gallop.

To leap the ditch. On arriving near the ditch, close the legs and give the hand to force the horse to make the leap; as soon as he reaches the ground on the other side, raise the hand a little to sustain him.

To leap the bar. On arriving near the bar, close the legs and lift the horse by elevating the hand and moving it slightly forward; the moment he makes the leap, give the hand; as soon as he reaches the ground on the other side, raise the hand a little to sustain him.

The recruit should cling to the horse with the thighs and calves of the legs, taking care to lean a little forward as the horse is in the act of springing, and to make his seat secure by leaning to the rear at the moment the horse reaches the ground.

Having made the leap, each man comes to a trot, and then to a walk, and takes his place in the rank, which is formed thirty yards beyond the obstacle. Horses should not be made to leap more than two or three times in any one day.

Instruction of a squad with closed intervals.

874. The recruits having acquired ease and steadiness in the management of their horses, any convenient number may now be united, and exercised in all the preceding movements in the open field. A corporal or well-
structed man is placed on each flank to act as guide or conductor, and attention is paid to precision in drill.

375. All movements are first executed at a walk: as the instruction progresses, the gait is gradually increased. This rule is general.

**Changes of gait.**

376. The squad being sufficiently instructed at a walk, the instructor repeats the movements at a trot, passing frequently from a walk to a trot and from a trot to a walk. He then drills at the trot from a halt, and at halting while marching at a trot, making the recruits understand that this is an exceptional movement, and that great care must be taken never to check a horse so suddenly as to injure his mouth or throw him on his haunches. The squad is next drilled at the gallop, the instructor causing it to pass to the trot and then to the walk before halting.

377. Whenever the change is made from a slow gait to one more rapid, as from the walk to a trot, begin slowly and increase it gradually to the degree prescribed; whenever the change is made from one gait to a slower one, as from the trot to the walk, slacken the gait gradually. This rule is general.

**MANUAL OF THE SABRE, MOUNTED.**

378. The instructor causes the recruits to take the sabre when they can ride well and execute the movements with precision.

379. The sabre is unhooked at the command, prepare to mount. As soon as the recruits dismount, they hook up the sabre and assume the position of stand to horse. This rule is general.
380. Before beginning the manual, a few movements should always be executed to quiet the horses.

Being in line, at a halt, the manual of the sabre is taught in the following order, and by the following commands:

1. **Draw**, 2. **Sabre**.

381. At the command *draw*, reach with the right hand over the bridle-hand and pass it through the sabre-knot; seize the gripe and draw the blade six inches out of the scabbard. At the command *sabre*, draw the sabre quickly, raising the arm to its full extent at an angle of about fortyfive degrees, the sabre in a straight line with the arm; make a slight pause, bring the back of the blade against the hollow of the shoulder, the wrist resting on top of the thigh, the little finger on the back of the gripe.—*This is the position of carry sabre, mounted.*

382. 1. **Present**, 2. **Sabre**, and, 1. **Inspection**, 2. **Sabre**.
Same as when dismounted.

1. **Return**, 2. **Sabre**.

383. Same as when dismounted, without using the left hand.

384. As soon as the recruits execute the manual properly at a halt, they are required to *draw* and *return* sabre while marching at a walk, the horses being kept at a steady gait. When the sabre is drawn, the instructor sees that the position of the bridle-hand is not deranged, and that the right shoulder is not thrown back. In returning sabre while marching, the back of the blade rests against the left arm until its point enters the scabbard.

The recruits are also exercised in drawing sabre at a trot and at a gallop.

385. Sabres are always returned before dismounting. *This rule is general.*
SABRE EXERCISE, MOUNTED.

386. The files are always open for instruction in the sabre exercise.

To open and close files.


At the second command, the recruits execute the march by the flank from line to the right; the fourth command is given when the man on the left has wheeled, and the command halt when the horse of the man on the right is in the new direction; at the command dress, each man casts his eyes to the right and moves forward or reins back so as to place himself on a line with the men on his right; at the command front, all cast their eyes to the front. The instructor superintends the alignment.

To increase the interval to more than three yards, the instructor specifies the distance the recruits will preserve in column of files, and each man wheels to the right in time to follow the preceding file at this distance.

388. To close files, the instructor commands: 1. Right (or left) close files, 2. March, 3. Right (or left), 4. Dress, 5. Front.

At the command march, the man on the right moves six yards to the front and halts; the others wheel to the right and form line to the left; the squad is aligned as just explained.

389. The files being opened, the sabre exercise is executed as on foot, except that, at the command guard, the men move the right hand and sabre only.
390. As the recruits become more skillful in the use of their sabres, they are practised in the sabre exercise while marching in column of files at all gaits, care being taken to increase the distance to two yards. They will also be exercised in leaping the ditch and the bar, at first with the sabre in the scabbard, afterwards with the sabre drawn.

Remarks on the use of the sabre.

391. Thrusts are preferable to cuts, as wounds made by cuts are generally trifling compared with those made by thrusts.

Great attention must be paid to the position and balance of the body, as, by too great an exertion in giving a cut or thrust, a man may be thrown, or so unsettled in his seat as to lose the advantage of his skill; he must depend upon his parries, and not trust to avoiding the attack of the enemy by turning or drawing back his body. In giving a forward thrust or cut, with the horse in rapid motion, very little force is required, as the impetus of the horse makes it effective. Choose the point of attack, and avoid if possible attacks made upon the left rear; in the latter case a change of position can alone place a man upon an equality with his opponent. This relative change may be effected by making a sudden halt, allowing an adversary to pass, or by turning quickly to the left about bringing him on the right. If a man cannot do this, he is forced to keep on the defensive, being unable to make effective blows, and must crowd up to his opponent, whose cuts would otherwise tell.

In meeting an enemy on the left front, a man should turn sharply to the left on his own ground, bringing his right arm in position to act upon the enemy's left. In meeting him on the right front, press quickly on, and by a
sharp turn to the right gain his left rear. If pursued, keep
an adversary on the right rear; when attacked by more
than one, try to keep them either to the right or to the left,
but, should they succeed in placing themselves on each side,
press close to the one on the left, and endeavor to keep the
one on the right at a distance.

The lance is parried like the sabre. A man must close
upon his enemy at once, and try to gain his right rear,
where he is least able to attack or to defend himself; the
same is true if he be armed with the bow and arrow. In
pursuit, always approach at the right rear.

When opposed to infantry, endeavor to meet an oppo-
nent on the right.

MANUAL OF THE PISTOL, MOUNTED.

392. Same as when dismounted.

INSPECTION OF ARMS, MOUNTED.

393. Same as when dismounted.
HORSE ARTILLERY.

394. The special instruction required for the cannoniers of a battery of horse artillery, embraces that of a gun detachment mounted, and that of two or more gun detachments mounted.

395. The men are habitually armed with the sabre, the movements in the manual of the sabre being executed in the same manner, with the ranks opened or closed.

The ranks are opened for instruction in the manual of the sabre; for the sabre exercise, the ranks and files are both opened.

THE GUN DETACHMENT MOUNTED.

396. (Pl. 1.) The detachment is formed in two ranks, boot to boot, with one yard's distance from the croup of the front-rank horses to the heads of the rear-rank horses. It is told off as a gun detachment dismounted, except that two additional men, Nos. 8 and 9, are required as horse-holders, and are posted in the centre of the front and of the rear ranks respectively, and that the gunner takes the place of the caisson corporal in ranks, this non-commissioned officer, when mounted, being always posted with the team of his caisson.

No. 2 is the right guide, and the gunner the left guide.

To lead out.

397. Executed as explained for the squad, except that each front-rank man is followed by his rear-rank man,
HORSE ARTILLERY.

who places the head of his horse at the distance of one yard from the croup of the horse of his front-rank man, the horses covering each other.

To mount.

398. The instructor commands:


The second and third commands are executed as already explained, the cannoneers mounting without moving their horses out of ranks; they make them give way very slightly to the right or left, if necessary.

399. If the instructor command: 1. Cannoneers, 2. Mount, the men execute at the command mount all that has been prescribed at the commands prepare to mount and mount.

To dismount.

400. The instructor commands:


The second and third commands are executed as already explained, the cannoneers dismounting without moving their horses out of ranks; they make them give way slightly to the right or left, if necessary.

401. If the instructor command: 1. Cannoneers, 2. Dismount, the men execute at the command dismount all that has been prescribed at the commands prepare to dismount and dismount.

Alignments.

402. The instructor superintends the alignment from the flank toward which the men dress. He sees that they move steadily and keep the shoulders square, without turn
ing the head too much; that they halt on the same line, and dress as they arrive without delay; that they do not open the knee in order to feel the boot; and that they give the hand and relax the legs as soon as they have dressed.

To calm the horses, short marches are occasionally made between the alignments.

403. *By file.* The instructor first teaches the men to dress by file; to this end, he moves two files from either flank three or four yards to the front, sees that they are in line, and that the rear-rank men cover their front-rank men at the proper distance, and then commands:


At the command *right,* the men of the right file gather their horses; at the command *dress,* they move forward; when near the line the front-rank man slackens the gait, moves up slowly, casts his eyes to the right, so as to see the buttons on the breast of the second cannoneer from him, sits squarely on his horse, keeps him straight in ranks, and touches lightly with the boot the boot of the man on his right; the rear-rank man executes the movement as explained for the front-rank man, and preserves the proper distance between the ranks. The other files dress in the same manner, each moving off when the preceding one halts. The rear-rank men preserve the proper distance between the ranks. At the command *front,* given when the last file is aligned, all cast their eyes to the front.

404. In successive movements, the men who are to move at the command of execution gather their horses at the preparatory command, the others gather their horses just before they begin the movement; in simultaneous move-
ments, all gather their horses at the preparatory command. This rule is general.

405. By detachment. Being in line, the instructor sees that the file on the flank toward which he wishes to dress, is in such a position that no cannoneer will have to rein back, and then commands:

1. Right (or left), 2. Dress, 3. Front.

At the command dress, the front-rank men align themselves promptly and steadily; the rear-rank men move forward with the front-rank men, cast their eyes toward the basis of alignment, dress, and preserve the proper distance between the ranks.

406. To align the detachment to the rear, the instructor causes two files from either flank to rein back a few yards, aligns them parallel to the line and opposite their places, and commands:

1. Right (or left) backward, 2. Dress, 3. Front.

At the command dress, the cannoneers rein back, keeping their horses straight, pass a little to the rear of the line, and dress up to the men who have been established.

The alignment to the rear is not habitually used.

To open ranks.

407. The instructor commands:


At the command march, the front-rank men cast their eyes to the right; the rear-rank men rein back six yards, each man preserving the direction of his front-rank man and dressing to the right. At the command front, the men cast their eyes to the front.
408. The ranks being open, the alignments may be executed as in closed ranks; for this purpose, two men from the right, or left, of each rank are moved forward three or four yards.

To close ranks.

409. The instructor commands:


The rear rank closes up, each man covering his proper front-rank man.

To rest.

410. Being in line, the instructor dismounts the detachment, and commands:

1. Detachment, 2. Rest.

To resume the attention, the instructor commands: 1. Detachment, 2. Attention.

To file off.

411. Each front-rank man executes the movement as already explained; each rear-rank man moves forward with his front-rank man, changes direction to the right (or left) at the same time with him, and then marches abreast of him.

To dismiss the detachment.

412. Executed as prescribed for dismissing the squad.

To march in line.

413. The detachment being at a halt, and properly aligned, the instructor commands:

At the command march, the guide moves straight to the front, selecting points on which to direct himself as explained in the School of the Battery Dismounted, and maintaining an even gait to avoid irregularity in the ranks; the cannoneers move forward at the same gait as the guide, keep their horses straight in ranks, feel lightly the boot of the man on the side of the guide so as to preserve the alignment, keep their heads to the front, yield to pressure coming from the side of the guide, and resist pressure coming from the opposite side. If in advance of the line, they check their horses gradually; if in rear, they move up, increasing the pace a little; if too near, or too far, from the man on the side of the guide, they move from or approach him by degrees, gaining more ground to the front than to the side.

To halt the detachment, and to align it.

414. The instructor commands:


Instead of giving the commands for dressing, the instructor may rectify the alignment by directing such files as are out of place to move up or back.

To oblique in line.

415. (Pl. 2.) Being in march, the instructor commands:

1. Right (or left) oblique, 2. March.

At the command march, the cannoneers open out slightly, and each man makes a half-wheel to the right, so
that the head of his horse may be opposite the shoulders of the horse on his right; each rear-rank man follows the second man on the right of his front-rank man, the two cannoneers nearest the flank toward which the oblique is made maintaining the same degree of obliquity as the front rank; all the cannoneers then move off in the new direction, regulating themselves upon the guide, which is, without indication, on the side toward which the oblique is made. The front of the detachment remains parallel to its original position.

To resume the direct march, the instructor commands:

1. _Forward, 2. March._

At the command _march_, each cannoneer half-wheels to the left, and moves forward, closing and dressing toward the guide, which is, without indication, on the side it was previous to the oblique.

If the oblique be executed from a _halt_, the guide is announced on taking the direct march.

_To rein back the detachment._

416. Being in line, at a halt, the instructor commands:

1. _Backward, 2. Guide_ (right or left), 3. _March._

At the command _march_, all rein back, dressing on the guide. After a few steps, the instructor commands:

To wheel the detachment.

417. Being in line, at a halt, the instructor commands:


At the command march, the detachment wheels to the right on a movable pivot; the front-rank pivot-man moves over a quarter-circle whose radius is two yards; upon completing the wheel, he moves off at right angles to the original direction; the other front-rank men cast their eyes toward the pivot, describe arcs of circles, without crowding or opening out, and increase the gait in proportion to their distance from the pivot, so as to remain as short a time as possible in rear of the line; on arriving in line, they take the gait of the leading pivot-man and dress toward him. The rear-rank cannoneers cover their front-rank men, and keep closed to the proper distance. The guide is announced, or the detachment halted, as soon as the front-rank man on the marching flank arrives in line.

If marching, the wheel is executed on the same principles, the leading pivot-man preserving the gait.

418. To make a half-wheel, the instructor commands:


419. As horses cannot be stopped instantly, the command halt is so given that they may be halted at the time
or place prescribed. The same principle applies to the command *march*. *These rules are general.*

*To execute the about by detachment.*

420. Being in line, the instructor commands:


Executed as the wheel by detachment, except that the leading pivot-man describes a half-circle whose radius is two yards, and then moves off in the new direction. The guide is announced, or the detachment halted, as soon as the front-rank man on the marching flank has completed the about.

*To march by the flank from line.*

421. Being at a halt, the instructor commands:

1. *By file, by the right* (or *left*) *flank*, 2. *March*.

Executed by each rank as in the School of the Soldier Mounted; the rear-rank cannoneers, after completing the wheel, approach to within one foot of their front-rank men.

If marching, the men on the flank toward which the movement is to be made, execute the wheel at the command *march*; the others halt, and then wheel in succession.

422. The detachment having been marched by the flank, is now in *column of files*, with the distance of one yard from the head of each horse to the croup of the one before him. Each cannoneer should so conduct his horse
that the man of his rank who immediately precedes him may hide all the other men in his front.

To form line to the right or left, from column of files.

423. The instructor commands:


Executed as in the School of the Soldier-Mounted, the rear-rank men wheeling with their front-rank men, and following them; the command halt is given when the leading file has advanced five yards after completing the wheel, and the commands right dress immediately after. The other files dress as they arrive on the line; the instructor places himself near the right to superintend, and gives the last command when all are aligned.

The instructor commands left (or right) into line, according as the column of files is right, or left, in front.

424. The column of files is right in front when the front-rank men are on the left of the rear-rank men: the column is left in front when the front-rank men are on the right of the rear-rank men.

To form line to the front, from column of files.

425. (Pl. 3.) Being at a halt, or marching at a walk, the instructor commands:


At the command march, the leading front-rank man moves forward at a walk; the other front-rank men oblique to the right until opposite their places in line,
when they march forward; each rear-rank man slackens his gait until abreast of the file in rear of his proper front-rank man, when all execute the movement in the same way as the front rank, each coming up behind his front-rank man. The leading file halts at the fourth command, given when it has advanced twenty-two yards; the commands left dress, are given immediately after, the other files halting and dressing to the left upon arriving in line. The instructor superintends the alignment, and gives the command front upon its completion.

If marching at a trot, or at a walk and the command be trot, the instructor commands: Guide left, immediately after the command march; the leading man moves at a walk; the others oblique at a trot, each taking the walk and dressing to the left upon arriving in line.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply, the leading man moving at a trot.

The instructor commands: Right (or left) front into line, according as the column of files is left, or right, in front.

To oblique in column of files.

426. The instructor commands:

1. Right (or left) oblique, 2. March.

To resume, or to take, the direct march, the instructor commands: 1. Forward, 2. March.
To change direction in column of files.

427. The instructor commands:

1. Column right (or left); or, 1. Column half-right (or half-left), 2. March.

Executed as in the School of the Soldier Mounted; the pivot-man of each file preserves the gait; each man on the marching flank increases the gait, to conform to that of the pivot.

Posts of the mounted gun detachment, at the piece limbered.

428. In rear. The detachment is in line facing to the front, its centre opposite the muzzle, and the head of the front-rank centre horse two yards from it. This is the habitual position of the detachment at the piece limbered.

In front. The detachment is in line facing to the front, its centre opposite the pole, and the croups of the centre horses in the rear rank two yards from the heads of the lead horses.

To change the post of the mounted detachment at the piece limbered.

429. From rear to front. Being at a halt, the instructor commands:


430. *From front to rear.* Being at a halt, the instructor commands:


**Manœuvres of two or more gun detachments mounted.**

431. The detachments, properly told off, are formed in line from right to left, in the order of their pieces in park, with intervals of fifteen yards between the detachments.

432. If the chiefs of platoon and of section and the chief of caissons be present, their posts are similar to those prescribed in the manœuvres of two or more gun detachments dismounted, observing that, when the chiefs of section are present, the intervals are increased to eighteen yards.

433. A commissioned officer is the instructor, and moves wherever his presence is required; a commissioned or non-commissioned officer is the assistant instructor; he takes the post of the chief of caissons, and acts as file-closer.

**To lead out.**

434. The cannoneers lead out by detachment, in the order of the numbers of their sections. At the command *lead out* of the instructor, or senior non-commissioned officer present, the cannoneers of the 1st section detachment lead out as already explained; the leading cannoneer of each of the other detachments moves off in time to follow the last cannoneer of the preceding detachment and
places his horse fifteen yards to the left of the front-rank horses of this detachment. If more convenient, this interval may be diminished; in this case, upon moving off, the detachments are formed successively in column of files, or take the proper distance, if in column of detachments.

To mount; to dismount; the alignments; to open, and to close ranks; to rest; to file off; to dismiss the detachments; to march in line; to oblique in line; and to rein back.

435. Executed in each detachment by the same commands and means as for a single detachment, observing that in simultaneous alignments the guides, on the side toward which the dress is ordered, preserve the interval.

To face the line to the rear, and to march it to the rear.

436. The detachments being in line, the instructor commands:


Executed by each detachment as already explained.

To march by the flank from line.

437. Executed simultaneously by all the detachments by the same commands and means as for a single detachment, the leading file of each detachment, following the rear file of the detachment in front, at the distance of one yard.

To form line to the right or left, from column of files.

438. Exécuté simultaneously by all the detachments by the same commands and means as for a single detach-
ment, the guides preserving the intervals upon coming into line, and the command detachments being substituted for detachment.

To oblique and to change direction in column of files.

439. Executed by the same commands and means as for a single detachment.

To form column of detachments to the right or left.

440. The detachments being in line, the instructor commands:


At the command march, each detachment wheels to the right and moves forward, the guides covering each other and preserving their distance. The guide is announced, or the detachments halted, as soon as the front-rank men on the marching flanks arrive in line.

To oblique in column of detachments.

441. Executed by the same commands and means as on foot, each detachment obliquing as explained for a single detachment mounted.

To change direction in column of detachments.

442. Executed by the same commands and means as on foot, each detachment wheeling as explained for a single detachment mounted.

443. Being in march, to make a small change of direction, the leading guide carries his bridle-hand slightly to the right, at the caution, incline to the right (or left), and
then takes two points a little to the right of those upon which he was marching.

To halt the column of detachments, and to put it in march.

444. The instructor commands:


To march the column of detachments to the rear.

445. The instructor commands:

1. Detachments right (or left) about, 2. March, 3. Guide (right or left).

To halt the column on the completion of the about, the instructor commands: 1. Detachments, 2. Halt, 3. Right (or left), 4. Dress, 5. Front.

To form column of detachments from column of files.

446. The instructor commands:


Executed by each detachment, as already explained for a single detachment, the instructor commanding, right (or left) front into line, according as the column of files is left, or right, in front.

To form column of files from column of detachments.

447. The instructor commands:

1. Right (or left) by files, 2. March.

At the command march, the right guide of each detach-
ment moves to the front; the right rear-rank cannoneer places himself at once on the right of this guide, with an interval of one foot; the second man from the right in the front rank, as soon as he has room, obliques in rear of the right guide, his rear-rank man places himself at once by his side and follows the right rear-rank cannoneer; the other files wheel to the right and again in succession to the left, so that the front-rank men may follow the guide, and have their rear-rank men on their right.

To form line to the right or left from column of detachments.

448. The instructor commands:


Executed as on foot, except that each detachment wheels as explained for a single detachment mounted, and that the instructor places himself outside of the pivot-man of the right detachment, before commanding right dress; the detachments should be at their proper intervals on coming into line.

To form line on the right or left from column of detachments.

449. Being in march, the instructor commands:

1. On right (or left) into line, 2. March, 3. Front.

Executed as on foot, each detachment wheeling as explained for a single detachment mounted; the guides preserve their proper intervals on coming into line.
To form line to the front from column of detachments.

450. The instructor commands:

1. Right (or left) front into line, 2. March, 3. Front.

Executed from a halt as on foot, each detachment obliquing as explained for a single detachment mounted, and the guides observing their proper intervals on coming into line; the leading detachment advances twenty-two yards before being halted.

If marching at a walk, the movement is executed as when marching in quick time on foot.

If marching at a trot, or at a walk and the command be trot, the movement is executed as on foot when marching in double time, or in quick time and the command is double time, the gunners commanding trot and walk, instead of double time and quick time.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply.

To march the mounted gun detachments to the park.

451. The detachments are marched to the park in column of files, or in column of detachments, by similar commands and means to those prescribed for dismounted detachments.

To post the mounted gun detachments with their pieces.

452. The column having arrived at the park, to post the detachments in rear, the instructor commands:

Detachments opposite your pieces.

Column of files. As each detachment arrives opposite its piece, the gunner commands, according as the right or left is in front:

Column of detachments. As each detachment arrives opposite its piece, the gunner commands, according as the right or left is in front: 1. Left (or right) wheel, 2. March, 3. Detachment, 4. Halt, 5. Left (or right), 6. Dress, 7. Front.

To leave the park.

453. If the pieces be at their usual interval of eighteen yards, the interval between detachments is fifteen yards. In this case, the detachments, being habitually in rear, are marched from the park in column of files; or, their posts may be changed so as to bring them in front, when they are marched from the park in column of files, or in column of detachments. If the pieces be parked at diminished intervals, the detachments are formed successively in column of files, or take the proper distance in column of detachments upon moving off.

The change of posts of detachments at the piece limbered is executed by each detachment as explained for a single detachment, the word detachments being substituted for the word detachment in the commands.
454. Any number of recruits, not exceeding six, who have been well instructed in the School of the Soldier Mounted, are united for the first lessons; they are equipped with sabre-belts and spurs. A pair of horses, taken in a double stall, is assigned to each recruit, who is, if possible, at first superintended by a thoroughly instructed man.

A pair of horses being properly harnessed, with traces untrussed, the instructor points out and names the different parts of the harness (Par. 1127), and explains their uses.

_Harness-pegns._

455. Harness-pegns for each pair are arranged in the walls of the harness-room and in the heel-posts of the stalls. The peg for the off harness is above the peg for the near harness; a small peg for the bridles is placed below the near harness-peg.

_Arrangement of harness on its pegs._

456. Pommels of the saddles against the wall or heel-posts; breeching hanging over the cantles; breast-straps and names over the pommels; traces, which are trussed, over the seat; whip on the hook of the off saddle; collars lying horizontally on the saddles, collar-straeps against the heel-posts; bridles and leg-guard hanging on their peg; the whole covered by the harness-sack properly secured.

457. The blankets are kept by the drivers in their quar-
ters, but may be put away in the harness-room, or other
safe place, at the discretion of the captain.

458. A trace is trussed by passing the rear trace-chain
through the trussing-strap, from rear to front, and securing
the trace by drawing down the sliding-loop.

To harness.

459. The sacks are taken off, and the harness brought
from the harness-room and hung on the pegs in the heel-
posts; each man having his blankets at hand, the instruct-
or causes him to face toward his harness, and commands: Harnes.

Each wheel-driver puts on and buckles the collar of
his off horse, smoothing the mane under the collar and
adjusting the collar to the shoulders; folds and puts on the
saddle-blanket, and then resumes his post in front of his
harness. (Two) He seizes the saddle by the girth-straps,
his hands close to the saddle; raises it from the peg; holds
it over his head, arms half extended; approaches the horse
on the near side, and places the saddle in its proper posi-
tion, taking care not to rumple or displacce the blanket, and
keeping the right arm extended over the horse's back to
adjust the girth and traces. (Three) He goes to the
front of the horse; passes the breast-strap carefully over
the horse's head; adjusts the hames to the collar; clasps
them together at the bottom, and tightens the hame-strap.
(Four) He goes to the near side of the horse; lifts the
breeching over the cantle; steps to the rear, and pulls it
over the horse's croup; arranges the loin-strap, and adjusts
and buckles the crupper, taking care that no hairs remain
between the crupper and tail. (Five) He sees that the
harness is properly arranged, buckles and tightens the
girth, and then buckles the belly-band. (Six) He bridles
the horse and ties the coupling-rein to the manger.
(One)—Each wheel-driver begins to harness his near horse, as prescribed for harnessing the off horse at the command harness. (Two), (Three), (Four), (Five). Same for near horse as for off horse. (Six) Each wheel-driver buckles the leg-guard on his right leg, plate outward, bridles his horse, and unties the coupling-rein.

Lead and swing drivers harness and unharness in the same manner as wheel-drivers, with such omissions as are required by the difference in the harness.

If there be no stable, the horses are taken at the picket-line, and the harness from the rack near the carriage to which it belongs.

Each driver stands to horse as soon as he has harnessed.

Position of stand to horse.

460. Same as in School of the Soldier Mounted, except that the driver stands on the left of his near horse, and holds in his right hand the reins of the near horse and the coupling-rein. If the horses be not coupled, the coupling-rein is passed over the neck of the near horse.

To unharness.

461. The instructor commands: Unharness.

Each wheel-driver ties the coupling-rein to the manger; takes off the leg-guard, and hangs it up; unbridles his near horse, and hangs up the bridle. (Two) He unbuckles and frees the crupper; raises the breeching from the croup, and lays it over the cantle, resting its middle on the seat. (Three) He goes to the front of the horse, draws the breast-strap well forward through the links, loosens the hame-strap, unclasps the hames at the bottom, passes the breast-strap over the horse’s head, and lays it and the hames over the pommel. (Four) He unbuckles the belly-band, and then the girth, takes off the saddle, places it
properly on its peg or rack, and covers it with the blanket. 
(Five) He removes and puts up the collar and secures the 
horse by the halter.

(One) Each wheel-driver unties the coupling-rein, un-
bridles his off horse, and hangs up the bridle. (Two),
(Three), (Four), (Five). Same for the off horse as for the 
near horse.

To lead out.

462. To leave the stable, or picket-line, the instructor 
commands: Lead out.

Executed as in the School of the Soldier Mounted.
When it is intended to lead out, as soon as each driver 
has harnessed and loosed the coupling-rein, he stands with 
his back to the manger or picket-line, takes the reins of the 
near horse in his right hand and those of the off horse in 
his left hand near the bit, turns his pair about so that they 
can be moved off promptly, and then stands to horse.

In leading out, when the stalls are single, with swing-
bars between them, the horses of each pair are backed into 
the gangway together; in single stalls, separated by parti-
tions, each horse must be backed out by himself.

463. Until further directions, intervals of two yards are 
taken between the pairs.

To couple.

464. Being in line, at a halt, the instructor commands: 
Couple.

Each driver goes in front of his horses; faces toward 
them; passes his right arm through the reins of the near 
horse and doubles the coupling-rein with the right hand, 
about three and one-half feet from the bit; next pushing 
with this hand the doubled part, from below, through the 
right hame-ring of the near horse, he again doubles the
end of the coupling-rein and inserts this doubled part in the loop of the bight made by the first doubling, still using his right hand; he then makes the knot fast, by pulling with his left hand on the coupling-rein, and resumes the position of stand to horse.

The pairs may be coupled before leading out, at the discretion of the instructor.

465. The coupling-rein is attached to the off ring of the off horse's bit and passes through the rear ring; it should be eight feet long, measured from the billet to the end. To give the driver a freer use of the whip when the off horse is hard to manage, the horses may be coupled as far apart as the length of the rein will permit.

466. To uncouple, each driver pulls the end of the coupling-rein until the rein is detached from the hame-ring.

To mount.

467. The pairs being coupled and in line, at a halt, the instructor commands:


Executed as prescribed in the School of the Soldier Mounted, except that none of the horses are moved out of ranks. Having adjusted the reins in his left hand, each driver passes his right hand through the loop and seizes the whip; he then takes hold of the coupling-rein twenty inches from the hame, in the manner prescribed for the right rein of the watering-bridle, the arm from the shoulder to the elbow falling naturally, the hand a little lower than the other; the whip leaves the hand between the thumb and forefinger, points upward across his body, and rests on the left forearm.

468. If the instructor command: 1. Drivers, 2. Mount,
the men execute at the command *mount* all that has been prescribed at the commands *prepare to mount* and *mount*.

*To dismount.*

469. Being in line, at a halt, the instructor commands:


At the second command, each driver hangs his whip on the hook of the off saddle, and drops the coupling-rein. The rest of the movement is executed as prescribed in the School of the Soldier Mounted, except that none of the horses are moved out of ranks.

470. If the instructor command: 1. *Drivers*, 2. *Dismount*, the men execute at the command *dismount* all that has been prescribed at the commands *prepare to dismount* and *dismount*.

*To rest.*

471. Being at a halt, the instructor dismounts the drivers, and commands:


. At the command *rest*, each man raises the collars from the shoulders, beginning with the near horse, and adjusts the blankets and harness, if displaced; then, holding the reins of the near horse, he remains on the left of his horses and keeps them in place.

To resume the attention, the instructor commands: 1. *Drivers*, 2. *Attention*.

*To file off.*

472. To return the horses to the stable, or picket-line, the instructor commands:
1. By the right (or left) file off, 2. March.

At the first command, each driver steps in front of his horses, uncouples, and passes the coupling-rein over the near horse's neck. The movement is then executed as in the School of the Soldier Mounted.

To dismiss the drivers.

473. The instructor, or senior non-commissioned officer present, causes the drivers to unharness, sees that the harness is cared for (Par. 1128), and covered with its sacks, orders the men to fall in, marches them to the battery parade-ground, and dismisses them.

Use of the coupling rein and whip.

474. The near horses are managed as prescribed in the School of the Soldier Mounted; the off horses are managed by the coupling-rein and whip.

The coupling-rein must never be used abruptly, particularly in halting and reining back, where such use of the rein would throw the off horse suddenly and too much upon his haunches.

The whip will not be used unnecessarily, and must never be applied about the horse's head or neck.

If the off horse keep in advance of the near horse, carry the right hand, without jerk, nearer the off horse's neck. If the off horse lag behind, make him feel the whip on his off haunch. If he throw his shoulders in or his haunches out, touch him lightly with the whip on his off haunch. If he throw his shoulders out and pull away from the near horse, shift the coupling-rein into the left hand and touch him lightly with the whip on his off shoulder, until he closes in again; then retake the rein with the right hand.
To gather the off horse. Elevate the right hand a little and carry it gently toward his neck.

To move forward the off horse. Gather the horse; lower the right hand by degrees and carry it forward without jerk; as soon as he moves off, replace the hand gradually. Should the horse fail to obey, threaten with the whip, or touch him lightly on the haunch, as may be required.

To halt the off horse. Gather the horse; elevate the right hand by degrees and carry it gradually back in the direction of the croup; when the horse obeys, replace the hand gradually.

To rein back the off horse. Gather the horse; elevate the right hand by degrees and carry it gradually back in the direction of the croup until the horse steps backward; as soon as he obeys, replace the hand gradually; when he stops backing, carry the hand back as before.

To wheel the off horse to the right. Gather the horse, and carry the right hand without jerk toward his right shoulder.

To wheel the off horse to the left. Gather the horse, and carry the right hand without jerk to the left and in the direction of the left ear of the near horse.

To march.

475. Being in line, the instructor commands:


At the command forward, each driver gathers his horses; at the command march, he moves them off together; the driver on the side toward which the guide is announced maintains an even gait and moves straight to the front; the other drivers dress toward the side of the guide and preserve their intervals.
476. In simultaneous movements, all gather their horses at the preparatory command: in successive movements, the men who are to move at the command of execution gather their horses at the preparatory command, the others just before they begin the movement. *This rule is general.*

To halt.

477. Marching in line, the instructor commands:


At the command *halt,* each driver stops both horses together, but not suddenly, and keeps his pair straight.

To march by the flank, from line with intervals.

478. (*Pl. 1.*) The instructor commands:


At the command *march,* each driver wheels his pair to the right by moving the pivot-horse over a quarter-circle whose radius is three and one quarter yards; the other horse quickens his movements to keep in line with the pivot-horse. On the completion of the wheel, each driver moves off his pair at right angles to the original direction.

479. The pairs having been marched by the flank, are now in *column of pairs,* with one yard's distance from head to croup. Each driver conducts his horses so that the man who immediately precedes him will hide all the other men in front.

As each pair occupies a space of three yards in length, by two yards in breadth, to form again in line with intervals, the instructor commands: 1. *Pairs*, 2. *By the right (or left) flank*, 3. *March*, 4. *Guide (right or left)*.

*To march to the rear.*

481. (*Pl. 2.*) Being in line with intervals, the instructor commands:


Executed as the march by the flank, except that each driver, instead of wheeling, makes his pivot horse describe a half-circle whose radius is three and one-quarter yards, and then moves off his pair in the new direction.

To halt upon the completion of the about, the instructor commands: 1. *Pairs*, 2. *Halt*.

482. If in column of pairs, the movement is similarly executed, the command for the guide being omitted.

*To oblique.*

483. Being in line with intervals, the instructor commands:

1. *Pairs right (or left) oblique*, 2. *March*. 
Executed as the march by the flank, except that each driver causes his pair to half-wheel to the right, his pivot horse describing the eighth of a circle whose radius is three and one-quarter yards; he then moves off his pair in the new direction. The guide is always, without indication, on the side toward which the oblique is made; on resuming the direct march, the guide is, without indication, on the side it was previous to the oblique.

To resume the direct march, the instructor commands: 1. Forward, 2. March.

At the command march, the drivers half-wheel to the left, and then move forward.

If the oblique be executed from a halt, the guide is announced on taking the direct march.

484. (Pl. 3.) If in column of pairs, the oblique is similarly executed, the leading driver being the guide.

To resume, or to take, the direct march, the instructor commands: 1. Forward, 2. March.

To change direction in column of pairs.

485. Being in march, the instructor commands:

1. Column right (or left); or, 1. Column half-right (or half-left), 2. March.

At the command march, the leading driver wheels, or half-wheels, to the right, and then moves off in the new direction; the other drivers execute in succession the same movement upon arriving on the same ground.
To rein back.

486. Being in line, at a halt, the instructor commands:


The movement is executed as already explained for each horse, care being taken to move both horses equally, and to keep them straight.

The command halt should be given when a few steps backward have been taken.

The instructor may place himself on either flank and give a general alignment by ordering any driver to move one or both of his horses forward or back.

Changes of gait.

487. To trot. Being at a walk, the instructor commands:


At the command march, each driver moves off both horses together at a moderate trot, the off horse by advancing the right hand and keeping him up to the gait of the near horse. Should the off horse not obey, the driver threatens him, or touches him lightly, with the whip.

488. To increase the gait to a fast trot, the instructor commands: Trot out; the gait is not allowed to slacken until the instructor commands: Slow trot, when the ordinary trot is resumed.

489. To pass from the trot to the walk. The instructor commands: 1. Walk, 2. March.

At the command march, each driver makes both horses resume the walk together, carrying the right hand gradually back in the direction of the off horse's croup, but not so powerfully as to bring him to a halt.

At the command march, each driver makes both horses take the gallop, using the whip on the off horse if necessary.  

491. To pass from the gallop to the trot. The instructor commands: 1. Trot, 2. March.

At the command march, each driver makes both horses resume the trot together, taking care not to check them too suddenly.

The riding-school.

492. A riding-school, of the form and dimensions already prescribed, may be used to advantage in perfecting recruits in the previous movements. They enter it and execute the changes of hand by the same commands and similar means as in the School of the Soldier Mounted.

The team.

493. A team consists of all the pairs belonging to a single carriage. The instruction is given for a team of three pairs, called the lead, swing, and wheel horses.

The team is formed in line, with intervals of two feet between the pairs, the lead-horses on the right, the wheel-horses on the left.

In leading out, the lead-driver begins the movement, and is followed by the swing and wheel drivers.

A non-commissioned officer, or well-instructed private, may be mounted and detailed as guide; in line, he is two feet from the right; in column, he is boot to boot with the lead-driver; and on his left.

The men wear the sabre in this instruction.

To align the drivers.

494. Being in line, at a halt, the instructor sees that
the man on the flank toward which he wishes to dress is in such position that no driver will have to rein back, and commands:

1. Right (or left), 2. Dress, 3. Front.

At the command dress, the men align themselves promptly and steadily, moving their horses so as to place themselves accurately on the line of the men on their right, keeping their pairs straight, and preserving their intervals.

To form the team in column of pairs from line.

495. To the right. Being at a halt, the instructor commands:


At the command march, the lead-driver wheels his pair to the right and moves forward in the new direction. The swing-driver wheels his horses to the right in time to follow the lead-horses at the distance of one yard from head to croup; the wheel-driver executes this movement in time to follow the swing-horses at the same distance.

496. To the front. Being at a halt, the instructor commands:


At the command march, the lead-driver moves his pair forward; the swing-driver oblique his horses to the right as soon as their heads are in line with the croups of the lead-horses, and moves forward in time to enter the column and keep at the distance of one yard from head to croup. The wheel-driver executes the movement as prescribed for the swing-driver.
To wheel by team.

497. Being in column of pairs, the instructor commands:

1. Right (or left) wheel, 2. March.

At the command march, the lead-driver wheels to the right, and then moves off in the new direction; the other drivers move forward, wheel successively on the same ground as the lead-driver, and follow him.

To halt the team upon the completion of the wheel, the instructor commands: 1. Team, 2. Halt, the command halt being given when the wheel-driver is in the new direction.

To execute an about by team.

498. The instructor commands:

1. Right (or left) about, 2. March.

Executed as the wheel by team, except that the drivers execute the right about in succession.

To halt the team upon the completion of the about, the instructor commands: 1. Team, 2. Halt, the command halt being given when the wheel-driver is in the new direction.

To oblique the team.

499. The instructor commands:

1. Right (or left) oblique, 2. March.

Executed as the wheel by team, except that the drivers half-wheel to the right in succession.

To resume, or to take, the direct march, the instructor commands:

The drivers half-wheel to the left in succession, and then move forward.

To form the team in line from column of pairs.

500. To the left. The instructor commands:


At the command march, the lead-driver wheels his pair to the left; each of the other drivers moves his pair forward, and wheels to the left as he approaches the wheeling-point of the preceding pair, so as to preserve his interval of two feet. The lead-driver halts at the fourth command, given when his horses are in the new direction; the other drivers halt and dress as they arrive in line, the instructor giving the command dress in time for the swing-driver to align himself as soon as he halts. The command front is given as soon as all the drivers have dressed.

501. On the right. Being in march, the instructor commands:


At the command march, the lead-driver wheels his pair to the right; each of the other drivers marches his pair beyond the wheeling-point of the preceding pair, and then wheels to the right, so as to preserve his interval of two feet. The lead-driver halts at the fourth command, given when his horses are in the new direction; the other drivers halt and dress as they arrive in line, the instructor giving the command dress in time for the swing-driver to align himself as soon as he halts. The command front is given as soon as all the drivers have dressed.

502. To the front. The instructor commands:

At the command march, the lead-driver moves his pair straight to the front; the other drivers oblique their pairs to the left until opposite their places in line, when each marches straight to the front. The lead-driver halts at the fourth command, given when he has advanced at least eighteen yards; the other drivers halt and dress as they arrive in line, the instructor giving the command dress in time for the swing-driver to align himself as soon as he halts. The command front is given as soon as all the drivers have dressed.

**Instruction of Two or More Teams.**

503. (Pl. 4.) Upon leading out, the teams are formed in line in the order of their sections in park, those of the front-rank carriages, in each section, on the right of those of the rear rank; the chiefs of section are on the right of the teams of their section; the interval between teams of the same section, and between non-commissioned officers and teams, is two feet. In horse-batteries, the chiefs of section are on the right of their piece-teams, and the caisson corporals on the right of their caisson-teams.

Should the nature of the ground require it, the teams of each rank of carriages may be formed in separate lines, in the order of their carriages in park, with four yards' distance from the croups of the horses of the line in front to the heads of the horses of the line in rear.

504. When not otherwise prescribed, chiefs of section
and caisson corporals of horse-batteries, mount, dismount; and dress at the commands for the drivers. This rule is general.

To lead out.

505. If there be teams of more than one section, the drivers lead out by section, in the order of the numbers of their sections. At the command lead out of the instructor, or senior non-commissioned officer present, the chief of the 1st section commands: 1. First section drivers, 2. Lead out. The chiefs of the other sections command: 1. Second (third, etc.) section drivers, 2. Lead out, in time for their teams to follow those of the preceding section.

The line being formed and the pairs coupled, the instructor mounts the drivers.

To form column of teams.

506. To the right. Being in line, at a halt, the instructor commands:


Executed in succession by each team as already explained for a single team, each lead-driver following the wheel-driver of the team preceding him, at the distance of two yards from head to croup, the distance between pairs of the same team being one yard. Non-commissioned officers on the right of teams place themselves boot to boot with the lead-drivers, and on their left, moving forward out of the line in time not to interfere with the movements of the lead-horses.

The non-commissioned officer with the leading team is the guide of the column.

507. (Pl. 5.) To the front. Being in line, at a halt, the instructor commands:
1. Right by teams, 2. March.

The team on the right breaks right by pairs, as already explained; the other drivers oblique in succession in the same manner as the swing and wheel drivers of the team on the right, each lead-driver preserving the distance of two yards from the wheel-driver of the team preceding him; the non-commissioned officers take their places as just explained.
(Pl. 6.) If the commands be: 1. *Left by teams*, 2. *March*, the team on the left breaks *right by pairs*; the lead-driver of the second team from the left obliques to the left, and enters the column; the swing and wheel drivers follow in succession, and conform to what has just been prescribed for the lead-driver, each moving off so as to have one yard’s distance on entering the column; the other teams move off in succession in like manner, each lead-driver fol-
lowing the wheel-driver of the team preceding him at two yards' distance; the non-commissioned officers take their places as before.

508. When the formation is in two lines, each team of the line in rear moves off in time to follow, at the proper distance, the corresponding team of the front line.

509. The column of teams is right in front when the teams of the right section in park lead; the column is left in front when the teams of the left section in park lead.

To change direction in column of teams.

510. Executed as prescribed for the column of pairs.

To oblique in column of teams.

511. The instructor commands:

1. Right (or left) oblique, 2. March.

To resume, or to take, the direct march, the instructor commands:


Each team oblique as already prescribed. The teams march on parallel lines, and regulate themselves so that the lead-drivers remain on a line parallel to the original direction.

To halt the column of teams, and to put it in march.

512. The instructor commands:


To march the column of teams to the rear.

513. The instructor commands:
1. Right (or left) about, 2. March.

At the command march, each team executes the about as already explained.

To halt the column on the completion of the about, the instructor commands: 1. Teams, 2. Halt, the command halt being given when the wheel-drivers are in the new direction.

To form line from column of teams.

514. Executed to the left, on the right, and to the front, as prescribed for a single team in column of pairs, substituting the command teams for team; the guide of the column passes in front of the leading pair as soon as it halts, and takes his place in line by a right about; each of the other non-commissioned officers leaves the column in time to take his place in line before the lead-driver, abreast of whom he was marching, arrives in line.

The line is formed in the direct or in the inverse order of the sections in park, according as the right or left is in front.

To dismiss the teams.

515. The column of teams is marched to the vicinity of the stable or picket-line, when line is formed facing to, or from, the stable or picket-line, as may be most convenient. The instructor dismounts the drivers and causes them to file off, the chiefs of section, and the caisson corporals of horse-batteries, preceding or following the team on the right of which they are posted, according to the flank from which the movement is made. The drivers are then dismissed as already explained, each chief of section superintending the drivers of his section.
General remark.

516. To give the horses regular exercise when the ground is soft or otherwise unsuitable for drill with the carriages, the teams are exercised in the movements of the battery, or platoon, without being hitched, the same commands being given and the same movements executed as far as practicable. The interval is the same as in the battery, but the distance is increased to seven yards.

To post teams with their carriages.

517. (Pl. 7.) If the column of teams be right in front, it enters the park at its left; if left in front, it enters at its right. As the head of the column approaches the flank of the park, the instructor commands:
1. Teams to your posts, 2. March.

At the command march, the teams of the rear-rank carriages leave the column by an oblique, move forward, and form another column, those in rear following the leading team that has obliqued; each column then directs itself upon a line parallel to the line of its carriages and in front of and near the poles. Each team of the front-rank carriages wheels to the left (or right) when at three and one-quarter yards from its position in front of its carriage, so as to come in front of and near the pole, and then halts without command. Each team of the rear rank conforms as nearly as possible to what has been prescribed for the teams of the front rank, the lead and swing-drivers inclining to one side, to avoid the front carriage of their file. Each non-commissioned officer moves with the lead-driver, by the side of whom he is posted, and conducts the team.

518. A single team is similarly posted with its carriage by the commands, 1. Team to your post, 2. March.

To hitch.

519. The pairs being coupled, the instructor dismounts the drivers and commands: Hitch.

At this command, each driver goes in front of his horses; faces toward them; grasps with his right hand the reins of the near horse, and with his left hand, the coupling rein of the off horse, and then backs his horses into such a position that they can be easily hitched.

Each wheel-driver opens the branches of the pole-yoke; puts the toggles through the sliding-rings, beginning with his off horse, and fastens the pole-straps to the sliding loops of the breast-straps, beginning with his near horse. He then goes behind the off horse, passing by his off side, untrusses and fastens both of his traces, and the inner trace of the near horse, to the hook of the splinter-
bar trace, or of the splinter-bar, beginning with the trace of the near horse and ending with the outer trace of the off horse. He then passes round the rear of the carriage at double time; untrusses the outer trace of the near horse, and fastens it to the hook of the splinter-bar trace, or of the splinter-bar.

Each swing-driver, as soon as the pole-straps are fastened, goes behind his off horse, passing by his off side; untrusses and fastens the traces, beginning with the outer trace of the off horse, and ending with the outer trace of the near horse, taking care to put the inner traces above the pole-straps and to keep all the traces slack, so that the wheel-driver may have no difficulty in hitching.

Each lead-driver conforms to what has just been prescribed for the swing-driver.

As soon as the wheel-driver has hitched, he steps to the end of the splinter-bar, lifts it, raises and fastens the pole-prop, and then stands to horse; the other drivers stand to horse as soon as they have hitched. The instructor makes a careful inspection of the harness; sees that it is properly put on; that the traces are of equal and sufficient length, and with the leathers on the flat side.

To unhitch.

520. The drivers being dismounted, the instructor commands: Unhitch.

Each wheel-driver goes to the splinter-bar; unfastens and trusses the traces of his near horse, and the inner trace of his off horse; passes at double time around the carriage; unfastens and trusses the outer trace of the off horse. He then goes in front of his horses, unfastens the pole-straps, beginning with the off horse; takes the toggles out of the sliding rings, beginning with the near horse, and unites the branches of the pole-yoke.
Each swing-driver goes in front of his horses; faces toward them, and backs them so as to unhitch more easily. He then goes to the left and rear of his horses, passing by the near side of his near horse; unfastens and trusses the traces, beginning with the outer trace of the near horse and ending with the outer trace of the off horse. He then goes to the heads of his horses, passing by the off side of his off horse.

Each lead-driver conforms to what has just been prescribed for the swing-driver.

Each driver stands to horse as soon as he has unhitched.

521. When the drivers of a team hitched are dismounted, the wheel-driver steps at once to the splinter-bar, unfastens the pole-prop, and raises the splinter-bar so as to let the prop rest upon the ground and support the pole. *This rule is general.*

**To leave the park.**

522. The instructor mounts the drivers, and commands:

1. *By team,* 2. *By the right (or left) flank,* 3. *March.*

At the command march, the team of the right carriage in the front rank wheels to the right and moves off in the new direction; the team of the right carriage in the rear rank moves forward, passing by the right of its front-rank carriage, and wheels to the right so as to enter the column and follow the first team at the proper distance. The teams of the other files of carriages move in succession as just prescribed, beginning the movement in time to enter the column and preserve their distances. Each non-commissioned officer moves with the lead-driver by the side of whom he is posted and conducts the team.

If the intervals between the carriages be not sufficient for the teams to pass, the teams of the rear-rank carriages
wheel as explained for the teams of the front rank. As the heads of the columns pass out of the park, the teams of the rear-rank carriages oblique so as to take their places in column in rear of the teams of the front carriages of their files.

THE TEAM HITCHED.

To march.

523. The team being at a halt and properly hitched, and the drivers mounted, the instructor commands:


At the command forward, the drivers see that their traces are stretched; at the command march, they move off the team.

524. Before a team hitched moves, the traces must always be stretched. This rule is general.

525. By observing this rule a team is enabled to pull steadily and together, and the horses are not fatigued by jerks, which make them balky, gall their shoulders, and break the harness.

To halt.

526. The carriage moving at a walk, the instructor commands:

1. Piece (or caisson), 2. Halt.

Each driver halts his pair as already explained, the wheel-driver exerting more strength in halting than the other drivers, as his horses have to stop the carriage.

527. The traces are stretched as soon as the carriage halts, by moving the horses a step or two forward. This rule is general.
To rest.

528. Being at a halt, the instructor dismounts the drivers, and commands:

1. Drivers, 2. Rest.

The movement is executed as previously explained, except that the drivers need not hold the reins, but must remain on the left of their horses and close to them.

To resume the attention, the instructor commands: 1. Drivers, 2. Attention.

529. When the drivers of a team hitched are called to attention, the wheel-driver first steps to the end of the splinter-bar, lifts it, and raises and fastens the pole-prop. This rule is general.

Changes of gait.

530. Executed as already explained, all the drivers acting together.


At the command march, the drivers start the team off together at a trot.

532. When necessary to halt from a trot, the instructor commands: 1. Piece (or caisson), 2. Halt.

At the command halt, each driver stops his pair gradually, the lead and swing drivers taking care that their horses are not injured by the pole or by the horses in their rear.

533. A carriage moving at a rapid rate cannot be stopped at once, but must move on five or six yards after the command halt is given. This rule is general.
To wheel.

344. (Pl. 8.) The instructor commands:

1. Right (or left) wheel, 2. March.

At the second command, the lead-driver, followed by the swing and wheel drivers, executes the wheel as explained for a team unhitched.

Unless the ground be difficult, or the load heavy, the lead and swing drivers slacken their traces, without letting them hang, so that their horses do not have to pull; the traces are stretched as soon as the wheel-driver is in the new direction.

To halt the carriage upon the completion of the wheel, the instructor commands:

1. Piece (or caisson), 2. Halt.

The command halt is given when the carriage is in the new direction.

To execute the about.

355. The instructor commands:

1. Right (or left) about, 2. March.

The drivers execute the about as explained for a team unhitched; this turns the carriage in nearly the shortest curve its construction will permit.

To halt the carriage upon the completion of the about, the instructor commands:

1. Piece (or caisson), 2. Halt.

The command halt is given when the carriage is in the new direction.
536. In executing the about at a trot, or gallop, the radius is somewhat increased, and the gait moderated, so as not to incur the risk of upsetting the carriage. This rule is general.

To oblique.

537. The instructor commands:

1. Right (or left) oblique, 2. March.

The drivers oblique to the right as explained for a team unhitched.

To resume, or to take, the direct march, the instructor commands: 1. Forward, 2. March.

To reverse.

538. (Pl. 9.) To place the carriage on the same ground, but facing in the opposite direction, the instructor commands:


At the command march, the drivers oblique to the right; the lead-driver, after gaining seven yards in that direction, moves his horses toward the left, so that the extreme part of the curve described by the off horse will be fourteen yards from the line of departure (or line occupied by the heads of the leaders at the beginning of the movement), and that, after passing three yards to
the left of the original left flank of the team and carriage, they will return to the ground occupied by the carriage at the beginning of the movement. The swing-driver follows the lead-driver. The wheel-driver directs his horses so that the right limber-wheel describes a loop, which, extending seven yards to the right and eleven to the front of the line of departure, passes a little to the left of the original left flank and then returns, bringing the hind-wheels in such a position that the rear of the carriage occupies the line of departure. The pairs in front move according to their distances from the pole, and must keep out of the way of the wheelers, who control the carriage. On the completion of the reverse, the drivers move off their horses in the new direction.

The instructor dismounts during the first execution of the movement, and precedes the leaders on foot over the curve which they are to describe.

To halt the carriage on the completion of the reverse, the instructor commands: 1. Piece (or caisson), 2. Halt.

The command halt is given as soon as the leaders reach the ground on which the hind-wheels stood at the beginning of the movement.

539. As horses cannot be stopped suddenly, the command halt is so given that they may be halted at the time or place prescribed. The same principle applies to the command march. These rules are general.

540. In reversing at a trot, or gallop, the loop is opened a little, and the gait moderated so as not to incur the risk of upsetting the carriage. This rule is general.

541. If the carriage have but two pairs of horses, the lead-driver moves as above prescribed for the swing-driver; if but a single pair, the driver moves as prescribed for the wheel-driver.
To back the carriage.

542. To the rear. Being at a halt, to back a short distance to the rear, the instructor commands:


At the command march, the drivers rein back their horses, taking care to keep the pole straight; at the fourth command, they stretch the traces and halt.

543. To the right or left. Being at a halt, the instructor commands:

1. Right (or left) backward, 2. March, 3. Piece (or caisson), 4. Halt.

At the first command, the drivers swing the team to the right, without advancing or backing the carriage, until the limber-wheel comes against the wheel guard-plate; at the command march, they rein the horses back, taking care to keep them to the right; at the command halt, they straighten the team and carriage, stretch the traces, and halt.

Whenever a carriage has to turn in a narrow space, as a street or lane, this method of backing is necessary, the carriage being halted when its rear part touches the wall, fence, etc.

Exercise of a section.

544. As a preparation for the Schools of the Battery and Platoon, a section (piece and its caisson), with the teams hitched, is placed in column with two yards' distance between the rear part of the leading carriage and the heads of the lead-horses of the carriage which follows. The chief of section is the guide; he takes post boot to boot with the lead-driver of the leading carriage, and on his left.
To march; to halt; and the changes of gait.
545. Executed by the commands and means explained for a single carriage, observing that in the commands the word section replaces the word piece or caisson.

To change direction in column.
546. Being in march, the instructor commands:

1. Column right (or left); or, 1. Column half-right (or half-left), 2. March.

At the command march, the leading carriage wheels, or half-wheels, to the right as already explained. The rear carriage follows in the track and wheels, or half-wheels, upon the same ground as the leading carriage.

To oblique.
547. (Pl. 10.) The instructor commands:

1. Right (or left) oblique, 2. March.

At the command march, each carriage obliques to the right and moves off in the new direction, the carriage in rear regulating itself on the other. The carriages march on parallel lines, the space between the carriages, measured perpendicularly to the oblique direction, being ten yards.

To resume, or to take, the direct march, the instructor commands: 1. Forward, 2. March.
Passage of carriages.

548. (Pl. 11.) Being at a halt, the piece in front, to change the relative positions of the piece and caisson, the instructor commands:

1. Caisson pass piece, 2. MARCH.

At the command march, the piece stands fast; the caisson inclines to the right, passes the piece, takes its place in front by inclining to the left, and moves forward; the piece then follows in the track of the caisson at the distance of two yards; the chief of section moves forward and joins the caisson as it passes.

If marching at a walk, the movement is executed as just explained, the piece halting at the command march.

If marching at a trot, or at a walk and the command be trot, the piece, at the command march, moves at a walk; the caisson passes it at a trot; the piece then takes the trot and follows the caisson.

If marching at a gallop, or at a trot and the command be gallop, the same principle applies, the piece moving at a trot.

Being at a halt, if the caisson be passed at a trot, the piece takes the trot upon the completion of the passage.

The piece is placed in front of its caisson, in a similar manner, at the commands: 1. Piece pass caisson, 2. MARCH.

The carriage which passes must take care to move far enough to the front, before inclining to the left, to avoid collision with the lead-horses of the carriage which is passed.
To execute the about.

549. The instructor commands:

1. Right (or left) about, 2. March.

Executed by each carriage as explained for a single carriage. On the completion of the movement, the chief of section moves forward and takes post with the lead-driver of the carriage now in front.

To halt the section upon the completion of the about, the instructor commands:

1. Section, 2. Halt.

The command halt is given when the carriages are in the new direction.

To reverse.

550. The instructor commands:


Executed by each carriage as explained for a single carriage. On the completion of the movement, the chief of section moves forward and takes post with the lead-driver of the carriage now in front.

To halt the section upon the completion of the reverse, the instructor commands:

1. Section, 2. Halt.

The command halt is given as explained for a single carriage.

To countermarch.

551. (Pl. 12.) To place a piece and its caisson in the same relative positions on the ground they occupied before, but facing in the opposite direction, the instructor commands:

At the command march, the leading carriage reverses, and moves at once to the position occupied by the rear carriage at the beginning of the movement; the rear carriage follows the track of the leading one, reverses on the same ground, and preserves its distance. On the completion of the countermarch, the section moves forward in the new direction.

To halt the section upon the completion of the countermarch, the instructor commands:

1. Section, 2. Halt.

The command halt is given when the heads of the lead-horses of the leading carriage reach the position occupied by the hind part of the rear carriage at the beginning of the movement.

552. In countermarching at a trot, or gallop, the same precautions must be taken as in reversing at these gaits. This rule is general.
SCHOOL OF THE BATTERY.

553. The School of the Battery includes that of the Platoon.

554. A section consists of a piece of light artillery and its caisson, manned, horsed, and equipped.

555. A platoon consists of two sections.

556. The battery of manœuvre consists of two or three platoons; in a mitrailleur battery the number of platoons may be increased to four or five.

557. Platoons and sections are designated as explained in the School of the Battery Dismounted.

558. The front of a battery, in the order in battery, is the line occupied by its pieces; in the other formations, it is the line occupied by the lead-drivers of the front-rank carriages.

The right or left of a battery, is the right or left of the actual front.

Interval, is space measured parallel to the front, and distance, space measured in depth, or perpendicular to the front.

559. The chiefs of section, and the caisson corporals of horse batteries, are the guides of the carriages with which they are posted; the lead-drivers are the guides of the carriages without non-commissioned officers.

The guides of a battery, or of a platoon, in line, are the guides of the front-rank carriages on its right and left.

560. Unless otherwise stated, the text refers to mounted batteries; it becomes equally applicable to horse batteries
by substituting the proper interval and distance, and by omitting such remarks as apply to the cannoneers of mounted batteries. Special directions are given when the detachments, or cannoneers, of horse batteries have to make any particular movement; when the detachments are not mentioned, they have only to maintain their posts in rear of their pieces, dressing toward the guide of the line or column; in column of sections, the guide of each detachment is, without indication, to the left.

561. On account of the noise of the carriages and the space occupied by a battery, the captain's commands are repeated more frequently than in the other arms. If a chief of platoon does not hear a command, he governs himself by what he sees executed by an adjoining platoon.

562. When no allusion is made to the commands of the chiefs of platoon, they repeat the commands after the captain.

Composition of the battery of manœuvres.

563. In this school, the battery of manœuvres is supposed to consist of three platoons, though the instruction is applicable to a greater or less number of platoons.

Each carriage is drawn by six horses; in a mitrailleur battery, the carriages have six, four, or two horses.

The personnel of a battery of manœuvres comprises—
One captain, who commands the battery.
Four lieutenants; three who are chiefs of platoon, and one who is chief of caissons. As the battery is formed in park, the senior lieutenant is posted with the right platoon; the next in rank, with the left platoon; the third in rank, with the centre platoon.

One first-sergeant, who reports all emergencies to the captain and acts as his assistant. In action, he brings up the caisson-limbers when a fresh supply of ammunition is
needed, and takes back the empty limbers; he also sees that spare horses are brought up to replace disabled animals.

One quartermaster-sergeant, whose duties are connected with the procurement of supplies, and the care of the matériel of the battery; though not a component part of the battery of manoeuvre, he has an assigned position for inspections, reviews, etc.

Six sergeants, who are chiefs of section.
Six gun detachments, each composed of nine cannoniers (two corporals and seven privates); in horse batteries, each detachment is composed of two corporals and nine privates. Six of the corporals are gunners of the pieces, and six in charge of the caissons.

Thirty-six drivers, one to each pair of horses.
Two trumpeters.

One guidon, who carries the battery standard, and ordinarily indicates the position of the guide.

564. The captain, lieutenants, sergeants, drivers, trumpeters, and guidon, are mounted; the cannoneers, as a rule, are on foot.

565. Cannoneers are usually mounted on the chests, etc., only for rapid movements; they are not ordered to mount, or dismount, when the battery is marching at a trot or gallop.

566. The sergeants, drivers, trumpeters, and guidon, are armed with the sabre; the cannoneers wear the sabre-belt only, their sabres being carried on the ammunition-chests. When the captain desires the first-sergeant, quartermaster-sergeant, and chiefs of section, to draw sabre, he commands: 1. Draw, 2. Sabre.

567. In horse batteries, every one is mounted, the cannoneers, except the horse-holders, dismounting to serve the guns; the drivers wear the sabre, and the cannoneers also, unless otherwise directed by the captain. The sabres
may be temporarily attached to the saddles, and left with them when the men dismount to serve the guns.

568. Chiefs of platoon, and the chief of caissons, when absent, are replaced by the first-sergeant and senior chiefs of section; the captain may also require the quartermaster-sergeant to perform this duty. The first-sergeant, if performing the duties of an officer, is not usually replaced. Gunners replace absent chiefs of section, caisson corporals absent gunners, and privates, selected for efficiency, absent caisson corporals.

Formations of the battery.

569. The habitual formations are the order in column, the order in line, and the order in battery. The formations are arranged so as to take up the least possible space and to require the least ground for passing from one to the other.

The order in column is that in which the battery is formed in column of platoons, or in column of sections, the pieces being limbered, and each followed or preceded by its caisson.

The order in line is that in which the carriages are formed in two ranks; the horses all facing in the same direction, the pieces limbered and in one rank, each followed or preceded by its caisson.

The order in battery is that in which the pieces are prepared for firing; the pieces, limbers, and caissons, being turned toward the enemy, and formed in three parallel lines.

In column of platoons, in line, and in battery, the interval between carriages is fourteen yards; in horse batteries, eighteen yards.

In column, or in line, the distance between two carriages, or between a carriage and mounted detachment, is
two yards. In battery, the distance between the lines of pieces and limbers is six yards, measured from the end of the handspike to the heads of the lead-horses; between the lines of limbers and caissons, eleven yards, measured from the rear part of the limbers to the heads of the lead-horses of the caissons.

570. When the carriages have but two pairs of horses, the intervals are diminished three yards; when but one pair, the intervals are diminished six yards; should the carriages have four pairs, the intervals are increased three yards.

571. In the order in battery, the distance between the lines of limbers and caissons is decreased by the same number of yards as the intervals; with this exception, which does not apply to horse batteries, the distances remain the same, irrespective of the intervals.

572. If any carriage have lost one pair of horses, or more, it has the same position as if the teams were complete, the distance being increased at the rate of three yards for each missing pair. In some changes of formation, such as the march by the flank, a carriage short of horses must execute the movement at an increased gait.

573. If the caissons be detached, the interval and distance in column of platoons, measured from piece to piece, are the same as when the caissons are present, so as to preserve the necessary space for wheeling into line.

574. In battle, the intervals and distances in the order in battery are modified to suit the nature of the ground. The limbers may be faced to the rear, and the pieces run back by hand to be limbered, so as to expose the horses less, should the battery retire. The caissons are posted some distance in rear, and under cover from fire, if possible.
Posts of officers, non-commissioned officers, etc., in the order in column.

575. (Pls. 1 and 2.) The captain is usually fourteen yards from the flank of the column, and opposite its centre; during the manoeuvres he goes wherever his presence is most required, and whence his commands can be best heard.

Each chief of platoon, in column of platoons, is half-way between his leading carriages, in line with the lead-drivers; in column of sections, opposite the centre of his platoon and four yards from the left flank, except the chief of the leading platoon, who is on the left and near the guide of the leading carriage.

The chief of caissons, in all formations of column of platoons by breaking to the front from line, is opposite the centre of the column and four yards from the right flank; in other formations from line into column of platoons, he is on the flank nearest his former position; if the column of platoons be faced to the rear, he does not pass to the other flank. In column of sections, he is abreast of the centre of the column and four yards from the flank, on the side opposite the chiefs of platoon.

The first-sergeant, in column of platoons, is abreast of the centre of the column, and four yards from the flank, on the side opposite to the chief of caissons; in column of sections, four yards in rear of the chief of the centre platoon; in column of sections, when the battery has but two platoons, his position is the same as in column of platoons.

The quartermaster-sergeant, in column of platoons, is half-way between the rear carriages of the rear platoon, in line with the wheel-drivers; in column of sections, in line with the wheel-driver of the rear carriage and four
yards from the flank, on the side opposite the chiefs of platoon.

Each chief of section is boot to boot with the lead-driver of his leading carriage, and on his left; in horse batteries,
each chief of section is boot to boot with the lead-driver of the piece, and on his left.

The *guidon*, in column of platoons, is boot to boot with the right, or left, guide of the leading platoon and on his left; in column of sections, in a similar position with respect to the guide of the second carriage.

The *trumpeters*, except when marching in review, are near the captain and in his rear.

The *cannoneers* are at their posts, or mounted on the chests, etc., as already explained. In *horse batteries*, the *cannoneers*, with the exception of the caisson corporals, are in the ranks of the mounted detachments, two yards in rear of their pieces, whether the pieces or caissons lead; each caisson corporal is boot to boot with the lead-driver of the caisson, and on his left.

*Posts of officers and non-commissioned officers, etc., in the order in line.*

576. (*Pls. 3 and 4.*) The captain is in front of the centre of the battery; the distance from the croup of his horse to the line passing through the heads of the lead-horses of the front-rank carriages is four yards; during the manoeuvres he goes wherever necessary, and whence his commands may be best heard.

Each chief of platoon is half-way between the leading carriages of his platoon, and in line with the lead-drivers.

The chief of caissons is in rear of the centre of the battery; the distance from the line passing through the rear of the rear-rank carriages to the head of his horse is four yards.

The first-sergeant is half-way between the central sections, in line with the limber-wheels of the pieces.

The quartermaster-sergeant is half-way between the central sections, in line with the wheel-drivers of the caissons.
The guidon, before leaving the park, and at inspections and reviews, is four yards from the right flank of the battery, aligned on the lead-drivers of the front-rank carriages; on other occasions, he is boot to boot with the right, or left, guide of the battery, and on his left.
The trumpeters, at inspections and reviews, are in line on the right of the guidon, each feeling the boot of the man on his left; on other occasions they have the same positions as in column.

The chiefs of section and cannoneers have the same positions as in column.

**Posts of officers and non-commissioned officers in the order in battery.**

577. (Pls. 5 and 6.) The captain is on the left of the chief of the centre platoon, but goes wherever his presence is required.

Each chief of platoon is habitually in the centre of his platoon, half-way between the lines of pieces and limbers. The chief of caissons is opposite the centre, four yards in rear of the line of caissons.

The first-sergeant and quartermaster-sergeant have the same positions as in line.

Each chief of section is on the left of his piece, outside but near the cannoneers, and opposite the middle of the trail handspike. When ammunition is fired, he habitually dismounts, gives the reins of his horse to the wheel-driver of the limber, and takes his place on the right or left of the piece, in such position as will best enable him to observe the effects of the shot.

The cannoneers are at their posts at the piece unlimbered. In horse batteries, the cannoneers are at their posts at the piece unlimbered, with the exception of the horseholders and caisson corporals; the horse-holders, with the horses of the detachment, are two yards in rear of the limbers; each caisson corporal has the same position as in column, unless ammunition be fired; in this case, he dismounts, gives the reins of his horse to the wheel-driver of the caisson, and takes his post at the piece unlimbered.
The *guidon* is on the flank of the line of caissons nearest his position on coming into battery, and abreast of the lead-drivers.

The *trumpeters* have the same positions as in column.

Measures of the elements composing a battery of manœuvre and of its formations.

578. The numbers given in the tables, having been chosen to avoid fractions, differ slightly from the exact measures; the differences, however, are of but little importance.
### Mounted Battery of Three Platoons

<table>
<thead>
<tr>
<th></th>
<th>Depth</th>
<th>Front</th>
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</thead>
<tbody>
<tr>
<td>Piece drawn by six horses</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Caisson drawn by six horses</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Limber drawn by six horses</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Piece in battery, with handspike</td>
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<td>2</td>
</tr>
<tr>
<td>Mounted detachment (horse bat'y)</td>
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<td>5</td>
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</table>

### Horse Battery of Two Platoons

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<th>Depth</th>
<th>Front</th>
</tr>
</thead>
<tbody>
<tr>
<td>Column of sections</td>
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<td>2</td>
</tr>
<tr>
<td>Column of platoons</td>
<td>80</td>
<td>22</td>
</tr>
<tr>
<td>Order in line</td>
<td>39</td>
<td>62</td>
</tr>
<tr>
<td>Order in battery</td>
<td>47</td>
<td>62</td>
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Instruction.

579. The captain is held responsible for the instruction of his battery.

He requires the officers and non-commissioned officers to study and recite the tactics, so that they can explain thoroughly every movement before it is put in execution, and causes them to learn the trumpet-calls so as to be able to recognize them at once when sounded; to secure uniformity, he also practises them in giving commands.

In the Schools of the Soldier, Mounted and Dismounted, and in the School of the Driver, the captain frequently requires the lieutenants to drill squads, and to instruct a single detachment in the Manual of the Piece and Mechanical Manœuvres. In the Schools of the Battery, Mounted and Dismounted, he may require them to act as instructors.

The platoons are instructed separately in the movements applicable to them acting singly, the precise limits of the instruction being determined by the captain. The chief of the platoon is ordinarily the instructor, but when the captain or a senior lieutenant replaces him, the chief acts as assistant and repeats the commands, which, with obvious additions and modifications, are the same as those of a chief of platoon in the battery.

Inexperienced officers are required to act as assistant instructors until sufficiently proficient to be intrusted with the instruction of a platoon.

The manœuvres of a platoon acting singly, being elementary in their nature, and intended as a preparatory exercise to the battery drill, will be executed with as much precision as possible, and the gaits, unless otherwise directed by the captain, will be limited to the walk and the trot.

In mounted instruction, all movements are first taught
at a walk; as the instruction progresses, the gait is gradually increased.

To make the drivers familiar with their duties in all situations, battery and platoon movements will be executed with the caissons in front, after they have been taught with the pieces leading.

During the drill, the instructor explains the meaning of the terms used in the course of instruction, such as interval, distance, etc., and asks questions to see whether every one understands the movements and the principles upon which they depend.

The park.

580. The carriages are parked in two ranks, the pieces limbered and in the front rank, the caissons covering their pieces; the interval is such as is most convenient; the distance from the rear part of the pieces to the end of the poles of the caissons is eight yards. The carriages of each section are arranged from right to left in the order of their permanent numbers, the 1st section on the right.

In horse batteries, the distance is seventeen yards, but may be decreased to eight yards if the nature of the ground require it.

To form the battery.

581. The battery dismounted having been formed and reported to the battery-officer of the day, the first-sergeant commands: Drivers fall out. At this command, the drivers step two yards to the front and form in double rank opposite the centres of their respective sections; the chiefs of section place themselves on the right of the front ranks of their drivers. The first-sergeant then sees that suitable cannoneers are detailed to replace absent drivers (not counting the men on guard, etc., who join their teams at the
stable or picket-line), closes the drivers toward either flank, and directs the senior chief of section to march them to the horses.

The drivers having marched off in column of files, the first-sergeant forms the gun detachments and marches them to the park, or puts them in charge of the senior gunner for this purpose, as explained in the School of the Battery Dismounted.

The drivers having arrived at the horses, the chief of section in charge halts them and commands: Harness, when the drivers of each section harness under the supervision of their chiefs. The horses of the chiefs of section are saddled while the drivers harness.

As soon as the gun detachments are posted at the pieces, the gunners, upon an intimation from the first-sergeant or senior gunner, have their carriages uncovered and the paulins folded up and strapped on the lids of the limber-chests; in a mitrailleur battery, the gun-covers, unless otherwise directed, are also taken off and strapped on the chest-lids.

If there be a gun-shed, the non-commissioned officer in charge halts the column in front of the building, designates the position of the carriages of the 1st section, and commands: 1. Form park, 2. At (so many) yards' interval, 3. March. At the command march, each gunner has his carriage run out by hand, and formed in park on those of the 1st section, the non-commissioned officer in charge seeing that they are in line.

The park being in order, each gunner forms his detachment in rear, causes it to call off, posts the cannoneers at the piece, and distributes the equipments.

In horse batteries, the duties of each gunner are as just prescribed, except that he distributes the equipments without posting the cannoneers, marches his detachment to the
horses, and causes the men to saddle, bridle, and prepare to lead out.

The first-sergeant sees that the cannoneers perform their duties in the park, and that the drivers harness, with the least possible delay and without noise or confusion; if the park be too far from the horses to enable the first-sergeant to superintend both drivers and cannoneers, the captain gives such instructions as he thinks proper.

The first-sergeant commands: Lead out, as soon as the teams are harnessed, and: Couple, when the line is formed: he then mounts the drivers, and posts the teams with their carriages.

In horse batteries, the cannoneers lead out and mount while the drivers are hitching, and are usually posted at the pieces by the first-sergeant, who returns for this purpose; if ready, they may be directed to lead out at the commands for the drivers, each detachment moving out after the team of its piece and forming in line on its left; as soon as the drivers are coupled, the first-sergeant commands: 1. Drivers and cannoneers, 2. Prepare to mount, 3. Mount. The teams are then posted with their carriages as before, each detachment following the team of its piece; at the commands teams to your posts, march, each detachment breaks from the column and takes post in rear.

If the park be in the immediate vicinity of the horses, the first-sergeant may command: Couple, when the drivers have harnessed, and direct that at the command lead out, the teams, and in horse batteries the detachment horses also, be led directly to their posts at the carriages; the teams move in succession by section.

In horse batteries, when the carriages are parked, with but eight yards' distance, the detachments are formed outside of the park, usually on the flank, and take post in rear as their pieces move out.
The teams being at their posts, the first-sergeant dismounts the drivers, if mounted; he then commands: Hitch, and takes his post.

The quartermaster-sergeant, and guidon, mounted, take their posts during the hitching. The trumpeters, mounted, report to the captain at such time and place as he may direct. The chiefs of platoon, mounted, join their platoons as soon as the teams are posted with the carriages and superintend the hitching.

Each chief of section, as soon as his teams are hitched, makes a minute inspection of his section, and reports the result to the chief of platoon.

Each chief of platoon having received the reports of the chiefs of section, and made a general inspection of the platoon, commands: 1. Platoon, 2. Rest, and causes the wheel-drivers to let down their pole-props.

Upon the approach of the captain, the chiefs of platoon bring their platoons to attention, and, as soon as the captain takes his place in front, they report in succession from right to left: (Such) platoon in order, Sir! but, if any thing be missing or out of order, they state it, instead of reporting as just prescribed.

The chiefs of platoon having reported, and the battery being ready to move, the captain mounts the drivers, and in horse batteries the cannoneers also.

To align the battery.

582. The captain causes one of the flank sections to move forward three or more yards, and commands:

1. Right (or left), 2. Dress, 3. Front.

The chiefs of platoon repeat the first and second commands only.

At the command dress, the other sections move forward,
preserving their intervals, the carriages approaching the line as squarely as possible, and halting a little in rear of it; the drivers cast their eyes to the right and dress up to the drivers of the carriages established as a basis; the captain places himself on the right flank in line with the wheel-driver of the leading carriage, facing to the left, and superintends the alignment of the wheel-drivers of the front-rank carriages; the chief of caissons places himself on the right flank in line with the wheel-driver of the rear carriage, facing to the left, and superintends the alignment of the wheel-drivers of the rear-rank carriages. At the command front, given when the battery is aligned, the captain and the chief of caissons resume their posts.

Instead of establishing a section as a basis, the captain having seen that the carriages on the side toward which he wishes to dress are in proper position, may give the same commands as before. The drivers dress as just explained, moving their horses forward or back so as to put themselves on the line.

583. In horse batteries, at the command dress, each detachment aligns itself to the side ordered, under the supervision of its gunner.

To unpark.

584. The captain commands:

1. Right (or left) by sections, 2. March.

At the first command, the chief of the right section commands: Forward; at the command march, which he repeats, the right section marches straight to the front, the guide of its leading carriage selecting points on which to direct himself as explained in the School of the Battery Dismounted. The chiefs of the other sections command in succession: 1. Forward, 2. March; each section, after ad-
vancing a few yards, inclines to the right and enters the column by the shortest line so as to follow the preceding section at two yards’ distance. The guide of the leading carriage is the guide of the column. The chiefs of platoon superintend the march of their sections, but do not repeat the commands.

As the battery unparks, the officers, first-sergeant, quartermaster-sergeant, and guidon, take their posts in column of sections.

585. Upon passing from any formation to one of the habitual formations of the battery, as soon as the movement permits, the officers and non-commissioned officers, whose posts are changed, go by the shortest route to their posts in the new formation. This rule is general.

586. The column of sections is right in front when the section leads whose permanent numerical designation is the lowest; the column of sections is left in front when the section leads whose permanent numerical designation is the highest.

**Route marches.**

587. The column of sections is the habitual column of route.

Marching at a walk, the captain commands: 1. At ease, 2. March. At the command march, the men are free to turn their heads and to talk; but no driver, and in horse batteries no cannoneer, is permitted to lounge in his saddle.

To cause the men to keep their eyes to the front and preserve silence, the captain commands: 1. Battery, 2. Attention. The chiefs of platoon command: Platoon, at the first command, and repeat the second.

The captain usually marches at the head of the column, with fourteen yards’ distance from the croup of his horse to the heads of the lead-horses of the leading carriage; he
is followed by the trumpeters, who march side by side, with one yard’s distance from the croup of the captain’s horse to the heads of their horses. The chief of caissons marches at the rear of the column, and follows the last carriage at four yards’ distance. If the road be narrow, the chiefs of the rear platoons, first-sergeant, and quarter-master-sergeant, close into the column.

588. In horse batteries, the gunners, whenever necessary, form their detachments in column of files, reforming line as soon as the ground permits.

To park.

589. The captain directs the column of sections toward either flank, or in rear, of the position to be occupied by the park, and establishes the guidon near the point where the lead-driver of the leading carriage is to halt.

590. To the right or left. The captain directs the column forty-seven yards in rear of, and parallel to, the line to be occupied by the lead-drivers of the front-rank carriages, and commands:

1. Right (or left) into park, 2. At (so many) yards’ interval, 3. March, 4. Front.

The chief of the leading section commands: Right wheel, at the first command, and repeats the third.

At the command march, given when the leading section is three and one-quarter yards from the point opposite the position which it is to occupy, the leading section wheels to the right, moves forward and is halted by its chief when the leading driver arrives in line with the guidon. Each of the other sections continues the march until three and one-quarter yards from the point opposite its place in park, then wheels to the right at the command of its chief, and moves forward; on arriving at three yards
from the line, the chief commands: 1. Section, 2. Halt, 3. Left, 4. Dress.

The chiefs of platoon superintend the movements of their sections, but do not repeat the commands. The captain and chief of caissons go to the left and superintend the alignment as previously explained.

The captain commands right into park, or left into park, according as the column is left, or right, in front.

591. When sections, or platoons, dress in succession at the commands of their chiefs, the captain and chief of caissons superintend the alignment from the flank toward which the dress is ordered as in simultaneous alignments; the command front is given by the captain on the completion of the alignment and is not repeated by the chiefs of platoon. These rules are general.

592. On the right or left. The captain directs the column forty-seven yards in rear of, and parallel to, the line to be occupied by the lead-drivers of the front-rank carriages, and commands:

1. On right (or left) into park, 2. At (so many) yards’ interval, 3. March, 4. Front.

Executed as explained for to the right into park, except that each section passes beyond the one preceding before wheeling to the right, and that upon halting, all the chiefs of section, except the leading one, command: 1. Right, 2. Dress.

The captain commands on right into park, or on left into park, according as the column is right, or left, in front.

593. To the front. The captain directs the column so as to bring the leading section in rear of the position it is to occupy; when this section is at least five yards from the point at which it is to halt, the captain commands:
1. **Right** (or left) **front into park**, 2. **At** (so many) **yards' interval**, 3. **March**, 4. **Front**.

At the first command, the chiefs of section, in rear of the first, command: **Right oblique**. At the command **march**, repeated by these chiefs of section, the leading section moves forward and halts, at the command of its chief, on arriving at the point established by the guidon; all the other sections oblique to the right until nearly opposite their places in park, when their chiefs command: 1. **Forward**, 2. **March**; on arriving at three yards from the line, each chief halts his section, and commands: 1. **Left**, 2. **Dress**.

The chiefs of platoon superintend the march of their sections, but do not repeat the commands.

The captain commands **right front into park**, or **left front into park**, according as the column is left, or right, in front.

594. In **horse batteries**, if necessary to park with but eight yards' distance, the captain directs the detachments to leave the column by an oblique as the battery approaches the park.

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**To rest the battery.**

595. Being in column at a halt, the captain dismounts the drivers and cannoneers, and commands:

1. **Battery**, 2. **Rest**.

Executed by the drivers and cannoneers as previously explained for each. The chiefs of platoon command: **Platoon**, at the first command, and repeat the second.

The battery may be rested as just prescribed in the other formations.

To resume the attention, the captain commands:

The chiefs of platoon command: Platoon, at the first command, and repeat the second. The captain then causes the drivers to mount, and in horse batteries the cannoneers also.

To dismiss the battery.

596. As soon as the battery is parked, each chief of section makes a minute inspection of his section, and reports all losses, or injuries, to the chief of platoon; the chiefs of platoon then report in succession from right to left: (Such) platoon in order, Sir! but, if any thing be missing or out of order, they state it, instead of reporting as just prescribed.

The chiefs of platoon having reported, the captain dismounts the drivers, and directs the first-sergeant: Dismiss the battery, at which the officers return sabre and leave the park.

The first-sergeant then commands: Unhitch, at which command the quartermaster-sergeant and guidon leave the park and return their horses to the stable or picket-line, and the gunners cause their cannoneers to replace equipments, clean, cover, or put away their carriages, as directed by the first-sergeant.

In horse batteries, while the drivers unhitch, the senior gunner marches the detachments from the park, forms them in line, and gives the commands for filing off, as explained in Horse Artillery. Each gunner causes the men of his detachment to unsaddle, unbridle, and care for their horses; he then marches the detachment back to the park, replaces equipments, and causes the men to attend to their carriages.

The teams being unhitched, the first-sergeant marches them from the park and dismisses them as explained in the School of the Driver.
If the park be in the immediate vicinity of the horses, the first-sergeant, instead of mounting the drivers, may direct the teams, and in horse batteries the detachment horses also, to be led directly to the stalls, or picket-line; the teams and detachment horses move in the order of the numbers of their sections.

The horses being at the stable or picket-line, the first-sergeant commands: Unharness, when the drivers of each section unharness under the supervision of their chiefs. The horses of the chiefs of sections are unsaddled while the drivers unharness.

As soon as the drivers have attended to their horses and harness, the first-sergeant directs the senior chief of section to march them in column of files to the battery parade-ground and dismiss them.

As soon as the cannoneers have attended to the carriages, the gunners form the detachments in front, or in rear; the first-sergeant, or senior gunner, then marches them to the battery parade-ground and dismisses them.

To change direction in column of sections.

597. Being in march, the captain commands:

1. Column right (or left), 2. March.

The chief of the leading platoon alone repeats the commands. At the command march, the leading section changes direction as already explained; the other sections move forward until each arrives on the ground where the leading section began to wheel, when it executes the same movement.

The chief of the leading platoon sees that the guide of the leading carriage directs himself on the proper points in the new direction.

598. Column half-right (or half-left), is similarly exe-
cuted, the chief of the leading platoon alone repeating the commands.

599. To make a slight change of direction, the captain cautions: *Incline to the right* (or *left*). The guide of the column carries his bridle-hand slightly to the right and takes two points a little to the right of those upon which he was marching.

600. To put the column of sections in march, and to change direction at the same time, the captain commands:

1. *Forward*, 2. *Column right* (or *left*); or, 2. *Column half-right* (or *half-left*), 3. *March*.

The chief of the leading platoon repeats the commands; the other chiefs of platoon repeat the first and third commands.

*To form column of platoons from column of sections.*

601. (*Pl. 7.*) Being at a halt, the captain commands:


The chief of the leading platoon commands: *Form platoon*, at the first command, and repeats the second; the other chiefs of platoon command: *Forward*, at the first command. At the command *march*, repeated by all the chiefs of platoon, the leading section of the leading platoon moves forward five yards and halts, the guidon taking post on the left of the guide of the leading carriage, and boot to boot with him; the rear section obliques to the left, gains its interval of fourteen yards, moves forward, and halts when in line with the leading section. The other platoons move forward, each chief commanding: 1. *Form platoon*, 2. *Left oblique*, in time to add: 3. *March*, when his leading section is seven yards from the rear carriage of
the preceding section; the platoons form as explained for the first.

If marching at a walk, the leading platoon executes the movement as explained from a halt; the other platoons continue the march without command, until formed successively by their chiefs.

If marching at a walk and the command be trot, the captain commands: Guide (right or left), after the command march. The chief of the leading platoon commands: Form platoon, at the first command, and repeats the other commands; his leading section moves forward at a walk, his rear section oblique at a trot, gains its interval, and, on arriving abreast of the leading section, takes the walk. Each of the other chiefs of platoon repeats the commands, trot, march, and, when his leading section has nearly closed to its distance, forms his platoon by the same commands as prescribed for the first. Each chief of platoon repeats the command for the guide as soon as his platoon is formed. The guidon takes his post in column of platoons as soon as the guide is announced.

If marching at a trot, the movement is executed as just explained; the rear platoons continue to march at a trot without command until formed successively by their chiefs.

If marching at a gallop, or at a trot
and the command be *gallop*, the same principles apply, the leading section moving at a trot.

602. The guidon is always boot to boot with the guide with whom he is posted, and on his left. Whenever the guide is announced, the guidon, if not already there, goes at once by the shortest route to the position of the guide. *These rules are general.*

603. The column of platoons is habitually employed for manoeuvring, as the column of sections requires too great an extension of the battery, and too much time for the movements.

*To form column of sections from column of platoons.*

604. (*Pl. 8.*) Being at a halt, the captain commands:

1. *Right* (or *left*) by sections, 2. *March.*

The chief of the leading platoon repeats the commands. At the command *march*, his right section moves forward, the guidon taking his post in column of sections; his left section remains halted until the leaders of its leading carriage are passed by the wheel-horses of the rear carriage of the right section, when it obliques to the right, enters the column, and follows the right section. The chiefs of the other platoons form them successively into column of sec-
tions by the same commands, each commanding march, when the wheel-horses of the left section of the preceding platoon begin to oblique.

If marching at a walk, at the command march, the right section of the leading platoon maintains the gait, and the left section halts without command; the chiefs of the other platoons command: 1. Platoon, at the first command, and add: 2. Halt at the command march; the movement is then executed as before.

If marching at a walk and the command be trot, the right section of the leading platoon takes the trot at the command march, the left section on beginning to oblique. The other platoons are formed successively into column of sections at a trot, each chief of platoon regulating the movement of his sections as before.

If marching at a trot, the right section of the leading platoon maintains the gait, and the left section takes the walk; the chiefs of the other platoons command: Walk, at the first command, and repeat the command march; the movement is then executed as just explained.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply.

To halt the column and to put it in march.

605. Being in column of platoons, the captain commands:


The chiefs of platoon command: Platoon, at the first command, and repeat the second.

To resume the march, the captain commands:


The guide maintains the direction, the carriages preserving the interval and distance.
606. Being in column of sections, the battery is halted by the same commands and means.
To resume the march, the captain commands:


607. To insure the execution of the halt by all the carriages at the same time, whenever the captain gives the command *halt*, he raises his arm and sabre to their full extent; the chiefs of platoon, chiefs of section, and caisson corporals of *horse batteries*, make the same motion; when the sabre is not drawn, the right arm is raised to its full extent. *This rule is general.*

*Changes of gait in column.*

608. Executed as prescribed in the School of the Driver.

*Passage of carriages in column.*

609. Being in column of platoons, at a halt, the captain commands, according as the pieces or caissons are in front:


Executed in each section as already prescribed for a single section in the School of the Driver; the guide of each carriage which passes in the right sections dresses on the guide of the corresponding carriage in the left sections; the guidon moves forward and joins the leading carriage at the same time as the chief of section with whom he is posted; the command for the guide is given as soon as the passage is completed.

Being in march, the movement is executed as before; the command for the guide being omitted; on the completion of the passage, the carriages which have passed dress toward the side of the guide.
610. When the passage is executed by two or more carriages in line with each other, the guide of the left carriage is the guide of the line of carriages during the passage. This rule is general.

611. In horse batteries, the movement is similarly executed; the caissons pass the pieces and detachments, or the pieces and detachments pass the caissons, according as the pieces, or caissons, are in front; the chiefs of section remain with their pieces; the guidon moves forward and takes post with the guide of the carriage which passes.

612. In column of sections, the captain commands, according as the pieces, or caissons, are in front:


The guidon moves forward and takes post with the guide of the carriage which is passed.

About, reverse, and countermarch in column.

613. About. Being in column of platoons, the captain commands:

1. Right (or left) about, 2. March, 3. Guide (right or left); or, 3. Battery, 4. Halt.

At the command march, each carriage executes an about; during the movement the guide of each right-section carriage dresses on the guide of the carriage on his left at the beginning of the movement; upon the completion of the about, the guide is announced or the battery halted.

614. In column of sections, the movement is executed by each carriage as before, the command for the guide being omitted.

615. Whenever the column of platoons is faced to the
rear, the guidon hastens to place himself at the rear now become the head of the column; if the battery be halted on the completion of the movement, the guidon takes post with the right guide of the leading platoon. In column of sections, the guidon hastens to take post with the guide of the second carriage from the rear, now become the guide of the second carriage from the head of the column. These rules are general.

616. Reverse. Being in column of platoons, the captain commands:


Executed as just explained, except that each carriage executes the reverse.

617. In column of sections, the command for the guide is omitted.

618. In horse batteries, the pieces advance nine yards after completing the about, or reverse, so that the heads of the lead-horses are on the ground before occupied by the rear of the detachments, and increase the gait so as to reach this position when the caissons complete the movement.

619. Countermarch. Being in column of platoons, the captain commands:


Executed as just explained, except that each section executes the countermarch, and that, during the movement, the guide of each leading carriage in the right sections dresses on the guide of the carriage on his left at the beginning of the movement.
620. In column of sections the command for the guide is omitted.

621. When two or more carriages in line with each other execute an about, or reverse, the guide of the left carriage at the beginning of the movement is the guide of the rank of carriages throughout the movement. This rule is general.

622. When two or more sections in line with each other countermarch, the guide of the leading carriage of the left section at the beginning of the movement is the guide throughout the movement. This rule is general.

623. In executing an about, or in reversing, the guide of each rank of carriages regulates himself on the guide of the rank in front of him. This rule is general.

624. In countermarching in column of platoons, the guide of the countermarch in each platoon regulates himself on the guide of the countermarch in front of him.

625. In executing an about, in reversing, and in countermarching, in column of sections, the carriages, or sections, regulate themselves on the carriages, or sections, in front of them.

To change direction in column of platoons.

626. (Pl. 9.) Marching at a walk, the captain commands:

1. Column right (or left), 2. March.

At the first command, the chief of the leading platoon commands: Right wheel; at the command march, repeated by this chief, his pivot-section changes direction to the right as explained for a single section, his other section takes the trot, and moves over a quarter-circle so as to preserve its interval and conform to the movement of the pivot-section; on the completion of the wheel it takes the
gait of this section. The other platoons move forward until each arrives on the ground where the leading pla-

Plate 9.

atoon began to wheel, when it executes the same move.
ment at the same commands from its chief. The guidon retains the post he had at the beginning of the movement.

If marching at a trot, the pivot-section moves at a trot; the other section moves at a gallop; the movement is then executed as before.

If marching at a gallop, the same principles apply; the pivot-section moves at a gallop, the other section increases the gait without urging the horses too much.

627. In wheeling, the guide is always, without indication, on the pivot-flank, and continues on this flank unless otherwise announced. This rule is general.

628. As the guide, after a change of direction, is on the side it was before the movement, in changing direction to the side opposite the guide, the chief of platoon commands: Guide right (or left), on the completion of the wheel, according as the guide was right, or left, before the movement.

629. Column half-right (or half-left), is similarly executed, each chief of platoon commanding: Right (or left) half-wheel.

630. To make a slight change of direction, the captain cautions: Incline to the right (or left).

631. To put the column of platoons in march, and to change direction at the same time, the captain commands:

1. Forward, 2. Guide (right or left), 3. Column right (or left); or, 3. Column half-right (or half-left), 4. March.

The chiefs of platoon repeat all the commands except the third; at this command, the chief of the leading platoon commands: Right wheel; or, Right half-wheel; at the command march, his pivot-section moves at a walk; his other section moves at a trot; the movement is then executed as before.
To oblique in column.

632. (Pl. 10.) Being in column of platoons, the captain commands:

1. Right (or left) oblique, 2. March.

At the command march, each section obliques to the right as explained for a single section, all the carriages marching on parallel lines; the guide of the leading right-section carriage is the guide of the column; the guides of the other carriages of the right sections conduct them so that the lead-drivers keep on a line parallel to the original direction; the space between the right-section carriages, measured perpendicularly to the oblique direction, is ten yards. Each carriage of the left sections marches in the trace of, and nine yards behind, the carriage which preceded the carriage on its right before the oblique; the guide of each left-section carriage regulates himself on the guide of the carriage on the right, so that both remain on a line parallel to their former position, and preserves his interval of fourteen yards; the space between the left-section carriages, and between carriages of the same rank, measured perpendicularly to the oblique direction, is ten yards.

The captain, chiefs of platoon, chief of caissons, first-sergeant, and quartermaster-sergeant, oblique to the right and maintain their relative positions, the chiefs of platoon superintending the march of their carriages. The guidon retains the post he had when the movement began.

To resume the direct march, the captain commands:


At the command march, each carriage half-wheels to the left and moves in the original direction.
If the oblique be executed from a halt, the guide is announced on taking the direct march.

Plate 11.

633. In obliquing, the guide is always, without indication, on the side toward which the oblique is made. On
resuming the direct march, the guide is, without indication, on the side it was previous to the oblique. These rules are general.

634. Being in column of sections, the commands are the same as before, and the oblique is executed as explained for the right sections in the column of platoons. The chiefs of platoon superintend the march of their carriages and maintain their relative positions.

To resume, or to take, the direct march, the captain commands: 1. Forward, 2. March.

635. (Pl. 11.) In horse batteries, the movement is executed on the same principles; the carriages of the left sections do not march in the trace of the carriages which preceded the carriages on their right before the oblique, and the spaces between the carriages measured perpendicularly to the oblique direction are different.

To close and extend intervals in column of platoons.

636. Marching at a walk, the captain commands:

1. On right (or left) sections, 2. To (so many) yards close (or extend) intervals, 3. Trot, 4. March, 5. Guide (right or left).

The chiefs of platoon command: On right section, at the first command, and repeat the others.

At the command march, the right sections move straight to the front at a walk; the left sections oblique toward (or from) the right sections at a trot; upon gaining the prescribed interval, they move forward and take the walk on arriving abreast of the right sections. The officers and non-commissioned officers conform to the movement.

If marching at a trot, the movement is executed as before; at the command march, the right sections move at a walk.
If marching at a *gallop*, or at a *trot* and the command be *gallop*, the same principles apply, the right sections moving at a trot.

*To march by the flank.*

637. (*Pl. 12.*) Being in column of platoons, the captain commands:

1. *By the right (or left) flank*, 2. *March*, 3. *Guide (right or left).*

At the command *march*, each carriage wheels to the right, moves forward, and dresses toward the guide.

The battery having been marched by the flank from column of platoons is now in line with the carriages of the right sections in the front rank, and those of the left sections in the rear rank. The interval is fourteen yards and the distance two yards. The captain, chiefs of platoon, chief of caissons, first-sergeant, and quartermaster-sergeant, wheel to the right and take post as in the regular order in line.

To march again in column of platoons, the captain commands:

1. *By the right (or left) flank*, 2. *March*, 3. *Guide (right or left).*

638. (*Pl. 13.*) In *horse batteries*, the march by the flank is executed on the same principles. The distance is six yards; when the pieces lead, the interval between carriages of the same section is twenty-three yards, and that between carriages of different sections fourteen yards; when the caissons lead, the interval between carriages of the same section is fourteen yards, and that between carriages of different sections twenty-three yards.

Each detachment wheels at the same time as its piece,
so as to take post on its right flank, two yards from the wheels, the heads of the front-rank horses being in line with the axle of the limber.
In marching again in column of platoons, if the original direction be resumed, each detachment wheels in the same direction as its piece, and takes its post in rear; but, if the column be faced in the opposite direction, each detachment halts until its piece has passed, and then takes its post in rear.

639. Being in column of sections, to march by the flank, the captain commands:

1. **By the right (or left) flank**, 2. **March**, 3. **Guide (right or left)**.

The captain, chiefs of platoon, and chief of caissons, wheel to the right and take positions corresponding to their posts in the regular order in line. The first-sergeant and quartermaster-sergeant wheel to the right and remain at four yards from the flank of the carriages near which they were posted when the movement began; if the battery have but two platoons, the first-sergeant is half-way between the central carriages.

To march again in column of sections, the captain commands:

1. **By the right (or left) flank**, 2. **March**.

**Being in column of sections, to form the caissons on the flank.**

640. Being at a halt, or marching at a walk, with pieces in front, the captain commands:

1. **Caissons right (or left)**, 2. **March**.

At the command *march*, the pieces move forward and the caissons oblique to the right; the leading piece halts after it has advanced its own length, the guidon taking post with its guide; the other pieces halt when each b
closed to two yards from the piece preceding; each caisson moves forward as soon as it has gained the interval of fourteen yards, and halts when in line with its piece.

The captain, chiefs of platoon, chief of caissons, first-sergeant, and quartermaster-sergeant, take post as in column of platoons.

If marching at a trot, or at a walk and the command be trot, the captain commands: Guide (right or left), after the command march. The leading piece moves at a walk; the other pieces move at a trot, and take the walk upon closing to their proper distance; the caissons move at a trot, and take the walk when in line with their pieces; each chief of platoon repeats the command for the guide as soon as his leading caisson is abreast of its piece.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply.

641. If the caissons lead, the pieces may be formed on the flank according to the same principles, the word pieces being substituted for the word caissons in the commands.

The caissons being on the flank, to form column of sections.

642. Being at a halt, the captain commands:


The chief of the leading platoon repeats the commands.

At the command march, the leading piece moves forward and is followed by its caisson, which takes its place in rear by an oblique, beginning the movement when its leaders are passed by the wheel-horses of the piece; the rear piece of the leading platoon moves forward when the wheel-horses of the leading caisson begin to oblique, and is followed by its caisson; the guidon takes his post in col-
umn of sections. The other platoons execute the movement in the same manner, their chiefs commanding: 1. Caissons rear, in time to add: 2. March, when the wheel-horses of the rear caisson of the preceding platoon begin to oblique.

If marching, the movement is executed, at the same or at an increased gait, on the same principles as in forming column of sections from column of platoons.

643. To form column of sections by placing the pieces in rear of their caissons, the captain commands:


To form line to the right or left from column of platoons.

644. (Pl. 14.) The captain commands:


The chiefs of platoon command: Right wheel, at the first command, repeat the second and the command for the guide; if the battery be halted, they repeat all the commands except the last, substituting platoon for battery, and the guidon takes post with the right guide of the battery.

At the command march, each platoon wheels to the right as explained in changing direction in column of platoons; the guide is announced, or the battery halted, as soon as the rear pivot-carriages, after completing the wheel, have advanced their own length in the new direction.
To form line on the right or left from column of platoons.

645. (Pl. 15.) Being at a halt, the captain commands:

1. **On right (or left) into line, 2. March, 3. Front.**

At the first command, the chief of the leading platoon commands: **Right wheel;** the chiefs of the other platoons: 1. **Forward,** 2. **Guide right;** the guidon takes post with the right guide of the leading platoon.

At the command **march,** repeated by all the chiefs of platoon, the leading platoon wheels to the right; as soon as its rear pivot-carriage, after completing the wheel, has advanced its own length in the new direction, the chief commands: 1. **Platoon,** 2. **Halt,** 3. **Right,** 4. **Dress;** each of the other platoons marches beyond the one which preceded it, and, at the commands of its chief, wheels to the right so as to have its proper interval; on arriving at three yards from the line, the platoon is halted by its chief and dressed up to the platoon which preceded it by the commands prescribed for the first.

If marching, before giving the commands, the captain orders the guide, if not already there, to the flank toward which the movement is to be executed, and the chiefs of the centre and rear platoons omit the commands for putting them in march; the movement is then executed as before.

To form front into line from column of platoons.

646. (Pl. 16.) Being at a halt, the captain commands:

1. **Right (or left) front into line, 2. March, 3. Front.**

At the first command, the chief of the leading platoon commands: 1. **Forward,** 2. **Guide left;** the other chiefs
command: *Right oblique*; the guidon takes post with the left guide of the leading platoon. At the command *mar*
repeated by the chiefs, the leading platoon advances eighteen yards, when its chief commands: 1. Platoon, 2. Halt, 3. Left, 4. Dress; the other platoons oblique to the right, each chief commanding: 1. Forward, 2. March, 3. Guide left, when his carriages, by half-wheeling to the left, will be in rear of their places in line; each platoon, on arriving at three yards from the line, is halted by its chief and dressed up to the platoon which preceded it by the commands prescribed for the first.

If marching at a walk, the chief of the leading platoon commands: Guide left, if the guide be not already there; the movement is then executed as before.

If marching at a walk and the command be trot, the captain commands: Guide left, immediately after the command march; the chief of the leading platoon repeats the command for the guide; the chiefs of the other platoons repeat the command trot, each commanding: 1. Walk, in time to add: 2. March, on arriving in line with the leading platoon.

If marching at a trot, the movement is executed in the same manner; the chief of the leading platoon commands: Walk, at the first command of the captain, and repeats the commands march and guide left.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply, the leading platoon moving at a trot.

647. In horse batteries, the leading platoon advances twenty-two yards.

648. When the teams of the carriages have but two pairs each, the distance over which the leading platoon advances is diminished three yards; when each team consists of a single pair, this distance is diminished six yards; should the teams have four pairs each, this distance is increased three yards.
To form front into line, faced to the rear, from column of platoons.

649. (Pl. 17.) Being at a halt, the captain commands:

1. Right (or left) front into line, faced to the rear, 2. March, 3. Front.

The movement is executed as in forming front into line, with the following modifications:

The chief of the leading platoon commands: 1. Countermarch, 2. March, as soon as his platoon has advanced eighteen yards, the guidon halting at the command march; on the completion of the countermarch, the chief adds: 3. Platoon, 4. Halt, 5. Right, 6. Dress.

The chief of the centre platoon commands: 1. Countermarch, as soon as his lead-drivers are in line with the guidon, and adds: 2. March, when they have advanced three yards beyond him; on the completion of the countermarch, he commands: 3. Platoon, 4. Halt, 5. Right, 6. Dress; at the command dress, his platoon aligns itself on the platoon which preceded it.

The movement is executed in the same manner by the rear platoon; as soon as it begins to countermarch, the guidon takes post with the right guide of the battery.

650. In horse batteries, the leading platoon advances twenty-two yards.

651. If the number of pairs be less or greater than three, the distances to be advanced are diminished or increased as prescribed for front into line.

To form line from column of sections.

652. To the right or left. The captain commands:

1. Right (or left) into line, 2. March, 3. Front.

Executed as explained for forming to the right into
SCHOOL OF THE BATTERY.

Plate 17.
park, the interval being fourteen yards; the chief of the leading section halts his section when the rear carriage has advanced its own length in the new direction after completing the wheel, the guidon taking post with the guide of its leading carriage. If executed from a halt, the chiefs of section in rear of the first command: Forward at the first command, and repeat the command march.

653. On the right or left. The captain commands:

1. On right (or left) into line, 2. March, 3. Front.

Executed as explained for forming on right into park, the interval being fourteen yards; the chief of the leading section halts his section, and the guidon takes his post, as explained in the preceding case. If executed from a halt, the chiefs of section in rear of the first command: Forward at the first command, and repeat the command march.

654. To the front. The captain commands:

1. Right (or left) front into line, 2. March, 3. Front.

Executed at a walk as explained for right front into park, the interval being fourteen yards; the chief of the leading section halts his section when it has advanced five yards, the guidon taking post with the guide of its leading carriage. If executed from a halt, the chief of the leading section commands: Forward, at the first command, and repeats the command march.

If marching at a trot, or gallop, or if the command be trot, or gallop, the captain commands: Guide left (or right), after the command march, and the same principles apply as in forming front into line from column of platoons.
To form column of platoons to the right or left.

655. (Pl. 18.) Being in line, the captain commands:
1. Platoons right (or left) wheel, 2. March, 3. Guide (right or left); or, 8. Battery, 4. Halt.

At the first command, each chief of platoon commands: *Right wheel*; at the command *march*, which he repeats, each platoon wheels to the right; the guide is announced, or the battery halted, when the rear pivot-carriages, after completing the wheel, have advanced their own length in the new direction. If the battery be halted, the guidon takes post with the right guide of the leading platoon.

*To form column of platoons to the front.*

656. (*Pl. 19.*) Being in line at a halt, the captain commands:


The chief of the right platoon commands: *Forward*, at the first command, and repeats the other commands, his platoon moving forward at the command *march*. Each of the other chiefs of platoon commands: 1. *Right oblique*, in time to add: 2. *March*, when the lead-drivers of the rear carriages of the platoon on his right are in line with him; his platoon obliques to the right until he commands: 1. *Forward*, in time to add: 2. *March*, when his carriages, by half-wheeling to the left, will follow in the track of the carriages of the preceding platoon; he then repeats the command for the guide.

If marching at a *walk*, the chief of the right platoon repeats the command for the guide, and his platoon continues the march; at the first command, the chiefs of the other platoons command: *Pivot*; at the command *march*, they command: *Halt*; the movement is then executed as before.

If marching at a *walk* and the command be *trot*, the
chief of the right platoon repeats the commands trot, march, and the command for the guide; the other platoons move at a walk, each chief, at the proper time, commanding: 1. Right oblique, 2. Trot, 3. March.

If marching at a trot, the chief of the right platoon repeats the command for the guide; the chiefs of the centre and left platoons command: Walk, at the first command, repeat the command march, and add: 1. Right oblique, 2. Trot, 3. March.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply; the right platoon moves at a gallop; the other platoons move at a trot and take the gallop when they begin to oblique.

To break into column of platoons from one flank to march toward the other.

657. (Pt. 20.) Being in line, at a halt, the captain commands:

1. Platoons, break from the right (or left) to march to the left (or right), 2. March, 3. Guide left (or right).

At the first command, the guidon takes post with the left guide of the right platoon, and the chief of the right platoon commands: Forward; at the command march, repeated by this chief, his platoon moves forward, when he commands: 1. Left wheel, in time to add: 2. March, as soon as the rear part of the limbers of his leading carriages are in line with the heads of the lead-horses of the platoon on his left; the leading platoon having wheeled to the left, the chief repeats the command for the guide.

Each of the other chiefs of platoon commands: 1. Forward, in time to add: 2. March, when the limber-wheel axles of the rear carriages of the platoon preceding his own are in front of him; the movement is then executed as
prescribed for the first platoon, each chief repeating the command for the guide as soon as his platoon has entered the column.

658. In horse batteries, if the pieces be in front, the chiefs of the centre and left platoons command march when the centre of the rear carriages of the preceding platoon are in front of them; if the caissons be in front, they give this command when the rear-rank cannoneers are in front of them.

\[ \text{To form double column.} \]

659. (Pl. 21.) Being in line, at a halt, the captain commands:


At the first command, the chief of the centre platoon commands: Forward, and repeats the other commands, his platoon moving forward at the command march. As soon as the guide is announced, the guidon takes post as in column of platoons.

The chief of the right platoon commands: 1. Left oblique, and the chief of the left platoon: 1. Right oblique, in time to add: 2. March, when the leaders of their leading carriages are passed by the wheel-horses of the rear carriages of the centre platoon, and their platoons begin to oblique. When the section nearest the column, in each platoon, is about to enter it, the chief of the right platoon commands: 1. Left by sections, 2. March, and the chief of the left platoon: 1. Right by sections, 2. March. The right platoon then forms in column of sections in rear of the right section of the centre platoon, and the left platoon in column of sections in rear of the left section of the centre platoon. The chiefs of the flank platoons see that their sections enter the column at the proper time. As soon
the column is formed, they repeat the command for the guide, and place themselves four yards outside of the column, the senior chief abreast of the leading driver of his leading section, the junior abreast of the leading driver of his rear section; each commands the two sections in line with him, which constitute temporary platoons.

The captain takes post as in column of platoons; the first-sergeant and quartermaster-sergeant retain their posts as in line; the chief of caissons follows the movement and places himself four yards in rear of the column and opposite its centre.

If marching at a walk, the chief of the centre platoon repeats the command for the guide, and his platoon continues the march; at the first command, the chiefs of the other platoons command: 1. Platoon; at the command march, they command: 2. Halt; the movement is then executed as before.

If marching at a walk and the command be trot, the chief of the centre platoon repeats the commands, trot, march, and the command for the guide; the other platoons move at a walk, their chiefs commanding, at the proper time: 1. Left oblique, 2. Trot, 3. March, and: 1. Right oblique, 2. Trot, 3. March.

If marching at a trot, the chief of the centre platoon repeats the command for the guide; the chiefs of the flank platoons command: Walk, at the first command, repeat the command march, and add: 1. Left oblique, 2. Trot, 3. March, and: 1. Right oblique, 2. Trot, 3. March.

If marching at a gallop, or at a trot and the command be gallop, the same principles apply; the centre platoon moves at a gallop; the other platoons move at a trot, and take the gallop when they begin to oblique.

660. If the battery have but two platoons, the double column is formed upon the two central sections, the office
and non-commissioned officers having the same posts as before. At the first command, the chief of the right platoon commands: Left by sections, and the chief of the left platoon: Right by sections. At the command march, repeated by the chiefs of platoon, the battery is formed in parallel columns of sections, the movement being executed at a halt, and at the different gaits, as prescribed for forming column of sections from column of platoons. The chiefs of platoon command temporary platoons as before, the senior chief repeats the command for the guide immediately; the junior, as soon as his sections enter the column.

To form line from double column.

661. Line is always formed from double column when the original centre of the battery is at the head of the column.

662. (Pl. 22.) To the front. The captain commands:

1. Right and left front into line, 2. March, 3. Front.

At the command march, the right sections execute right front into line from column of sections; the left sections execute left front into line from column of sections, the leading left section being dressed to the right upon halting. At the command front, given as soon as the flank sections have dressed, the guidon takes post with the right guide of the battery.

The captain and chief of caissons superintend the alignment from the right flank.

If marching at a trot, or gallop, or if the command be trot, or gallop, the movement is similarly executed; the guide of the leading carriage in the right sections is the guide of the battery until all the sections arrive in line, when the captain commands: Guide (right or left).
Plate 99.
663. To and on the right or left. The captain commands:

1. To and on right (or left) into line, 2. March, 3. Front.

At the command march, the right sections execute right into line from column of sections, and the left sections, on right into line from column of sections, except that the leading left section advances fourteen yards before wheeling to the right, and dresses to the right upon halting. At the command front, given as soon as the flank sections have dressed, the guidon takes post with the right guide of the battery.

The captain and chief of caissons superintend the alignment from the right flank.

664. In forming line from double column, the chiefs of platoon superintend the movements of their platoons, but do not repeat the commands.

To march in line.

665. Being at a halt, the captain indicates to the guide a fixed point on a line perpendicular to the front of the battery, and then commands:


At the command march, the battery moves forward, the sections taking the alignment and preserving their intervals from the side of the guide; the guide of the battery marches straight to the front at an even gait, and selects points on the ground upon which to direct himself; the chiefs of platoon superintend the march of their front-rank carriages; the chief of caissons superintends the march of the rear-rank carriages, and moves wherever necessary.
To halt the battery, and to align it.

666. The captain commands:


The chiefs of platoon repeat all the commands except the last, substituting platoon for battery.

The captain may rectify the alignment, without giving the commands for dressing, by directing such carriages as are out of the line to move up or back.

Changes of gait in line; passage of carriages in line; about, reverse, and countermarch in line; and to march by the flank from line.

667. Executed by the same commands and means as in column of platoons.

To oblique in line.

668. (Pl. 23.) The captain commands:

1. Right (or left) oblique, 2. March.

At the command march, each section obliques to the right, all the carriages moving on parallel lines; each rear-rank carriage marches in the trace of, and nine yards behind, the carriage on the right of its front-rank carriage; the guides in each rank regulate themselves on the guides of the section toward which the oblique is made, so as to remain on a line parallel to their former position, and preserve their intervals of fourteen yards; the guide of the leading carriage of the right section is the guide of the battery; the space between the carriages, measured perpendicularly to the oblique direction, is ten yards. The chiefs of platoon superintend the march of their carriages.
and maintain their relative positions. The guidon retains the post he had when the movement began.

To resume the direct march, the captain commands:


If the oblique be executed from a halt, the guide is announced on taking the direct march.

To wheel the battery.

669. (*Pl. 24.*) Being in line, the captain commands:

1. *Battery right (or left) wheel*, 2. *March*, 3. *Guide (right or left)*.

At the command *march*, the pivot-section describes a quarter-circle whose radius is fourteen yards, and then moves off in the new direction; the other sections move at an increased gait, proportioning the swiftness to their distances from the pivot and preserving their intervals from it; they arrive on the line in succession, remaining as short a time as possible in rear of it without urging their horses too much. The guide is announced when the left section arrives on the line.

If marching at a *trot*, the pivot-section moves at a trot and the other sections at an increased gait; the movement is then executed as before.

If marching at a *gallop*, the same principles apply, the pivot-section moving at a gallop.

670. To halt the battery upon the completion of the wheel, the captain commands:


At the command *halt*, given when the rear pivot-carriage, after completing the wheel, has advanced its own
length in the new direction, the guidon takes post with the right guide of the battery.

At the command battery, the chief of the right platoon commands: Platoon, and repeats the commands, halt, right, dress; the other chiefs of platoon give the same commands as the chief of the right platoon, in time to be applicable to their platoons.

671. To make a half-wheel to the right or left, the captain commands:


Executed on the same principles as the wheel.

To close and to extend intervals in line.

672. (Pl. 25.) Marching at a walk, the captain commands:

1. On first (or such) section, 2. To (so many) yards close (or extend) intervals, 3. Trot, 4. March, 5. Guide (right or left).

At the command march, the designated section moves straight to the front at a walk; each of the other sections obliques toward (or from) it at a trot, regulating its march by the nearest section on the side of the directing section; upon gaining the prescribed interval, each section moves forward, and takes the walk when on a line with the directing section. The officers and non-commissioned officers conform to the movement.

The command for the guide is given as soon as all the intervals are closed or extended.

If marching at a trot, the movement is executed as be
SCHOOL OF THE BATTERY.

Plate 25.
fore; at the command *march*, the designated section moves at a walk.

If marching at a *gallop*, or at a *trot* and the command be *gallop*, the same principles apply, the designated section moving at a trot.

*To countermarch with diminished intervals.*

673. Being in line, at a halt, the captain commands:


At the second command, the right section of each platoon moves forward; at the fourth command, given when they are disengaged, all the sections countermarch; at the command for the guide, given on the completion of the countermarch, the sections in rear take the trot; on arriving in line with the other sections, they resume the walk.

If the command *halt* be given on the completion of the countermarch, the leading sections halt; the other sections move forward at a *walk*, and halt on arriving in line.

If marching at a *walk*, the left section of each platoon halts at the second command; the movement is then executed as before.

If marching at a *trot*, or at a *walk* and the commands be *right sections forward, trot*, at the second command, the right section of each platoon moves at a trot and the other sections at a walk; at the fourth command, given as before, all the sections countermarch at a trot, the leading sections take the walk upon the completion of the countermarch, and the other sections on arriving in line.

If marching at a *gallop*, or at a *trot* and the commands be *right sections forward, gallop*, the same principles apply;
the left section of each platoon moves at a trot, counter-marches at a gallop, and then resumes the trot; the right section of each platoon moves forward and counter-marches at a gallop, and resumes the trot on arriving in line.

674. The reverse with diminished intervals is executed by the same commands and means as the counter-march, the word reverse replacing the word counter-march in the commands.

To pass obstacles.

675. Marching in line, if the obstacle covers the front of one platoon, the captain commands:

1. (Such) platoon, 2. Obstacle, 3. March.

At the command march, the chief of the designated platoon causes it to take its place in rear of an adjoining platoon by the commands and means prescribed for executing right or left by platoons.

When the obstacle is passed, the captain commands:

1. (Such) platoon into line, 2. March.

At the command march, the chief of platoon causes the platoon to resume its place in line, by the commands and means prescribed for executing front into line from column of platoons.

If the obstacle cover less than the front of a platoon, the chief, without intimation from the captain, causes one or both sections to avoid it by an oblique, and to resume their intervals after the obstacle is passed; if necessary, he may break by sections, and afterward reform platoon.

To form in battery to the front from line, by moving the pieces forward.

676. This method of coming into action is to be pre-
ferred when the pieces are moving toward the line upon which they are to go into position, and particularly when it is difficult to bring them about by hand. In horse batteries, it is always the best, as the detachments halt on the ground their horses are to occupy, and the cannoneers can dismount while the pieces are moving forward and reversing.

677. (Pl. 26.) Pieces in front. Being at a halt, the captain commands:

1. In battery, 2. March.

At the command in battery, the pieces, chiefs of platoon, and chiefs of section, march in line to the front, dressing to the left; the caissons stand fast; their chief goes to the left and rectifies their alignment; the guidon takes his post in battery.

At the command march, given as soon as the pieces have advanced seventeen yards, the pieces reverse; the chiefs of platoon and of section halt; the chiefs of section then align themselves to the left.

Each chief of section commands: 1. Action, in time to add: 2. Rear, when the muzzle of his piece is in line with his horse's head; the piece halts at the command rear, and is prepared for firing as explained in the School of the Soldier Dismounted; as soon as it is unlimbered, the chief sees that it is in line with the pieces on its left; the limber moves to its place at a walk.

If the cannoneers be dismounted, they halt in each section when No. 7 is opposite the head of the chief of section's horse; as soon as the piece has cleared the cannoneers, the column of files composed of the odd members faces about; each column of files then moves off, changes direction to the left, marches four yards, again changes direction to the left, and halts so as to be on the ground
just occupied by the other; each man, as soon as he halts, faces to his left.

If the cannoneers be mounted, those with each caisson dismount as soon as it halts, run forward to the chief of

Plate 26.

section, crossing over in front of the caisson so as to change sides, and form in two ranks facing each other, the numbers being in the same order as before; the cannoneers with each piece dismount the instant it halts.

If marching at a walk, the movement is executed as
from a halt, the caissons halting at the command in bat-
tery.

If marching at a trot, or at a walk and the commands be
in battery, trot, the pieces move forward, and reverse, at a
trot; the limbers take their places at a trot; the caissons
halt as before.

If marching at a gallop, or at a trot and the commands
be in battery, gallop, the same principles apply; the pieces
and limbers move at a gallop; the command march is given
when the pieces have advanced some five or six yards
farther than usual, so as to give the caissons space in which
to halt.

678. Upon the completion of all formations in battery,
the captain, if necessary, rectifies the alignment of the
pieces and limbers from the same flank as the chief of cais-
ssons superintends the alignment of the caissons. This rule
is general.

679. Pieces in battery are aligned on their wheels.
This rule is general.

680. In horse batteries, the movement is similarly exe-
cuted; the command march is given when the pieces have
advanced eight yards; each gunner cautions his detach-
ment to stand fast, or orders it to halt, and then com-
mands: 1. Cannoneers, 2. Dismount; as soon as the men
dismount they run to their posts.

681. In horse batteries, when the cannoneers dismount
to serve the piece, the horse-holders remain on their
horses; each man who dismounts passes the reins over
his horse’s head and hands them to the horse-holder of his
rank, who takes the reins of the horses on his right in the
right hand, and the reins of those on his left in the left
hand. This rule is general.

682. Caissons in front. Being at a halt, the captain com-
mands:

The command in battery is given as soon as the passage is completed, and the movement is executed as before.

If marching at a walk, the movement is executed as from a halt; the caissons halt at the second command and then stand fast.

If marching at a trot, or at a walk and the passage be ordered at a trot, the pieces execute the passage, move forward, and reverse, at a trot; at the command which decides the execution of the passage, the caissons move at a walk; at the command in battery, the caissons halt.

If marching at a gallop, or at a trot and the passage be ordered at a gallop, the same principles apply; the pieces move at a gallop; the caissons move at a trot and then halt.

683. In forming in battery to the front by moving the pieces forward, if the teams of the carriages have but two pairs each, the distance over which the pieces advance is diminished three yards; if each team consists of a single pair, this distance is diminished six yards; should the teams have four pairs each, this distance is increased three yards. This rule is general.

To form in battery to the front from line, by moving the caissons to the rear.

684. (Pl. 27.) If the pieces be easily handled, this method of coming into action is usually employed when the guns are already on the line of battle.

Being at a halt, pieces or caissons in front, the captain commands:


At the command front, each piece is prepared for firing as explained in the School of the Soldier Dismounted; each
caisson executes a left about, and takes its place in battery by another left about.

The lead-driver of the caisson on the left, when the movement begins, is the guide of the caissons throughout the movement.

Plate 27.

If the caissons be in front, they slacken the gait, if necessary, to allow the limbers to precede them in moving to the rear.
Each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its left.

If the cannoneers be mounted, they dismount at the command *front*, and run to their posts.

If marching at a walk, the movement is executed as from a halt, the pieces halting at the command *front*.

The movement is not executed from a *trot*, or *gallop*.

685. In *horse batteries*, at the command *front*, the detachments move to the posts of their horses in battery at the commands of their gunners, who halt them as soon as they reach these positions, and command: 1. *Cannoneers*, 2. *Dismount*; if the horse-holders can readily lead the detachment-horses, the captain may command: 1. *Cannoneers*, 2. *Dismount*, immediately before commanding *action front*; in this case, the horse-holders conduct the led-horses to their posts in battery as soon as the cannoneers dismount. If the caissons be in front, they move at once to their posts without waiting for the limbers, unless the cannoneers are dismounted before the commands *action front* are given.

686. In *horse batteries*, unless otherwise directed, whenever the detachments leave their posts at the pieces to take any special position, the gunners give the necessary commands for the movement. *This rule is general.*

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**To form in battery to the rear from line.**

687. (Pl. 28.) *Pieces in front.* Being at a halt, the captain commands:


At the command *march*, the pieces stand fast; the caissons incline to the right, move straight forward until the heads of their lead-horses are thirty-three yards in advance
of the heads of the lead-horses of the pieces (seventeen yards after unmasking the pieces and gaining a distance of two yards); the caissons then take their places in battery by a left about; the lead-driver of the caisson on the left, when the movement begins, is the guide of the caissons throughout the movement. The command *rear* is so given that the movement of the caissons will precede that of the limbers.
The chief of caissons moves forward in advance of the caissons and places himself on the centre of the line to be occupied by the lead-drivers when they begin the about; on its completion, he goes to the right, rectifies the alignment of the caissons, and then takes his place in battery.

Each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its right.

If the cannoneers be mounted, the captain preferably commands: 1. Cannoneers, 2. Dismount, before ordering the caissons to pass; otherwise the cannoneers dismount at the command rear, and run to their posts.

If marching at a walk, the movement is executed as from a halt, the pieces halting at the command march.

If marching at a trot, or at a walk and the passage be ordered at a trot, the pieces move at a walk at the command march, and halt at the command rear; the caissons and limbers execute the movement at a trot.

If the passage be ordered at a trot when the pieces are halted, the movement is similarly executed, the pieces standing fast at the command march.

The caissons, as a rule, are ordered to pass at a trot when the battery is halted or marching at a walk.

If marching at a gallop, or at a trot and the passage be ordered at a gallop, the same principles apply; the pieces halt at the command rear, and the caissons and limbers move at a gallop.

If the cannoneers be mounted when the movement is executed at a trot, or gallop, or by passing the caissons at a trot, or gallop, the cannoneers with the pieces dismount the instant the pieces halt; those with the caissons dismount and run to their posts the instant the caissons halt; each caisson halts for this purpose at the command rear, and then completes the movement at a trot.

688. In horse batteries, the detachments move off as
soon as the caissons pass them, take the gait of the caissons, incline to the right, pass their pieces, and take the posts of their horses in battery; the gunners then dismount the cannoneers, who run to their posts.

689. Caissons in front. Being at a halt, the captain commands:

1. Action, 2. Rear.

At the command rear, the caissons advance seventeen yards, and take their place in battery by a reverse; the lead-driver of the caisson on the left, when the movement begins, is the guide of the caissons throughout the movement; the chief of caissons performs the same duties as when the pieces are in front; each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its right.

If marching at a walk, the movement is executed as from a halt, the pieces halting at the command rear.

If marching at a trot, or gallop, the pieces halt, and the caissons and limbers execute the movement at a trot, or gallop.

If the cannoneers be mounted, the same principles apply as when the pieces are in front; but, if at a halt, or marching at a walk, as the cannoneers dismount at the command rear, it is unnecessary to order them to dismount before the movement begins.

690. In horse batteries, at the command rear, the detachments execute the same movements as when the pieces are in front. When the battery is halted, or marching at a walk, the gunners, unless otherwise directed, cause their detachments to move at a trot, slackening the gait a little, if necessary, so as not to interfere with the movements of the caissons.

691. In forming in battery to the rear from line, if the
teams of the carriages have but two pairs each, the distance over which the caissons advance is diminished three yards; if each team consists of a single pair, this distance is diminished six yards; should the teams have four pairs each, this distance is increased three yards. This rule is general.

To form line to the front from battery.  
692. Pieces in front. The captain commands:

1. Limber, 2. Front.

At the command front, the pieces are limbered as explained in the School of the Soldier Dismounted, and the caissons close to their proper distance.

(Pl. 29.) If the pieces cannot be brought about by hand, the captain commands: 1. Limber, 2. Rear, 3. Pieces reverse, caissons forward, 4. March, 5. Guide (right or left); or, 5. Battery, 6. Halt.

The chiefs of platoon repeat the commands, substituting platoon for battery.

At the command rear, the pieces are limbered as explained in the School of the Soldier Dismounted; at the third command, the pieces reverse and the caissons move forward in time to close to their proper distance.

693. In horse batteries, upon limbering to the front, the horse-holders lead the horses to their posts in rear of the pieces, and the cannoneers mount without command as soon as they have limbered. Upon limbering to the rear, the horse-holders, unless directed by the captain to stand fast, lead the horses at a trot to their posts in rear of the pieces, and the cannoneers mount as before.

694. In horse batteries, when the cannoneers mount after serving the piece, the men, before mounting, take their reins from the horse-holders. This rule is general.
695. Caissons in front. The captain commands:

1. Limber, 2. Front, 3. Caissons pass pieces, 4. March,
5. Guide (right or left); or, 5. Battery, 6. Halt.

Executed as in forming line to the front with pieces in
front, the caissons passing while the pieces are being lim-
bered.

If the caissons pass at a trot, the captain may also
command: 5. Walk, 6. March, 7. Guide (right or left),
the sixth command being given as soon as the passage is
completed.

Plate 29.

If the pieces cannot be brought about by hand, the
captain commands: 1. Limber, 2. Rear, 3. Caissons for-
ward, pieces reverse, 4. March, 5. Guide (right or left);
or, 5. Battery, 6. Halt.
The chiefs of platoon repeat the commands, substituting \textit{platoon} for \textit{battery}.

The caissons move straight forward and pass while the pieces are reversing.

\textit{To form line to the rear from battery.}

696. \textit{Pieces in front}. The captain commands:


The chiefs of platoon repeat the commands, substituting \textit{platoon} for \textit{battery}.

The pieces move straight forward and pass while the caissons are reversing.

697. The captain may also command:


At the command \textit{march}, given while the pieces are limbering, each caisson inclines to the right, moves beyond its piece, and takes its place in rear by a left about. The lead-driver on the left, when the movement begins, is the guide throughout the movement.

698. \textit{Caissons in front}. The captain commands:


The chiefs of platoon repeat the commands, substituting \textit{platoon} for \textit{battery}.

The caissons reverse and the pieces move forward in time to close to their proper distance.
To form in battery to the right or left, from column of platoons, gaining ground to the right or left.

699. Pieces in front. The captain commands:

Plate 30.
1. **Fire to the right (or left), 2. Right (or left) into line wheel, 3. March, 4. In battery, 5. March.**

The second and third commands are executed as previously explained; the fourth and fifth commands are executed as explained from line, the command in battery being given as soon as the pivot-caissons, after completing the wheel, have moved forward their own length in the new direction.

700. *(Pl. 30.) Caissons in front.* The captain commands:

1. **Fire to the right (or left), 2. Right (or left) into line wheel, 3. March, 4. Pieces pass caissons, 5. March, 6. In battery, 7. March.**

The second and third commands are executed as previously explained; the other commands are executed as explained from line; the fifth command is given as soon as the pivot-caissons, after completing the wheel, have moved forward their own length in the new direction; the command in battery is given as soon as the pieces have completed the passage.

If marching at a trot, or at a walk and the passage be ordered at a trot, the command which decides the execution of the passage is given as soon as the pivot-caissons complete the wheel, and the command in battery when they have advanced their own length in the new direction after completing the wheel.

If marching at a gallop, or at a trot and the passage be ordered at a gallop, the same principles apply.

*To form in battery to the right or left from column of platoons gaining ground to the left or right.*

701. *(Pl. 31.) Pieces in front.* The captain commands:
The second and third commands are executed as previously explained; the other commands are executed as explained from line; the fifth command is given as soon as the pivot-pieces, after completing the wheel, have moved forward their own length in the new direction.

If marching at a trot, or at a walk and the passage be ordered at a trot, the command which decides the execution of the passage is given as soon as the pivot-pieces have completed the wheel, and the command rear, when they have moved forward their own length, in the new direction, after completing the wheel.

If marching at a gallop, or at a trot and the passage be ordered at a gallop, the same principles apply.

702. Caissons in front. The captain commands:

1. Fire to the right (or left), 2. Left (or right) into line wheel, 3. March, 4. Action, 5. Rear.

The second and third commands are executed as previously explained; the fourth and fifth as explained from line; the command rear is given as soon as the pivot-pieces, after completing the wheel, have moved forward their own length in the new direction.

To form in battery on the right or left from column of platoons.

703. Pieces in front. The captain commands:

1. On right (or left) into battery, 2. March.

Executed as prescribed for forming on right into line, with the following modifications:

The leading platoon having wheeled to the right, its chief commands: 1. In battery, 2. March, the first command being given when his pivot-caisson, after completing the wheel, has advanced its own length in the new direc-
tion. The other platoons having wheeled to the right, the chiefs give their commands so as to form them in battery on a line with the leading platoon. Each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its right.

704. *Caissons in front.* The movement is executed as with pieces in front, except that the chiefs of platoon command: 1. *Pieces pass caissons,* 2. *March,* 3. *In battery,* 4. *March.* The chief of the leading platoon gives the second command as soon as his pivot-caisson, after completing the wheel, has advanced its own length in the new direction, and the command *in battery* as soon as his pieces have completed the passage.

If marching at a *trot,* or *gallop,* he gives the command which decides the execution of the passage as soon as his pivot-caisson completes the wheel, and the command *in battery,* when it has advanced its own length in the new direction after completing the wheel.

To form in battery to the front from column of platoons.

705. *Pieces in front.* The captain commands:

1. *Right (or left) front into battery,* 2. *March.*

Executed as prescribed for forming *right front into line,* with the following modifications—As soon as the leading platoon has advanced eighteen yards its chief commands: 1. *In battery,* adding: 2. *March,* when his pieces have advanced seventeen yards; the other chiefs of platoon command: 1. *In battery,* when their caissons are in line with those of the platoon on their left, and add: 2. *March,* when the lead-drivers of the pieces are in line with the chiefs of section of this platoon, or with the muzzles of its pieces if they be unlimbered. Each chief of section, as
soon as his piece is unlimbered, sees that it is in line with the pieces on its left. The chief of caissons goes to the left and rectifies the alignment of the caissons.

If marching at a walk and the command be trot, or at a trot and the command be gallop, as soon as the leading platoon has advanced eighteen yards, its chief forms it in battery at a trot, or gallop; the movement is then executed as before.

706. (Pl. 32.) Caissons in front. Executed as with pieces in front, with the following modifications:

The chiefs of platoon command: 1. Pieces pass caissons, 2. March, 3. In battery, 4. March. The chief of the leading platoon gives his second command when his caissons have advanced eighteen yards, and the third the instant the passage is completed; the chiefs of the other platoons give their commands so as to form their platoon in battery on a line with the leading platoon.

If marching at a trot, the chief of the leading platoon gives the command in battery when his caissons have advanced eighteen yards; his pieces complete the passage and move forward, when the movement is executed as before.

If marching at a walk and the command be trot, the chief of the leading platoon orders the passage at a trot; the movement is then executed as when at a trot.

If marching at a gallop, the movement is executed on the same principles as when marching at a trot.

If marching at a trot and the command be gallop, the chief of the leading platoon orders the passage at a gallop; the movement is then executed as when at a gallop.

707. In horse batteries, in forming in battery to the front from column of platoons, the same principles apply, the commands being given so as to halt the caissons after they have advanced twenty-two yards.
708. In forming in battery to the front from column of platoons, if the number of pairs be less or greater than three, the distances to be advanced are diminished, or increased, as prescribed for front into line.

To form in battery to the rear from column of platoons.

709. Pieces in front. The captain commands:

1. Right (or left) front into battery, faced to the rear,
2. March.

Executed as prescribed for forming right front into battery, with the following modifications:

Each chief of platoon commands: 1. Caissons pass pieces,
2. March, 3. Action, 4. Rear. The chief of the leading platoon gives the command march, as soon as his pieces have advanced eighteen yards; the chiefs of the other platoons give their commands so as to form their platoons in battery on a line with the leading platoon. Each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its right. The chief of caissons goes to the right and rectifies the alignment of the caissons.

If marching at a trot, the chief of the leading platoon gives the command rear as soon as his pieces have advanced eighteen yards, his caissons taking their places as explained in forming in battery to the rear from line; the movement is then executed as before.

If marching at a walk and the command be trot, the chief of the leading platoon orders the passage at a trot; the movement is then executed as when at a trot.

If marching at a gallop, the movement is executed on the same principles as when marching at a trot.

If marching at a trot and the command be gallop, the chief of the leading platoon orders the passage at a gallop; the movement is then executed as when at a gallop.
710. In horse batteries, the same principles apply, the commands being given so as to halt the pieces after they have advanced twenty-two yards.

711. Caissons in front. The movement is executed as with pieces in front, except that the chiefs of platoon command: 1. Action, 2. Rear.

712. In forming in battery to the rear from column of platoons, if the number of pairs be less or greater than three, the distances to be advanced are diminished, or increased, as prescribed for front into line.

To form in battery from double column.

713. To the front. The captain commands:

1. Right and left front into battery, 2. March.

Executed as prescribed for forming line from double column, with the following modifications:

The chiefs of the leading sections command: 1. In battery, 2. March, and, 1. Action, 2. Rear; or, 1. Piece pass caisson, 2. March, 3. In battery, 4. March, and, 1. Action, 2. Rear, according as the pieces or caissons are in front, the command in battery being given when their sections have advanced five yards; as each of the other sections arrives in line, its chief of section forms it in battery by the same commands, given so as to place his piece on a line with the piece of the leading right section.

714. To the rear. The captain commands:

1. Right and left front into battery, faced to the rear, 2. March.

Executed as prescribed for forming in battery to the front from double column, each chief of section commanding: 1. Caissons pass pieces, 2. March, 3. Action, 4. Rear; or, 1. Action, 2. Rear, according as the pieces or caisson
are in front. The chiefs of the leading sections give the command rear, when their sections have advanced five yards; the chiefs of the other sections give their commands so as to place their pieces on a line with the piece of the leading right section.

715. To the right or left. The captain commands:

1. To and on the right (or left) into battery, 2. March.

Executed as prescribed for forming to and on the right into line from double column, with the following modifications:

The chief of the leading right section commands: 1. In battery, 2. March, and, 1. Action, 2. Rear; or, 1. Piece pass caisson, 2. March, 3. In battery, 4. March, and, 1. Action, 2. Rear, according as his piece or caisson is in front; the command in battery is given when the caisson, after completing the wheel, has moved forward its own length in the new direction. As each of the other sections arrives in line, its chief forms it in battery by the same commands, given so as to place his piece on a line with the piece of the leading right section.

To march by the flank from battery, and to form again in battery.

716. (Pl. 33.) The pieces being limbered to the rear, the captain commands:

1. Pieces left (or right), caissons right (or left) wheel, 2. March, 3. Guide (right or left).

At the command march, the pieces wheel to the left; the caissons wheel to the right; the interval is eight yards, and the distance two yards.

The battery having arrived at the desired position, the captain commands:

The command *rear* is given as soon as the pieces complete the wheel, and are in the new direction.

717. In *horse batteries,* before limbering to the rear, the captain cautions the horse-holders to stand fast; as each piece wheels to the left, its detachment wheels to the right, and places itself two yards from the right of the piece, the heads of the horses of the front rank being in line with the limber-axle; the interval is eight yards, and the distance five yards. On forming again in battery, the detachments wheel immediately, follow the movements of their caissons, and move to the posts of their horses in battery.

718. Instead of limbering to the rear, the captain may limber to the right (or left); while the pieces are limbering, the caissons, without command, wheel to the right (or left), and halt.

The pieces being limbered, the captain commands:

1. *Forward,* 2. *Guide* (right or left), 3. *March,* and when the battery arrives at the desired position he forms in battery as before.

719. In *horse batteries,* the horse-holders wheel the led-horses to the right (or left), at the same time as the caissons wheel.

*To form in battery to the right or left, from column with the caissons on the flank.*

720. Being at a halt, the captain commands:


At the command *right,* each piece is prepared for firing as explained in the School of the Soldier *Dismounted;* each
caisson, if on the left of its piece, wheels to the left, gains the necessary distance to the rear, and takes its place by a left about; if on the right, it wheels to the left, passes between its piece and the one which was next in front, and then takes its place as before; the caisson which was in rear (in front, if the command be action left) when the movement began is the guide throughout the movement.

In both cases each chief of section, as soon as his piece is unlimbered, sees that it is in line with the pieces on its right; the captain, in both cases, if necessary, rectifies the alignment of the pieces and limbers from the right flank; the chief of caissons rectifies the alignment of the caissons from the flank of the directing caisson.

If marching at a walk, the movement is executed as before, the pieces halting at the command right.

If the cannoneers be mounted, when the movement is executed from a halt or while marching at a walk, they dismount at the command right, and run to their posts.

The movement is not executed from a trot or gallop.

721. In horse batteries, if the detachments be on the flank toward which the action is ordered, the captain commands: 1. Cannoneers, 2. Dismount, immediately after, action right (or left); the horse-holders follow the limbers, and take their places in battery. If the detachments be on the other flank, or in rear, they wheel to the left (or right), and then take their places in battery, according as the command is action right (or left).

**To form in battery to the rear from battery.**

722. (Pl. 34.) The captain commands:


At the command march, the pieces are brought about
as in limbering to the front, the limbers and caissons oblique to the right, and then move forward parallel to their pieces until they have gained enough distance to take their places in battery by a left about. During the movement, the lead-drivers of the limber and caisson on the left when the movement begins, are the guides of the limbers and caissons respectively. The officers, non-commissioned officers, and guidon conform to the movement, the duties of the chief of caissons being the same as in forming in battery to the rear from line.

If the command be trot, or gallop, the movement is executed as before.

723. In horse batteries, the horse-holders follow their limbers, and move far enough beyond them to take their posts by a left about; if unable to manage the led-horses, the horse-holders are assisted by Nos. 1 and 2.

724. If the pieces cannot be brought about by hand, the captain commands:


725. In horse batteries, the captain cautions the horse-holders to stand fast before giving his first command; the horse-holders follow their caissons, and take their places by a left about; if unable to manage the led-horses, the horse-holders are assisted by Nos. 1 and 2.

Firings.

726. Executed as prescribed in the School of the Battery Dismounted.

To fire retiring with prolonge fixed.

727. The battery firing, the captain causes the firing to cease, and commands:

The chiefs of platoon repeat the commands, substituting platoon for battery.

At the second command, the prolonges are fixed as prescribed in the School of the Soldier Dismounted, and the caissons reverse so that their horses may face in the same direction as those of the limbers.

At the command retire, the cannoneers at each piece face about; if the piece be loaded, No. 3 thrusts the priming-wire into the vent to keep the cartridge in place; the chief of section has the projectile drawn, No. 5 usually keeping it in his cartridge-pouch. With fixed ammunition the projectile is not drawn.

At the command march, the limber moves off, dragging the piece; the cannoneers, except Nos. 1 and 3, march on the left of the piece; the gunner attends to the handspike, taking it out in passing ditches, etc., and moves the trail to the right, or left, whenever the direction is changed, so that the wheels will not cut the prolonge; No. 7 keeps it clear of the limber-wheels.

In executing an about, the limber first backs a little and then takes a smaller radius than usual.

At the command halt, No. 3 withdraws the priming-wire, No. 1 rams home, No. 5 brings up the projectile, and the loading is completed.

The firing is resumed at the command commence firing, given by the captain.

The captain may retire without commanding cease firing, the loading and firing being kept up during the movement. In this case, No. 5 inserts the charge; No. 2 serves vent, receiving the thumbstall and priming-wire from No. 3; each chief of section causes his limber to halt momentarily so that the piece can be pointed.
When the captain commands: 1. Coil, 2. Prolonge, the prolonges are detached and coiled as prescribed in the School of the Battery Dismounted, and the caissons reverse and take their places in battery; if the pieces be limbered, the caissons take or hold their proper places in battery.

Change of front.

728. In action, slight changes of front may be executed by moving the pieces by hand to the front or rear, the limbers preserving their relative positions.

If the change of front be considerable, the pieces of the platoon on the flank toward which the change is to be executed, are moved on the new line by hand, the limbers taking their places immediately, or as soon as the ground is uncovered; if the change of front be in advance of the old line, the chiefs of the other platoons limber to the front, move forward, wheel to the right or left when opposite their positions in the new line, and on arriving on the new line form in battery; if the change of front be in rear of the old line, the chiefs of the other platoons limber to the rear, and then execute the movement as before.
SCHOOL OF THE BATTALION.

729. In this school a field-officer is the instructor; in the text he is designated as major. The instructor is accompanied by a trumpeter, and goes wherever his presence is required.

730. If necessary, the instructor may preface the commands laid down in the text, by the command attention.

731. During the manoeuvres, captains repeat such of the instructor's commands as are to be immediately executed by their batteries, such as forward, platoons right wheel, march, halt, etc.

Captains do not repeat commands which are not essential to the execution of a movement by their batteries, such as guides posts, on first battery deploy column, etc.

In successive movements, each captain gives the commands necessary to insure the execution of the movement by his own battery, at the proper time.

732. When mounted and horse batteries manoeuvre together, the intervals between horse batteries and the mounted batteries next to them are thirty-six yards. In formations in battery, the captains of the horse batteries give the commands so that their pieces shall be in line with those of the mounted batteries; in other formations, they give their commands so as to preserve their proper intervals and distances.

Formation of the battalion.

733. A battalion consists of any number of batteries from two to five.
In this school, the battalion is supposed to consist of four batteries.

734. When the battalion is formed, batteries take their places in an order depending on the rank of their captains; the first battery on the right, the second on the left, the third the right centre (or centre, if there be an odd number of batteries).

In a battalion of five batteries, the batteries take places in the following order from right to left—first, fifth, third, fourth, second.

Batteries whose captains are absent, take their places in line according to the relative rank of the officers present in command of them. A battery whose captain is absent for a few days only, may retain its place according to the rank of the captain, at the discretion of the commanding officer.

After the line is formed, no cognizance is taken of the relative order of the batteries.

735. The interval between batteries in line is twenty-eight yards. In horse batteries the interval is thirty-six yards.

736. In whatever direction the battalion faces, the batteries are designated numerically from the right to the left in line, and from the head to the rear when in column, first battery, second battery, and so on.

737. In whatever direction the battalion faces, the batteries to the right of the centre of the battalion in line constitute the right wing; those to the left of the centre constitute the left wing. If there be an odd number of batteries, the centre battery always belongs to the right wing.

Posts of major, adjutant, sergeant-major, and trumpeter.

738. The major, or senior officer present, commands the
battalion, and in line is twenty-eight yards in front of the centre.

The adjutant is in line with the chiefs of platoon, and three yards outside of the right flank of the battalion. When the battalion faces to the rear, the adjutant executes an about and takes his place in line with the chiefs of platoon, but does not change to the other flank.

The sergeant-major is in line with the chiefs of platoon, three yards from the left flank. When the battalion faces to the rear the sergeant-major executes an about, and takes his place in line with the chiefs of platoon, but does not change to the other flank.

At review, other staff-officers, in line, are on the right of the adjutant; in column, they are in rear of the major. On all other occasions, they accompany the major.

739. If there be no adjutant and sergeant-major with the battalion, the commanding officer details an officer and non-commissioned officer to act as such.

To form the battalion.

740. The batteries being formed at their own parks, adjutant's call is sounded, at which the adjutant and sergeant-major, the latter on the left, proceed to the battalion parade-ground, and post themselves facing each other, a few yards outside the points where the right and left of the right centre battery is to rest in line. The batteries approach the line so as to arrive from the rear, and parallel to the line established by the adjutant and sergeant-major; the right centre battery (or centre battery, if the number of batteries be uneven) is first established on the line.

As the right centre battery approaches the line, the first-sergeant and guidon, who are called principal guides, detach themselves, precede the battery by fifteen or twenty
yards, and place themselves between the adjutant and sergeant-major, facing each other, at a distance apart a little less than the front of the battery; the adjutant rectifies the position of the first-sergeant; the sergeant-major that of the guidon.

The captain of the right centre battery halts it at three yards from the line and dresses it to the left as prescribed in the School of the Battery, so that the heads of the lead-horses of the leading carriages of the right and left sections shall be in line with the boots of the principal guides.

The other batteries successively approach the line on the right and left of the right centre battery.

The principal guides of the other batteries detach themselves as prescribed for the guides of the right centre battery, and hasten to place themselves on the line to be occupied by their respective batteries; they face toward the principal guides already established, at a distance from each other a little less than the battery front; the principal guide nearest those already established carefully preserves the interval of twenty-eight yards between the batteries.

The adjutant and sergeant-major, having rectified the positions of the principal guides of the battery which arrives first on the line, draw sabre; the adjutant then executes a right about, moves toward the right, and again executes a right about, so as to place himself in rear of the right principal guide of the battery next on the right; the sergeant-major executes a left about, moves toward the left, and executes a left about, so as to place himself in rear of the left principal guide of the battery next on the left. In this manner the adjutant in the right wing, and the sergeant-major in the left wing, rectify in succession the positions of the guides of each battery; they then take their posts in line.
Each captain halts and dresses his battery as prescribed for the right centre battery; each battery is dressed toward the right centre battery.

The line being formed, the adjutant advances three yards from his post on the right, wheels to the left, halts, and commands: 1. Guides, 2. Posts, at which the captains and principal guides return to their posts in line.

The major takes post facing the line, at a convenient distance in front of the centre of the battalion, generally equal to about half its front; the adjutant then passes in rear of the captains to the centre, wheels to the right, and halts half-way between the major and the line, executes a left about, commands: 1. Present, 2. Sabre, executes a left about, salutes the major, and reports:

Sir! The battalion is formed.

The major returns the salute with the right hand, directs the adjutant: Take your post, Sir! draws sabre, and commands: 1. Carry, 2. Sabre.

The adjutant executes a left about, moves toward the line, wheels to the left, and, passing in rear of the captains, takes his post on the right.

To rest the battalion.

741. The major dismounts the drivers, and in horse batteries the cannoneers, and commands:

1. Battalion, 2. Rest.

To resume the attention, the major commands: 1. Battalion, 2. Attention. He then causes the drivers to mount, and in horse batteries the cannoneers also.

742. Whenever the command battalion is given, the captains command battery. This rule is general.
To dismiss the battalion.

743. The major commands:

Dismiss your batteries.

Each captain march his battery to its own park, and dismisses it.

To march in line.

744. The major commands:


At the second command, the captains of the right wing command: Guide left; the captains of the left wing command: Guide right. At the command march, the line moves to the front; the left guide of the right centre battery is the guide of the battalion, and moves steadily to the front; the guides of the other batteries preserve the interval of twenty-eight yards, and dress toward the guide of the battalion. If the guide of the battalion does not move accurately to the front, the major commands: Incline to the right (or left), at which the guide selects new points on the ground a little to the right of the direction in which he was marching, and slightly changes his direction. The directing battery conforms gradually to the march of its guide; the captains of the other batteries see that their guides conform gradually to the movement of the directing battery, and gradually slacken, or quicken, the gait, according as they are in advance, or in rear, of the line, obliquing slightly when necessary to preserve the intervals.

The major may command guide right (or left) instead of guide centre, in which case the guide of the right or left battery is the guide of the battalion, and the alignment and intervals are preserved toward him.
To halt the battalion and to align it.

745. The major commands:


To give a general alignment, the major orders the principal guides of the right centre battery on the line, establishes them facing each other, and on the direction he wishes to give the battalion, and commands:


At the first command, the principal guides of each battery post themselves as explained in forming the battalion; covering the principal guides already established, and taking care to preserve the interval of twenty-eight yards between the batteries; the adjutant and sergeant-major rectify the positions of the guides in their respective wings. At the third command, each captain conducts his battery, if not already there, to within three yards of his principal guides, halts it, and dresses it upon the guides; the batteries are dressed to the left or right, according as they are in the right or left wing. At the fifth command, the captains and principal guides take their posts in line.

The major may establish the principal guides of the right or left battery, and command: 1. Principal guides on the line, 2. Right (or left), 3. Dress. All the principal guides face toward the right.

Changes of gait.

746. Executed in all formations by the same commands and means as in the School of the Battery.

Passage of carriages.

747. The passage of carriages in line, and in column, is
executed by the same commands and means as in the School of the Battery.

In the passage in line from a halt, the guide is announced.

Reverse, countermarch, and about in line.

748. The major commands:


If the march be continued on the completion of the movement, the captains of the right wing command: Guide left; the captains of the left wing command: Guide right.

To oblique.

749. Executed in line and in column by the same commands and means as in the School of the Battery.

In the oblique in line, the battalion preserves its intervals, and continues parallel to its original position. If the oblique be executed from a halt, on taking the direct march the major commands: Guide centre (right or left), and the captains announce the guide as when marching in line.

To march by the flank.

750. Being in line, the major commands:

1. By the right (or left) flank, 2. March, 3. Guide (right or left).

To march again in line, the major commands:


At the third command, the captains announce the guide as when marching in line.
To form column of platoons to the right or left.

751. Being in line, the major commands:


In column of platoons, the major is on the side of the guide, twenty-eight yards from the column, and abreast of the centre; the adjutant and sergeant-major, each in his own wing, are abreast of the leaders of the leading and rear carriages of the column, on the side of the guide, fourteen yards from the column; each captain is on the side of the guide, fourteen yards from the flank of his battery, abreast of the chief of the leading platoon.

The distance between batteries in column of platoons is fourteen yards. In horse-batteries the distance is eighteen yards.

To break into column of platoons from the right or left, to march to the left or right.

752. Being in line, at a halt, the major commands:

1. Platoons, 2. Break from the right (or left), to march to the left (or right), 3. March.

At the command march, the right battery executes the movement; the guide directs his march parallel to the front of the battalion. The captains of the other batteries successively repeat the commands, in time to follow at the proper distance in rear of the battery preceding.

To march in column of platoons.

753. The major commands:

The guide of the leading battery is the guide of the battalion and moves accurately to the front, under the supervision of the adjutant or sergeant-major, whichever is at the head of the column; the guides of the other batteries preserve with exactness the trace and distance, under the supervision of the sergeant-major or adjutant in rear.

To halt the column of platoons.

754. The major commands:


To close and extend intervals in column of platoons.

755. Executed by the same commands and means as in the School of the Battery.

Reverse, countermarch, and about in column of platoons.

756. The major commands:

1. Reverse (countermarch, or right (or left) about), 2. March, 3. Guide (right or left); or, 3. Battalion, 4. Halt.

To change direction in column of platoons.

757. Being in march, the major commands:

1. Column right (or left), 2. March.

At the first command, the guidon of the first battery places himself on the left and abreast of the lead-horses of the left section of the leading platoon, and two yards from them. At the command march, the leading battery changes direction; the guidon halts, faces to the right, and remains in this position until his battery has passed, when he is re-
lieved by the guidon of the battery next in rear, and returns to his post. The other batteries march squarely up to the principal guide, when each battery changes direction by the same commands and means as the first.

758. To make a slight change of direction, the major cautions: Incline to the right (or left).

Executed in each battery as prescribed in the School of the Battery, the batteries in rear executing the movement on the same ground as the first.

759. To put the column in march, and to change direction at the same time, the major commands:

1. Forward, 2. Guide (right or left), 3. Column right (or left), 4. March.

To march by the flank, from column of platoons.

760. The major commands:

1. By the right (or left) flank, 2. March, 3. Guide centre (right or left).

The captains announce the guide as when marching in line.

To march again in column of platoons, the major commands:

1. By the right (or left) flank, 2. March, 3. Guide (right or left).

Route marches.


The major marches at the head of the column, the adjutant is one yard on his left; the trumpeter is in rear of the commanding officer; the sergeant-major in rear of the adjutant.

If there be other staff-officers, they ride in rear of the
major and adjutant; the trumpeter and sergeant-major in their rear.

To resume the attention, the major commands: 1. Battalion, 2. Attention.

To form the column of platoons to the right or left into line.

762. The major commands:


At the command march, each battery wheels into line to the right. At the third command, the captains of the right wing command: Guide left; the captains of the left wing command: Guide right.

If the battalion be halted, the command halt is given when the rear pivot-carriages, after completing the wheel, have advanced their own length in the new direction; each captain dresses his battery to the right.

General rules for successive formations.

763. By successive formations are meant all of the formations in which the several subdivisions arrive successively on the line, such as, on right or left into line, front into line, the deployment of columns, formations into line by two movements, etc.

In all successive formations, except formations into line by two movements, the adjutant or sergeant-major, whichever is at the head of the column, or nearest the point of rest, establishes the principal guides of the battery which is to arrive first on the line, at the point where the right and left sections of the battery are to rest.

The principal guides face toward the point of rest, that is, the point where the right of the battalion is to rest if
the movement be from right to left, or where the left is to rest if the movement be from left to right.

If the formation be central, the principal guides are placed on the line facing each other, and in front of the battery which forms first on the line.

In all formations from a halt, the principal guides are established at the preparatory command indicating the direction in which the line is to extend; if marching, they hasten toward the point of rest at the preparatory command, and are established at the command march.

In forming on right (or left) into line, the principal guide at the point of rest is established forty-four yards to the right (or left) of the head of the column.

In forming front into line from column of platoons, the principal guides are established eighteen yards in front of the head of the column.

In forming front into line from column of batteries, they are posted battery distance in front of the head of the column.

In deploying, the principal guides are established three yards in front of the head of the column when the deployment is on the first battery, and twenty-eight yards in front of the column when the deployment is on a rear battery.

The line is prolonged by the principal guides of the other batteries, who precede their respective batteries as explained in forming the battalion; the principal guides are assured, as they successively arrive, by the adjutant or sergeant-major, whichever is at the head of the column, or nearest the point of rest.

If the movement be central, the adjutant and sergeant-major, after establishing the guides of the right-centre battery, establish the positions of the guides in their respective wings.
The principal guides should be taught to post themselves without aid, after which the adjutant and sergeant-major may accompany the major.

When line is to be formed, facing to the rear, the principal guides are posted so as to permit their batteries to pass the line between them, after which the one nearest the point of rest reins back, and the other closes so as to be at a little less than battery distance from him. If the formation be central, both principal guides of the battery first on the line, close toward each other.

In all successive formations, the batteries are dressed up to the principal guides, and toward the point of rest.

All successive formations are terminated by the commands: 1. Guides, 2. Posts, at which the captains and principal guides resume their places in line.

To form the column of platoons on the right or left into line.

764. Being at a halt, the major commands:

1. On right (or left) into line, 2. March.

At the first command, the captains of batteries in rear of the first command: 1. Forward, 2. Guide right. At the command march, the first battery executes on the right into line. The other batteries march beyond the first, each captain commanding: 1. On right into line, 2. March, when the head of his battery has to move three and a quarter yards to be opposite its point of rest.

If marching, the major orders the guide, if not already there, to the flank toward which the movement is to be executed, and gives the commands as before. The movement is executed as previously explained, except that the captains of batteries, in rear of the first, omit the commands for putting their batteries in march.
To form column of platoons front into line.

765. Being at a halt, the major commands:

1. Right (or left) front into line, 2. March.

(Pl. 1.) At the first command, the captain of the second battery commands: 1. Forward, 2. Guide left, 3. Column right; the other captains command: 1. Forward, 2. Guide left, 3. Column half-right. At the command march, the leading battery executes right front into line; the chief of its leading platoon halts it at three yards from the line, and dresses it up to the principal guide. The captain of the second battery conducts it opposite to the left of its place in line, changes direction to the left, and, when at eighteen yards from the line, commands: 1. Right front into line, 2. March. The other captains conduct their batteries to a point battery distance and eighteen yards in rear of the left of their places in line, change direction half-left, and, when at eighteen yards from the line, conform to what is explained for the captain of the second battery.

If marching at a walk, the captains of batteries in rear of the first omit the command forward, adding: Guide left, if the guide be not already there.

If marching at a trot, or gallop, or if the command of the major be trot, or gallop, each battery moves toward its position and executes front into line, at a trot, or gallop.

766. The major may execute front into line, on a direction oblique to that of the column, by first causing the leading battery to execute column half-right (or left). The line is established at right angles to the new direction of the leading battery; the other batteries are so directed, if possible, that the head of each may arrive opposite its position, at a point battery distance and eighteen yards in rear of the line.
767. To form *front into line, faced to the rear*, the major commands:

*Plate 1.*
1. **Right (or left) front into line, faced to the rear**, 2. **March**.

Executed as explained for **right front into line**, except that each battery, on approaching its point of rest, executes **right front into line faced to the rear**.

**To form front into line on the head of an interior battery.**

768. Being at a halt, the major commands:

1. **On third (or such) battery**, 2. **Right (or left) front into line**, 3. **March**.

*(Pl. 2.)* At the second command, the captain of the fourth battery commands: 1. **Forward**, 2. **Guide left**, 3. **Column right**; the captains of the first and second: **Left into line wheel**. At the command **march**, the third and fourth batteries execute **right front into line** as previously explained; the captain of the second battery marches it in line, with the guide to the left, twenty-one yards to the left, when he commands: 1. **Platoons left wheel**, 2. **March**; the movement being completed, he immediately gives the commands for forming **right front into line faced to the rear**; the first battery marches in line with the guide to the left, twenty-one yards to the left, when the captain commands: 1. **Platoons left wheel**, 2. **March**, adding, upon the completion of the wheel: 1. **Guide left**, 2. **Column right**, 3. **March**; he then conforms to what has been explained for forming **front into line faced to the rear**.

769. **Front into line, faced to the rear**, on the head of an interior battery, is executed on the same principles; the battery designated, and those in rear, execute **front into line, faced to the rear**; the batteries in front, at the proper time, execute **front into line**.
Formation of column of platoons into line by two movements.

770. A part of the column having changed direction to the right, to form line to the left, the major commands:

1. Left into line wheel, 2. Rear batteries left front into line, 3. March.

(Pl. 3.) The batteries which have changed direction wheel into line to the left; the captains halt their batteries when the rear carriages, after completing the wheel, have advanced their own length in the new direction, and dress them to the right, remaining on the right until the commands guides, posts. The rear batteries execute left front into line, the leading platoons advancing to the line of the batteries which wheeled by platoon into line.

To form line to the right, the major commands:

1. Right into line wheel, 2. Rear batteries left front into line, faced to the rear, 3. March.

(Pl. 4.) The batteries which have changed direction wheel into line to the right; the captains halt their batteries when the rear carriages, after completing the wheel, have advanced their own length in the new direction, and then dress them to the left, remaining on the left until the command guides posts. The rear batteries execute left front into line, faced to the rear.

771. If the column have changed direction to the left, to form line to the right, the major commands:

1. Right into line wheel, 2. Rear batteries right front into line, 3. March.

To form line to the left, he commands:
1. Left into line wheel, 2. Rear batteries right front into line, faced to the rear, 3. March.

772. In forming line by two movements, the command
*march* is given when the rear platoon of a battery is about to complete the wheel in order to enter the new direction.
To form column of batteries to the right or left.

773. Being in line, the major commands:


At the first command, each captain commands: Battery right wheel. At the command march, each battery wheels to the right; the leading guide marches directly to his front, under the direction of the adjutant or sergeant-major; the succeeding guides gradually gain, and carefully preserve, the trace and distance.

The distance between batteries in column at full distance is equal to the battery front.

If the battalion be halted, the command halt is given when the rear carriages of the pivot-sections, after completing the wheel, have advanced their own length in the new direction; each captain then dresses his battery to the right.

774. Whenever a battery is dressed in column, the captain, after commanding front, places himself in front of the centre. This rule is general.

775. In column of batteries, the major is abreast of and twenty-eight yards from the centre of the column, on the side of the guide, or on the side toward which the batteries are dressed; the adjutant and sergeant-major, each in his own wing, are abreast of the lead-horses of the leading and rear batteries, on the side of the guide, fourteen yards from the flank.

776. In column, when the guide is changed, the adjutant and sergeant-major, unless otherwise directed, pass by the most convenient line to the other flank. This rule is general.

777. In forming from line into column, the batteries
preserve their line designations until the movement is completed, when they take their designations in column; in like manner, on forming line from column, the batteries preserve their column designations until the movement is completed, when they take their designations in line. These rules are general.

To change direction in column at full distance.

778. Executed on the same principles as in column of platoons, each captain at the proper time commanding:

1. Battery right (or left) wheel, 2. March.

To march in column; to halt the column; to execute the about, reverse, and countermarch; to march by the flank, and to march again in column.

779. Executed in column at full distance, as explained in column of platoons.

Column at full distance to the right or left into line.

780. Being at a halt, the guides covering each other at the proper distances, the major commands:


At the command march, the adjutant and sergeant-major take their places in line; the batteries wheel to the right; at the command guide centre, the captains of the right wing command: Guide left; the captains of the left wing command: Guide right.

If marching, the guide, if not already there, is first ordered to the flank toward which the movement is to be executed; the movement is then executed as before.
To form column at full distance, on the right or left into line.

781. Being at a halt, the major commands:

1. On right (or left) into line, 2. March.

At the first command, the captain of the first battery commands: Battery right wheel; the other captains command: 1. Forward, 2. Guide right. At the command march, the first battery wheels to the right, and, when the rear carriage of the pivot-section, after completing the wheel, has moved forward its own length in the new direction, the captain halts the battery, and dresses it to the right, up to the principal guides; the other batteries move forward, each captain giving the command: 1. Battery right wheel, in time to add: 2. March, when the heads of his horses have passed fourteen yards beyond the left flank of the battery which preceded it in the movement; each battery is halted at three yards from the line and dressed as explained for the first.

If marching, the major orders the guide, if not already there, to the flank toward which the movement is to be executed; the movement is then executed as before, except that the captains of batteries following the first omit the commands for putting their batteries in march.

Column at full distance front into line.

782. Being at a halt, the major commands:

1. Right (or left) front into line, 2. March.

At the first command, the captain of the first battery commands: 1. Forward, 2. Guide left; the other captains command: Right half-wheel. At the command march, the first battery advances, and, when three yards from the
line, is halted and dressed to the left against its principal guides. The other batteries half-wheel to the right, each captain commanding: Guide left, when the battery has completed its half-wheel; when the left guide of each battery, marching in the new direction, arrives nearly opposite its place in line, the captain commands: 1. Left half-wheel, 2. March; the battery half-wheels to the left, and, when at three yards from the line, is halted and dressed as explained for the first battery.

If marching, the leading battery continues the march, its captain announcing the guide toward the point of rest, if not already there; the movement is then completed as before.

783. To form front into line, faced to the rear, the major commands:

1. Right (or left) front into line, faced to the rear, 2. March.

Executed as right front into line, except that the batteries are marched with the guide to the left, three yards beyond the line, when they are countermarched, halted, and dressed to the right, up to the principal guides.

To advance in line of platoon columns.

784. A platoon column is a battery in column of platoons.

Being in line, the major commands:


At the command march, each battery executes the movement; the captains repeat the commands for the guide, as when marching in line, and place themselves on the side of the guide abreast of their leading platoons; the guides
carefully preserve the interval toward the guide of the column. The major marches twenty-eight yards from the column on the side of the guide and abreast of the leading platoons; if the guide be centre, he marches on either flank. The adjutant and sergeant-major march fourteen yards outside of the column, abreast of the leading platoons.

785. To retire in line of platoon columns, the major first causes the batteries to reverse or countermarch, and then gives the commands for advancing.

786. Marching in line of platoon columns, to gain ground to the front and to the right or left, the major commands: 1. Batteries, 2. Column half-right (or half-left), 3. March, 4. Guide right (or left). To resume the original direction, the major commands: 1. Batteries, 2. Column half-left (or half-right), 3. March, 4. Guide (right, left, or centre).


To form line from line of platoon columns.

788. The major commands:


At the command march, each battery executes right front into line.

If executed at a trot, or gallop, the major commands: Guide centre when the rear platoons arrive in line.

Being in line of platoon columns to form column of batteries.

789. The major commands:
1. Right (or left) into line wheel, 2. March, 3. Guide (right or left); or, 3. Battalion, 4. Halt.

If the battalion be halted, each captain dresses his battery to the right.

Being in column of batteries at full distance to form line of platoon columns.

790. The major commands:

1. Platoons right (or left) wheel, 2. March, 3. Guide (right, left, or centre).

Marching in line of platoon columns to march in column of platoons.

791. The major commands:


To march again in line of platoon columns, the major commands:


To form column of platoons from column of batteries.

792. The major commands:


To form again in column of batteries, the major commands:

To advance in line of double columns.

793. The major commands:


At the command march, each battery executes the movement. The positions of the major, captains, adjutant, and sergeant-major, are the same as when advancing in line of platoon columns.

To form line from line of double columns.

794. The major commands:


At the command march, each battery executes the movement.

If executed at a trot, or gallop, the major commands: Guide (right, left, or centre), when the rear sections arrive in line.

To ploy the battalion into close column.

795. In close column the distance between batteries is fourteen yards.

Being in line, at a halt, to ploy the battalion into close column of batteries, on first battery, with the first battery in front, the major commands:


(Pl. 5.) At the first command, all the captains, except the captain of the first battery, hasten to the right of their respective batteries. At the second command, the captain of the first battery commands: 1. Forward, 2. Guide left;
the other captains command: *By the right flank.* At the command *march*, the first battery marches seventy yards to the front, is halted, and dressed to the left by its captain; the second battery marches by the flank in rear of and parallel to the line of the first battery; its captain halts in rear of the left section of the preceding battery; when the lead-horses of the rear carriages of his rear platoon arrive at three and a quarter yards from him, he commands:

1. *By the left flank*,
2. *March*,
3. *Battery*,
4. *Halt*,
5. *Left*,
6. *Dress*,
7. *Front*; the commands *march* and *halt* are so given that, when the movement is completed, the left section of the second battery shall be directly in rear of the left section of the first battery and fourteen yards
The other batteries, upon executing by the right flank, incline to the right, and, at fourteen yards from the flank of the column, incline to the left, so as to enter the column in rear of and on a line parallel to the preceding battery; the captains conform to what is prescribed for the captain of the second battery. The positions of the major, adjutant, and sergeant-major, are the same as in column of batteries at full distance.

796. If the command be left in front, the captain of the first battery cautions it to stand fast; the captain of the second battery commands: 1. Forward, 2. Guide right; the other captains command: By the right flank. At the command march, the captain of the first battery dresses it to the left; the second battery moves forward until the heads of the lead-horses of the rear carriages are in line with the heads of the lead-horses of the front carriages of the first battery, when the captain marches it by the right flank, passes immediately in front of the first battery, and halts in front of the left section of this battery; when the lead-horses of the rear carriages of his rear platoon are three and a quarter yards from him, he commands: 1. By the left flank, 2. March, 3. Battery, 4. Halt, 5. Left, 6. Dress, 7. Front; these commands are so given that, when the movement is completed, the left section of the second battery shall be directly in front of and fourteen yards from the left section of the first battery. The other batteries, upon executing by the right flank, incline to the left, and, when fourteen yards from the point where their left is to rest, incline to the right so as to enter the column and complete the movement as prescribed for the second battery.

If marching, the designated battery moves forward seventy yards and halts, or halts at the command march from the major, according as the ployment is in rear or in front of it.
797. Close column is formed on the fourth battery, left or right in front, by similar commands and means; the batteries are dressed to the right.

798. To ploy on an interior battery, the major commands:

1. Close column on (such) battery, 2. Right (or left) in front, 3. March.

The designated battery moves seventy yards to the front and halts; the battery next on the right moves to the front until its rear-rank carriages are abreast of the front-rank carriages of the designated battery, and then marches by the left flank; the batteries to the left move by the right flank, and all the batteries are conducted by commands of their captains to the places they are to occupy in column, as explained in the ployment on a flank battery, except that the captains ploying in front of the designated battery march abreast of their leading platoons until nearly in front of the left section of the designated battery, when they command: 1. By the right flank, 2. March, 3. Battery, 4. Halt, 5. Left, 6. Dress, 7. Front.

799. All the batteries are dressed to the left, if the right batteries ploy in front, and to the right, if the left batteries ploy in front.

To form column of platoons from close column.

800. Being at a halt, the major commands:

1. Column of platoons, 2. First battery, 3. Right (or left) by platoons, 4. March, 5. Guide (right or left).

At the command march, the first battery executes right by platoons. The captains of the other batteries successively command: 1. Right by platoons, 2. March, in time to follow, in column of platoons, the battery preceding.
801. The major may likewise command:

1. Column of platoons, 2. First battery, 3. Platoons right (or left) wheel, 4. March, 5. Guide (right or left).

At the command March, the battery designated executes the movement; the other batteries successively execute platoons right wheel, in time to follow, by inclining to the left or right, the battery next preceding.

To form close column from column of platoons.

802. Being at a halt, the major commands:

1. Close column, 2. Batteries, 3. Right (or left) front into line, 4. March.

(Pl. 6.) At the third command, the captains of the batteries in rear of the first command: 1. Forward, 2. Guide left. At the command March, the first battery executes right front into line; the other batteries move forward, each captain commanding: 1. Right front into line, in time to add: 2. March, when the first platoon is thirty-two yards from the battery preceding.
If marching, the captains of the batteries in rear of the first omit the commands for putting their batteries in march, but command *guide left*, if the guide be not already there.

If the movement be executed at a *trot*, or *gallop*, the chief of the leading platoon of the first battery halts it when it has advanced eighteen yards.

*To march in column; to change direction and to halt; to march in line of platoon columns; to march by the flank, and to resume the march in column; to face to the rear; to march to the rear.*

803. Executed in close column by the same commands and means as in column at full distance.

*To change direction in close column by the flank.*

804. Being at a halt, the major commands:


*(Pl. 7.*) At the first command, all the captains command: *By the right flank*; the principal guides of the first battery hasten to the front, and are established by the adjutant or sergeant-major, who is at the head of the column, on the prolongation of the right section of the first battery; the left principal guide is posted about twenty-eight yards in front of and facing the right section of the battery; the right principal guide covers the left principal guide at a little less than battery distance. At the command *march*, the first battery executes *by the right flank*, on the completion of which the captain commands: 1. *Guide left*, 2. *Column left*, 3. *March*, the leading guide directing himself twenty-one yards to the right of the principal guides; the captain halts opposite the left prin-
cical guide, and, as the lead-horses of the rear carriages of his rear platoon approach, commands: 1. *By the left flank*, 2. *March*, 3. *Battery*, 4. *Halt*, and dresses his battery to the left up to the principal guides. The other batteries make two changes of direction half-left and enter the new column, in rear of and parallel to the first; each captain halts when near the point where the left of the battery is to rest in column, allows his battery to march
past him, and, when its rear approaches, conforms to what is already prescribed for the captain of the first battery. The adjutant and sergeant-major, if not already there, place themselves on the flank toward which the batteries are dressed. At the commands guides, posts, the principal guides of the first battery return to their posts.

*To form line to the right or left from close column.*

805. The major first causes distances to be taken, and then gives the commands for wheeling to the right or left into line; or, he breaks into column of platoons from the head of the column, and then wheels by platoons to the right or left into line.

*To deploy the close columns.*

806. Being at a halt, to deploy on the first battery, the major commands:

1. *To the right (or left),* 2. *On first battery deploy column,* 3. *March.*

At the second command, all the captains, except the captain of the first battery, command: *By the right flank.* At the command *march,* the captain of the first battery dresses his battery to the left against the principal guides; the other batteries move by the right flank, the captains adding: *Guide left;* the captain of the second battery halts opposite the left of his position in line; when the lead-horses of the rear carriages of his rear platoon approach him, he commands: 1. *By the left flank,* 2. *March,* 3. *Guide left,* when at three yards from the line, he halts the battery, and dresses it to the left against the principal guides; the captain of the third battery halts after marching twenty-eight yards beyond the flank of the second, and conforms to what is prescribed for the captain of the second;
the fourth battery deploys as explained for the third. In approaching the line, the captains of the third and fourth batteries move in front of the centres of their batteries.

If marching, the first battery is halted at the command *march*, and the movement is completed as from a halt.

807. Being at a halt, to deploy on the fourth battery, the major commands:

1. *To the right (or left)*, 2. *On fourth battery deploy column*, 3. *March*.

At the second command, all the captains, except the captain of the fourth battery, command: *By the right flank*. At the command *march*, the fourth battery stands fast; all the other batteries move by the right flank. The captain of the third battery halts after passing twenty-eight yards beyond the flank of the fourth battery, and, when the lead-horses of the rear carriages of the rear platoon approach him, commands: 1. *By the left flank*, 2. *March*, 3. *Battery*, 4. *Halt*; the captain of the fourth battery, when he sees it nearly unmasked, commands: 1. *Forward*, 2. *Guide left*, 3. *March*, halts his battery when at three yards from the line, and dresses it to the left against his principal guides; the captains of the first and second batteries conform to what is explained for the captain of the third; the second and third batteries are conducted to the line as explained for the fourth; the first battery is dressed up to the line as soon as the captain of the second battery commands *front*.

If marching, the fourth battery is halted at the command *march*, and the movement is completed as before.

808. To deploy the column, on the first, or fourth battery, faced to the rear, the major commands: 2. *On first (or fourth) battery deploy column, faced to the rear*.

The movement is executed as already explained, except
that each battery is marched across the line, and is then countermarched, halted, and dressed toward the point of rest.

809. To deploy on an interior battery, the major commands:

1. To the right and left, 2. On (such) battery, deploy column, 3. March.

The designated battery stands fast or is halted; the captains of the other batteries command: By the right flank, or: By the left flank, according as they are in front or in rear of the designated battery. At the command march, the batteries in front of the one designated deploy to the right as explained for deploying on the fourth battery; those in rear deploy to the left as explained for deploying on the first battery. The designated battery, as soon as unmasked, is conducted to the line with the guide to the left, and is dressed to the left. The other batteries are dressed toward the designated battery.

810. If the major command: To the left and right, the batteries in front of the designated battery deploy to the left; those in rear deploy to the right. The designated battery is conducted to the line with the guide to the right, and is dressed to the right.

811. The column may be countermarched and then deployed.

812. To deploy on any battery standing fast, the major commands: 2. On (such) battery, standing fast, deploy column. The designated battery stands fast and is dressed to the left or right, according as the batteries in front deploy to the right or left; the batteries in rear deploy as previously explained; the front batteries march by the right flank till opposite their places in line, when they march by the right flank, with the guide right, cross the
line, execute the reverse, and are then dressed toward the designated battery.

To close the column in mass.

813. Being in column of batteries at full distance, and at a halt, the major commands:


At the second command, the captains of the batteries in rear of the first command: 1. Forward, 2. Guide right. At the command march, the captain of the first battery dresses it to the right. Each of the other batteries moves forward, and when it arrives at fourteen yards from the one preceding is halted and dressed to the right.

If marching, the major omits the command for the guide, and the captains of batteries in rear of the first omit the command for putting their batteries in march; at the command march, the first battery is halted and dressed to the side of the guide; the other batteries continue the march, are halted at the proper distance and dressed to the side of the guide.

If marching at a trot, or at a walk and the command be trot, the first battery, by command of its captain, at the command march, moves at a walk; the others close at a trot, taking the walk by command of their captains, at fourteen yards from the preceding battery.

If marching at a gallop, or at a trot and the command be gallop, the same principle applies, the first battery moving at a trot.

814. To arrest the march during the execution of the movement, the major commands: 1. Battalion, 2. Halt; only those batteries halt which have arrived at closed distance; the other batteries are successively halted by their captains upon closing to the proper distance.
815. To close the column in mass on the rear battery, the major countermarches the column, and then gives the same commands as before.

*Being in close column, to take distance.*

816. Being at a halt, the major commands:


At the second command, the captain of the first battery commands: 1. *Forward,* 2. *Guide right.* At the command *march,* the first battery moves forward. The captains of the batteries in rear successively command: 1. *Forward,* 2. *Guide right,* in time to add: 3. *March,* when their batteries are at wheeling distance from the one preceding.

If marching, the major omits the command for the guide. The leading battery continues the march; the captains of the following batteries halt their batteries at the command *march,* and successively put them in march as they gain wheeling distance.

If marching at a *trot,* or at a *walk* and the command be *trot,* the leading battery moves at a trot; the other batteries, by command of their captains, move at a walk, and successively take the trot when at wheeling distance.

If marching at a *gallop,* or at a *trot* and the command be *gallop,* the same principle applies, the leading battery moving at a gallop.

*To change front.*

817. Being in line, the major forms column of platoons to the right or left, and then executes *front into line,* or, *front into line faced to the rear.*

818. If the obliquity of the new line be less than forty-five degrees, the major commands;
1. **Oblique change of front, on first (or fourth) battery, 2. March.**

At the first command, the captain of the right battery commands; *Right half wheel*; the other captains command: 1. *Forward, 2. Guide right*. At the command *march*, the right battery wheels to the right until parallel to the new line, when it is moved forward, halted at three yards from the line, and dressed to the right against the principal guides; the other batteries move forward, and, when the right section of each battery is opposite its place in the new line, the battery is wheeled until parallel to the new line, moved forward, halted, and dressed, as prescribed for the right battery.

*Order in echelon.*

819. Being in line, at a halt, to advance by echelon, the major commands:

1. *Batteries from the right (or left), 2. At (so many) yards’ distance, 3. Front into echelon, 4. March.*

At the third command, the captain of the right battery commands: 1. *Forward, 2. Guide right*. At the command *march*, the right battery moves forward; when it has advanced the specified distance, the captain of the second battery from the right puts it in march, with the guide to the right, and so on to the left of the line. The guidon of each rear battery marches on a line with the lead drivers and directly in rear of the left section of the battery preceding.

If marching, the right battery continues the march; the other batteries are halted by their captains and resume the march when at the specified distance.

820. To retire by echelon, the major causes the batteries
to execute the reverse, or countermarch, and then gives
the same commands as for the advance by echelon.

821. To halt the echelon, and to resume the march, the

The guide is announced right, or left, according as the
leading battery is on the right or left.

822. To march the echelon by the flank, the major
commands: 1. By the right (or left) flank, 2. March, 3. Guide right (or left). The guide is announced toward the
leading battery.

823. To march the echelon to the rear, the major causes
the battalion to reverse, or countermarch, and announces
the guide toward the leading battery.

To execute and oblique change of front in echelon.

824. Being in echelon, the major commands:

1. Batteries left (or right) half-wheel, 2. March, 3. Guide
left (or right); or, 4. Battalion, 4. Halt.

If the battalion be halted, each captain dresses his bat-
tery to the left. The half-wheel is executed to the left or
right according as the right or left battery is in front.

To form line from echelon.

825. Being at a halt, the major commands:

1. Form line on (such) battery, 2. March, 3. Guides, 4.
Posts.

At the first command the captains in front of the des-
ignated battery command: Reverse; those in rear com-
mand: 1. Forward, 2. Guide right (or left), according as
they are on the right or left of the designated battery. At
the command march, the captain of the designated battery
dresses it toward the flank, if it be a flank battery, toward the centre, if it be an interior battery. Each captain in front of the designated battery marches his battery three yards to the rear of the line, reverses it and dresses it toward the designated battery; each captain in rear halts his battery three yards in rear of the line and dresses it toward the designated battery.

If marching, the designated battery is halted by its captain at the command march of the major.

Formations in battery.

826. In all formations in battery, the movement is executed in each battery as prescribed in the School of the Battery. The adjutant and sergeant-major accompany the major.

To form in battery to the front from line.

827. The major commands:

1. Front into battery, 2. March.

828. Pieces in front. At the first command, each captain commands: In Battery; at the command march, given when the pieces have advanced seventeen yards, each battery executes the movement.

829. Caissons in front. At the first command, each captain commands: 1. Pieces pass caissons, 2. March; the pieces having passed the caissons, each captain commands: 3. In battery; at the command march of the major, given when the pieces have advanced seventeen yards, each battery executes the movement.

To form in battery to the front by moving the caissons to the rear.

830. The major commands:

At the command front, each battery executes the movement.

831. Being in battery, to give a general alignment, the major commands:

1. Right (or left), 2. Dress, 3. Front.

At the command dress, the pieces, limbers, and caissons dress to the right; the major superintends the alignment of the pieces and limbers, the adjutant that of the caissons.

To form in battery to the rear from line.

832. The major commands:

1. To the rear into battery, 2. March.

833. Pieces in front. At the first command, the captains command: 1. Fire to the rear, 2. Caissons pass pieces, 3. March; at the command march, given when the leaders of the caissons are abreast of the leaders of the pieces, each captain commands: 4. Action, 5. Rear.

834. Caissons in front. At the first command, the captains command: 1. Action; at the command march, they command: 2. Rear.

To form line from battery.

835. The batteries are formed in line facing to the front or rear, with pieces or caissons in front, by the commands and means prescribed in the School of the Battery, the colonel substituting in the commands, battalion for battery, and guide right, left, or centre, for guide right or left.

To form in battery to the right, or left, from column of platoons, gaining ground to the right, or left.

836. The major commands:
1. To the right (or left) into battery, 2. Right (or left) into line wheel, 3. March.

At the first command, the captains command: Fire to the right. At the command march, each battery wheels into line to the right. If the pieces be in front, each captain commands: 1. In battery, 2. March; if the caissons be in front, he commands: 1. Pieces pass caissons, 2. March, 3. In battery, 4. March.

To form in battery to the right, or left, from column of platoons, gaining ground to the left, or right.

837. The major commands:

1. To the right (or left) into battery, 2. Left (or right) into line wheel, 3. March.

At the first command, each captain commands: Fire to the right. At the command march, each battery wheels into line to the left. If the pieces be in front, each captain commands: 1. Caissons pass pieces, 2. March, 3. Action, 4. Rear; if the caissons be in front, he commands: 1. Action, 2. Rear.

To form the column of platoons on right or left into battery.

838. The major commands:

1. On right (or left) into battery, 2. March.

Executed on the same principle as on right into line, each captain substituting in the commands, on right into battery, for on right into line.

839. In successive formations in battery, the principal guides are not posted.

To form the column of platoons front into battery.

840. The major commands:
1. Right (or left) front into battery, 2. March.

Executed on the same principles as right front into line, each captain substituting in the commands, right front into battery, for right front into line.

841. Right (or left) front into battery, faced to the rear, is executed on the same principles as right (or left) front into battery, except that each battery, at the proper time, executes right (or left) front into battery, faced to the rear.

To form front into battery on the head of an interior battery.

842. The major commands:

1. On third (or such) battery, 2. Right (or left) front into battery, 3. March.

Executed on the same principles as right front into line on third battery, except that the captains of the first and second batteries march them with the guide to the left thirty yards to the front before giving the command left into line wheel; the third and fourth batteries execute right front into battery; the first and second, at the proper time, execute right front into battery, faced to the rear.

843. Right or left front into battery, faced to the rear, is executed on the third battery on the same principles as right (or left) front into battery, except that the third and fourth batteries execute right (or left) front into battery, faced to the rear, and that the first and second batteries, at the proper time, execute right (or left) front into battery.

Formation of column of platoons into battery by two movements.

844. A part of the column having changed direction to the right, to form in battery to the left, the major commands:
1. To the left, and left front into battery, 2. Left into line wheel, 3. Rear batteries left front into battery, 4. March.

The batteries which have changed direction execute the movement as prescribed for forming in battery to the left, gaining ground to the left; the rear batteries execute left front into battery.

To form in battery to the right, the major commands:

1. To the right and left front into battery, faced to the rear, 2. Left into line wheel, 3. Rear batteries left front into battery, faced to the rear, 4. March.

The batteries which have changed direction execute the movement as prescribed for forming in battery to the right, gaining ground to the left; the rear batteries execute left front into battery, faced to the rear.

845. If the column of platoons have partly changed direction to the right, to the right and right front into battery, and to the left and right front into battery, faced to the rear, are executed on the same principles; in both cases, the batteries which have changed direction wheel into line to the right.

To form in battery from column at full distance.

846. To the right or left. The major first forms line to the right or left, and then gives the commands for forming in battery.

847. On the right or left. The major commands:

1. On right (or left) into battery, 2. March.

Executed as explained for on right into line, except that, as soon as each battery has completed the wheel, the captain gives the commands for forming in battery.

848. To the front. The major commands:
1. **Right (or left) front into battery, 2. March.**

Executed on the same principles as *right front into line*, the captains forming in battery to the front on arriving in line.

849. **Right or left front into battery, faced to the rear,** is executed on the same principles, the captains forming in battery to the rear on arriving in line.

*To form in battery from line of platoon columns.*

850. **To the front.** The major commands:

1. **Batteries, 2. Right (or left) front into battery, 3. March.**

   At the command *march*, each battery executes *right front into battery*.

851. **To the rear.** The major commands:

1. **Batteries, 2. Right (or left) front into battery, faced to the rear, 3. March.**

   At the command *march*, each battery executes *right front into battery, faced to the rear*.

*To form battery from line of double columns.*

852. The major commands:

1. **Batteries, 2. Right and left front into battery; or, 2. Right and left front into battery, faced to the rear, 3. March.**

   At the command *march*, each battery executes the movement.

*To form in battery from close column.*

853. To deploy on the first battery, the major commands:
1. Front into battery, 2. To the right (or left), 3. On first battery deploy column, 4. March.

At the command march, the captain of the first battery forms it in battery; the other batteries deploy as previously explained, except that, upon arriving in line, the captains, without halting and dressing their batteries, form in battery.

854. Front into battery, faced to the rear, on first battery, is executed on the same principles; each battery at the proper time forms in battery to the rear.

855. To deploy front into battery on the fourth battery, the major commands:

1. Front into battery, 2. To the right (or left), 3. On fourth battery deploy column, 4. March.

The deployment is executed as previously explained, except that the fourth battery, after being unmasked, moves forward and forms in battery when it has advanced thirty-three yards beyond the former head of the column; the other batteries form in battery successively as they arrive in line.

856. Front into battery, faced to the rear, on fourth battery, is similarly executed.

857. To deploy front into battery on an interior battery, the major commands:

1. Front into battery, 2. To the right and left (or, To the left and right), 3. On (such) battery deploy column, 4. March.

The deployment is executed as previously explained, the designated battery conforming to what has been explained above for the fourth battery.

858. Front into battery, faced to the rear, on an interior battery, is similarly executed.
859. If the formation be on an interior battery standing fast, the designated battery forms in battery to the front or to the rear as soon as unmasked by the battery in its front.

*Front into battery, on an interior battery standing fast,* is only executed when the pieces are in front; *front into battery faced to the rear,* on an interior battery standing fast, is only executed when the caissons are in front.

To form in battery from echelon.

860. Executed to the front and to the rear by the same commands and means as from line.

Firings.

861. The kind of ammunition to be used, when not prescribed by the major, is prescribed by each captain.

Being in battery, to commence firing, the major commands:


To cease firing, the major commands:


To march by the flank from battery, and to form again in battery.

862. Executed by the same commands and means as in the School of the Battery, substituting in the commands to the rear into battery, march, for action rear.

To form in battery to the right or left from column, with the caissons on the flank.

863. The major commands:
1. Action, 2. Right (or left).

**To form in battery to the rear from battery.**

864. Executed by the same commands and means as in the School of the Battery.

**To fire advancing.**

865. The major designates the battery or batteries to move forward, and the advance position to be occupied. The battery or batteries designated cease firing, move forward to the new position, and resume the fire; similar instructions are sent to the remaining batteries, when each moves forward to the position.

**To fire retiring.**

866. Executed on the same principles as firing advancing.

The major remains with the batteries nearest the enemy.

**To change front in battery.**

867. The major designates the new line to the captains, who immediately cease firing, conduct their batteries by the simplest means to their new positions, and open fire.
EVOLUTIONS OF A BRIGADE.

868. A brigade consists of two or more battalions.

869. At reviews battalions are posted in line from right to left, according to the rank of their commanders, the senior on the right. On all other occasions they are posted at the discretion of the general.

870. For evolutions, the interval between battalions is eighty-two yards; in battle it may be modified according to circumstances.

871. In whatever direction the brigade faces, the battalions are designated from the right in line, and from the head in column, first, second, and so on.

872. The brigade is formed on the principles of successive formations, and is presented to the general by the adjutant-general, as explained for the adjutant of a battalion, the battalion commanders repeating commands.

873. The field-exercises of a brigade should be limited to the movements oftenest employed in campaign, such as deploying into line and into battery from column of platoons, the advance in line and line of platoon columns, etc.

874. The commands of the general, when they cannot be sounded on the trumpet, are communicated through staff-officers; they should be explicit, should be couched as far as possible in tactical language, and should be thoroughly comprehended by the officers delivering them.

 Posts of the brigadier-general and staff.

875. In line, the general takes post twenty-eight yards in front of the line of battalion commanders, opposite the
centre of the brigade; during the evolutions he goes wherever his presence is required.

The general is attended by his personal staff; the adjutant general riding on his left, his aides-de-camp in rear, the senior on the right. On the march, the remaining members of his staff march according to rank in rear of the aides-de-camp, the senior of each rank on the right.

To advance in line.

876. The general causes the forward, and guide centre, to be sounded. If the number of battalions be odd, the commander of the centre battalion causes the guide to be repeated; the commanders of the battalions to the right cause guide left to be sounded, those to the left cause guide right to be sounded. If the number of battalions be even, the right centre battalion is the guide, and its commander causes guide left to be sounded.

The same principles in regard to the guide apply in advancing in line of platoon columns, also when the line is to advance on the completion of the about, reverse, or counter-march.

To form in column.

877. Being in line, the general causes platoons (or batteries), right (or left) wheel to be sounded, and the signal for the guide.

To form line from column of platoons or batteries.

878. To the right or left. The general causes platoons (or batteries), right (or left) wheel, to be sounded; he then causes the halt, or the guide to be sounded, according as he wishes the line to halt or to move forward.

879. On the right or left. The general causes on right (or left) into line to be sounded. The commander of
the first battalion at once causes it to execute on right into line; the other battalions move beyond the first, and execute the movement successively.

880. To the front. The general causes right (or left) front into line to be sounded. The first battalion at once executes right front into line; the commanders of the other battalions conduct them in rear of their points of rest, and then execute right front into line.

Formations in battery.

881. To the front. Being in line, the general sends orders to form to the front into battery. Each battalion at once executes the movement.

882. To the rear. Being in line, the general sends orders to form to the rear into battery. Each battalion at once executes the movement.

883. To the right or left. Being in column, the general first causes line to be formed to the right or left, and then sends orders to form in battery to the front or rear.

884. On right (or left) into battery, and right (or left) front into battery, are executed on the same principles as on right into line, and front into line.
SPECIAL INSTRUCTIONS FOR OFFICERS AND NON-COMMISSIONED STAFF-OFFICERS.

885. All commands to troops under arms are given with the sabre drawn.

886. In rendering honors, officers execute *present sabre* and *carry sabre*.

At the command *present*, officers execute the motion of present sabre as prescribed for enlisted men; at the command *sabre*, they drop the point of the sabre by extending the arm so that the right hand is brought to the side of the right thigh, back of the hand down, blade of the sabre inclining downward and to the front. At the commands *carry, sabre*, they resume the *carry*.

In presenting sabre with troops armed with the musket or carbine, officers execute the first motion of the salute at the command *present*, and the second motion at the command *arms*. At the commands *carry, arms*, they resume the *carry*.

887. In rendering honors, non-commissioned staff-officers execute *present* and *carry sabre* as prescribed in the School of the Soldier Dismounted.

In presenting sabre with troops armed with the musket or carbine, they execute the present and carry at the command *arms*.

888. At the commands *parade, rest*, officers and non-commissioned staff-officers take the position of parade rest
as prescribed in the School of the Soldier Dismounted; at the command *attention*, they resume the *carry*.

889. In funeral ceremonies, officers, and non-commissioned staff-officers, dismounted, reverse the sabre under the right arm, and clasp the blade, behind the back, with the left hand; at the commands *parade, rest*, they stand at parade rest, inclining the head to the front.

890. With the above exceptions, officers and non-commissioned staff-officers do not execute the manual of the sabre, nor the sabre exercise, with the men, unless especially directed.

891. On all duties under arms, officers and non-commissioned staff-officers have their sabres drawn; they draw and return sabre as prescribed in the School of the Soldier Dismounted without waiting for any words of command.

892. When marching in double time, officers and non-commissioned staff-officers carry the sabre diagonally across the breast, edge to the front, the point inclined to the left and two feet higher than the hand; the left hand steadies the scabbard.

893. In route marches the sabre is habitually carried in the scabbard.

894. Officers, and non-commissioned staff-officers, are not required to mount and dismount at the commands given for mounting and dismounting the men, except when specially directed.

**SALUTE WITH THE HAND FOR OFFICERS.**

895. (*First motion.*) Raise the right hand till the tips of the fingers touch the visor opposite the right eye, the thumb closed, the fingers and hand extended in prolongation of the forearm, the elbow down.
(Second motion.) Lower the hand briskly and to the right, until the points of the fingers are at the height of the shoulder and in front of it, the elbow advancing slightly; the hand and fingers still extended in prolongation of the forearm.

(Third motion.) Drop the hand by the side.

ABOUT FACE FOR OFFICERS DISMOUNTED.

896. At the command about, carry the toe of the right foot about eight inches to the rear and three inches to the left of the left heel, without changing the direction of the foot. At the command face, turn upon the left heel and right toe, face to the rear, and replace the right heel by the side of the left.

897. The non-commissioned staff face about as prescribed for officers.

SALUTE OF THE GUIDON.

898. Mounted, the heel of the staff rests in the socket attached to the right stirrup; the right hand grasps the staff at the height of the elbow. The guidon salutes as follows:

(First motion.) Lower the staff by straightening the arm to its full extent. (Second motion.) Bring back the staff to the habitual position.

899. Dismounted, the heel of the staff is supported at the right hip, and, in saluting, the guidon, in the first motion, slips the right hand along the staff to the height of the eye before lowering the staff.

HONORS TO BE PAID BY TROOPS.

900. The President is saluted with the highest honors.
all standards and colors dropping, officers and troops saluting, bands, or trumpets, sounding the President's March.

901. The General commanding-in-chief is received with standards and colors dropping, officers and troops saluting, bands, or trumpets, sounding the General's March.

902. A Lieutenant-General is received with standards and colors dropping, officers and troops saluting, trumpets sounding three flourishes.

903. A Major-General is received with standards and colors dropping, officers and troops saluting, trumpets sounding two flourishes.

904. A Brigadier-General is received with standards and colors dropping, officers and troops saluting, trumpets sounding one flourish.

905. Officers of the Navy are received with the honors due to their assimilated rank, which is as follows: Admiral, general; Vice-Admiral, lieutenant-general; Rear-Admiral, major-general; Commodore, brigadier-general; Captain, colonel; Commander, lieutenant-colonel; Lieutenant-Commander, major; Lieutenant, captain; Master, first-lieutenant; Ensign, second-lieutenant.

906. Officers of Marines, and officers of Volunteers and Militia in the service of the United States, receive the honors due to their rank.

907. To the Vice-President, and members of the Cabinet, to the Chief-Justice, and Speaker of the House of Representatives of the United States and to Governors within their respective States and Territories, the same honors are paid as to the General commanding-in-chief.

908. American and foreign envoys, or ministers, are received with the compliments due to a lieutenant-general.

909. Officers of foreign services visiting any post or station are received with the honors due to their rank.
910. No honors are paid when troops are on route marches.

911. All guards turn out and present arms to officers entitled to the compliment as often as they pass them, except the personal guards of general officers, which turn out only to the general whose guards they are, and to his superiors in rank.

912. The guard of a camp, or garrison, turns out and presents arms to the commander of the camp or garrison whenever he approaches its post.

913. When general officers, or persons entitled to a salute, pass in rear of a guard, it does not salute, but stands at a carry, facing to the front.

914. All guards turn out under arms when armed parties approach their posts; and to parties commanded by commissioned officers, they present arms, officers saluting.

915. All guards and sentinels will pay the same compliments to the officers of the Navy and Marines, and to officers of Volunteers and Militia in the service of the United States, as are directed to be paid to the officers of the Army according to their relative ranks.

916. The national or regimental colors passing a guard or other armed body of men are saluted, the trumpets sounding a march.

917. Courtesy among military men is indispensable to discipline; respect to superiors will not be confined to obedience on duty, but will be extended on all occasions.

918. All officers will salute each other when they meet, the inferior making the first salute.

919. Officers under arms salute with the sabre or hand, according as the sabre is drawn or in the scabbard.

920. Officers salute with the sabre or hand, in making and receiving all official reports, the junior making the first salute.
921. On official occasions, officers, when under arms in-doors, do not uncover, but they salute with the sabre or hand, according as the sabre is drawn or in the scabbard; when in-doors and not under arms, they uncover and stand at attention, but do not salute.

922. A non-commissioned officer or private, in command of a detachment, salutes all officers with the sabre, if the sabre be drawn; if he be unarmed, or if the sabre be not drawn, he salutes with the hand.

923. The commanding officer is saluted by all commissioned officers in command of troops or detachments.

924. No salutes are rendered by commanders of troops or detachments when marching in double time, or at a trot, or gallop.

925. A non-commissioned officer or private, armed with the sabre, when out of ranks, and not a file-closer, salutes all officers with the sabre, or with the hand, according as the sabre is drawn or in the scabbard.

Sentinels, armed with the sabre, salute all officers by presenting sabre.

926. Whenever a non-commissioned officer or soldier, without arms, passes an officer, he salutes him, using the hand farthest from the officer; if mounted, he salutes with the right hand.

927. A non-commissioned officer or soldier being seated, and without particular occupation, rises on the approach of an officer, faces toward him and salutes; if standing, he faces toward the officer for the same purpose. If the parties remain in the same place or on the same ground, such compliments need not be repeated.

928. If actually at work, soldiers do not cease it to salute an officer, unless addressed by him.

929. A non-commissioned officer or soldier makes the acribed salute with the sabre or hand, before addressing
HONORS TO BE PAID BY TROOPS.

an officer; he also makes the same salute after receiving a reply.

930. In-doors, a non-commissioned officer or soldier, when unarmed, uncovers and stands at attention, but does not salute; in all other cases he salutes as prescribed, without uncovering.

931. A mounted soldier dismounts before addressing an officer not mounted.

932. An officer mounted dismounts before addressing a superior officer not mounted.

933. When an officer enters a room where there are soldiers, the word "attention" is given by some one who perceives him, when all rise, remain standing in the position of the soldier, and preserve silence until the officer leaves the room; if at meals, they will not rise.

934. Soldiers at all times, and in all situations, pay the same compliments to officers of the Army, Navy, and Marines, and to all officers of the Volunteers and Militia in the service of the United States, as to officers of their own particular regiments and corps.

935. Officers in citizens' dress are saluted in the same manner as when in uniform.

936. Officers will at all times acknowledge the courtesies of enlisted men. When returning the salute of enlisted men, officers salute as prescribed in the tactics.

937. When several officers in company are saluted, all who are entitled to the salute return it.

Salutes with cannon.

938. The national salute is determined by the number of States composing the Union, at the rate of one gun for each State.

939. The President receives a salute of twenty-one guns.
940. General commanding-in-chief, seventeen guns.
941. Lieutenant-General, fifteen guns.
942. Major-General, thirteen guns.
943. Brigadier-General, eleven guns.
944. An officer assigned to duty according to brevet rank receives the salute due to the full rank of the grade to which he has been brevetted.
945. Officers of the Navy are saluted according to their assimilated rank.
946. Officers of Marines, and officers of Volunteers and Militia in the service of the United States, are saluted according to their rank.
947. The Vice-President receives a salute of nineteen guns.
948. Members of the Cabinet, the Chief-Justice, the Speaker of the House of Representatives, and Governors within their respective States and Territories, are saluted as prescribed for the General commanding-in-chief.
949. A foreign sovereign, or the chief magistrate of any foreign country, receives the salute prescribed for the President. Members of a royal family receive the salute due to their sovereign.
950. American or foreign envoys are saluted as prescribed for a lieutenant-general.
951. Officers of foreign services visiting any port or station, are saluted according to their rank.
952. The salute of a national flag is twenty-one guns.
953. It is the custom of foreign vessels-of-war on entering a harbor, or in passing in the vicinity of a sea-coast fortification, to hoist, at the fore, the flag of the country in whose waters they are, and to salute it.
954. On the completion of the salute to the flag, a salute of twenty-one guns is promptly returned by the nearest fort or battery.
955. If there be several forts or batteries in sight, or within six miles of each other, the principal one only returns the salute.

956. Naval regulations require vessels-of-war to return salutes to the flag only when there is no fort or battery to answer them.

957. A general officer is saluted but once a year at each post, and only when notice of his intention to visit the post has been given.

958. Salutes to individuals are fired as soon after their arrival as practicable.

959. A national salute will be fired at noon on the anniversary of the independence of the United States at each military post, or camp, provided with artillery and ammunition.
CEREMONIES.

960. In all forms of ceremony mounted, chiefs of platoon repeat only those commands which they repeat in the School of the Battery.

961. In all forms of ceremony mounted, the pieces are in front.

REVIEW OF A BATTERY.

962. The reviewing officer takes post in front of the centre of the battery, the point being marked by a flag previously established; the points are also marked where the column is to change direction, so that the right flank in passing shall be six or eight yards from the reviewing officer.

The battery being in line, the captain, in front of and facing the centre, commands:


The commands action, front, are executed as previously explained, except that the chiefs of platoon move forward and place themselves in front of the centre of their platoons, the groups of their horses six yards in front of the line of muzzles, and that the trumpeters and guidon, who execute a left about at the same time as the limbers, place themselves four yards to the right of the lead-horses of the limber of the right section.
At the command *dress*, the chiefs of platoon dress to the right, and cast their eyes to the front as soon as their alignment is verified; the captain superintends the alignment of the chiefs of platoon, the pieces, and limbers; the chief of caissons superintends the alignment of the caissons.

At the command *front*, the chief of caissons takes his post in battery; the captain passes in front of the chiefs of platoon to the centre, places himself with the croup of his horse six yards in front of the heads of the horses of the chiefs of platoon, executes a left about, and commands:

1. **Draw**, 2. **Sabre**.

At the second command, the first-sergeant, quarter-master-sergeant, and chiefs of section, draw sabre; the captain then executes a left about and resumes his post.

The reviewing officer now advances a few yards towards the captain, and halts, when the captain executes a left about and commands:

1. **Present**, 2. **Sabre**.

At the second command, the officers and non-commissioned officers whose sabres are drawn, present sabre; the guidon also salutes, should the rank of the reviewing officer entitle him to it, in which case the trumpeters sound a march or flourish according to his rank; sabres being presented, the captain executes a left about and salutes.

The reviewing officer acknowledges the salute by touching or raising his hat, after which the captain executes a left about, and commands: 1. **Carry**, 2. **Sabre**.

The captain then joins the reviewing officer, who proceeds to the right of the battery, and, passing in front of the chiefs of platoon to the left of the line, returns to the
right, passing in rear of the chief of caissons, or between the lines of carriages.

The trumpets are sounded while the reviewing officer passes round the battery, until he leaves the right of the battery to return to his station; the captain returns to his post in front of the centre, and commands:


These commands are executed as previously explained, the chiefs of platoon returning to their posts in line.

The reviewing officer having resumed his post, the captain commands:


At the command *halt*, given when the pivot-sections complete the wheel, the guidon takes his post in column of platoons, the trumpeters place themselves with the croups of their horses fourteen yards in front of the chief of the first platoon; the chief of caissons, first-sergeant, and quartermaster-sergeant, place themselves four yards from the left flank of the column; the chief of caissons abreast of the centre, the first-sergeant abreast of the chief of the first platoon, the quartermaster-sergeant abreast of the lead-drivers of the rear carriages of the rear platoon.

The captain then causes the cannoneers to mount, and commands:


At the command *march*, the column moves forward, the cannoneers folding their arms; the column changes direction, without command from the captain, at the points indicated, the captain taking his place six yards in front
of the chief of the first platoon, immediately after the second change; when the trumpeters arrive at forty yards from the reviewing officer they begin to sound a march, and, as soon as they have passed him, they wheel to the left out of the column, and take post in front of and facing the reviewing officer, where they remain until the rear of the column has passed, when they cease sounding, and return to their place at the head of the column.

The captain salutes when at six yards from the reviewing officer, and returns to the carry when at six yards beyond him; the other officers, the first-sergeant, and quartermaster-sergeant, salute and return to the carry at the points prescribed for the captain. Non-commissioned officers in command of platoons, salute as prescribed for a sergeant. When the guidon salutes, he lowers the staff on arriving at six yards from the reviewing officer, and raises it when six yards beyond him.

In saluting, all turn the head and look toward the reviewing officer.

The reviewing officer acknowledges the salutes of the captain and guidon only.

The captain, having saluted, places himself on the right of the reviewing officer, and remains there until the rear of the battery has passed, when he rejoins the battery.

As soon as the head of the column makes a second change of direction to the left, after passing the reviewing officer, the captain commands: Guide left; when the battery arrives on the original ground, he wheels it into line to the left, prepares it for review as before, presents sabre, and salutes; the acknowledgment of the salute by the reviewing officer terminates the review.

If the battery is to march past the reviewing officer again, and at a trot, instead of changing the guide and forming line as above, the captain commands: 1. Trot, 2.
March; and, at the second change of direction, places himself at the head of the column as before.

In passing in review at a trot, the cannoneers do not fold their arms; the trumpeters, without sounding, remain at the head of the column, and there is no saluting; the captain having passed the reviewing officer, places himself on his right, and the review is concluded as already explained.

After the review the captain causes the battery to perform such manoeuvres as the reviewing officer may direct.

963. When a battery is reviewed before an inspector, junior in rank to the commanding officer, the commanding officer receives the review, and is accompanied by the inspector.

964. When a battery is reviewed in line with infantry, or cavalry, the captain, at the command rear open order, commands: Action; at the command march, he commands: Front; the axles of the pieces are dressed on the front rank of the infantry, or on the rank of cavalry; the chiefs of platoon place themselves on the line of company officers, the captain on the line of field officers.

The sabres are presented, and carried, at the commands, present arms and carry arms; the captain repeats the commands, present and carry, and at the command arms, he commands sabre.


When the battery arrives at its original position, after passing in review, the captain wheels it into line to the right, and, when it has gained sufficient distance to the
rear, he countermarches it, and halts it on the original line.

965. The forge and battery-wagon do not accompany the battery at review, except when the review is to precede an inspection, in which case they are posted fourteen yards from the left of the battery, the forge in line with the pieces, the battery-wagon in line with the caissons.

At the commands action, front, they execute two left abouts as prescribed for the limbers and caissons, and take their places in line with them. In the march in review the forge follows in rear of the left file of carriages, the battery-wagon in rear of the right file; upon wheeling into line, they resume their posts on the left as before explained.

966. If the artificers have horses, they take post on the left of the battery in a position corresponding to that of the guidon and trumpeters on the right; they draw and present sabre as prescribed for the chiefs of section; in marching in review, they march four yards in rear of the rear platoon, or at the same distance in rear of the forge and battery-wagon.

If the artificers have no horses, the blacksmiths take post one yard outside of, and in line with, the front part of the limber-wheels of the forge, the senior on the left; the wheelwright and saddler take corresponding positions at the battery-wagon, the wheelwright on the left; the artificers mount on the limber-chests of the forge and battery-wagon at the commands for mounting the cannoneers, and dismount at the commands for dismounting them.

If the forge and battery-wagon do not accompany the battery, the artificers may serve as cannoneers.

967. In horse batteries, the caisson corporals draw and present sabre as prescribed for the chiefs of section.
PARADE OF A BATTERY, DISMOUNTED.

968. No form of dress parade is prescribed for a single battery dismounted, nor will a single battery dismounted be required to attend dress parade with troops of other arms in the evenings, nor in the mornings on days when there is mounted battery drill.

When a single battery dismounted attends dress parade with troops of the other arms, it forms on the left, and conforms to the principles explained in the dress parade of a battalion dismounted.

UNDRESS PARADE OF A BATTERY, DISMOUNTED.

969. The battery forms without arms on its parade-ground; the first-sergeant having reported the result of the roll-call and taken his post, the captain, or officer superintending the roll-call, dresses the battery to the right, then places himself six yards in front of its centre, faces to the rear, commands: 1. Parade, 2. Rest, 3. Sound off, and comes to parade rest. At the command sound off, the trumpeters sound the retreat. When all the officers are required to be present, they take post as prescribed in the School of the Battery Dismounted. If a non-commissioned officer be in charge of the battery, he remains at his post on the right of the battery.

The retreat being sounded, the officer in charge of the battery calls the battery to attention, publishes the orders, and directs the first-sergeant to dismiss the battery.

970. At all established roll-calls of a battery, the officer superintending the roll-call reports the result to the battery commander.
INSPECTION OF A BATTERY.

971. The battery being in line, the captain commands:

1. Prepare for inspection, 2. Action, 3. Front, 4. Right,

These commands are executed as prescribed for review, the trumpeters also drawing sabre; if the inspection has been preceded by a review, the captain may omit the seventh and eighth commands, cautioning the trumpeters to draw sabre.

The inspecting officer inspects the captain, and then the chiefs of platoon, beginning on the right; passing around the left of the battery, he inspects the chief of caissons, then goes to the right and inspects the trumpeters and guidon; the inspector next goes to the right section of the right platoon and inspects the section; beginning with the chief, who executes inspection sabre, he passes in front of the piece, along the right of the section, and in rear of the caisson, returning by the left of the section to the front; he then goes to the left section of the right platoon and inspects it, as prescribed for the right section; he then inspects the other sections in like manner.

As the inspector approaches each limber, No. 6 opens the lid of the chest so as to show its contents; he closes the lid as soon as the inspector passes the limber on its left. The caisson corporal opens and closes the lid of the caisson limber-chest, as explained for No. 6; he also, when so directed, opens and closes the lids of the other chests.

The trumpeters, chiefs of section, first-sergeant, quartermaster-sergeant, and the artificers when mounted, execute inspection sabre as the inspector approaches them.

The captain, as soon as inspected, returns sabre and accompanies the inspector. Each chief of platoon accom-
panies the inspector during the inspection of his platoon; he then returns to his post, faces to the rear, and remains at ease.

As soon as the forge and battery-wagon, after the commands action, front, have taken their places in line with the limbers and caissons, the senior blacksmith opens the lid of the limber-chest of the forge, and the wheelwright opens the battery-wagon; they then resume their posts. If mounted, they dismount and give the reins of their horses to the wheel-drivers of the forge and battery-wagon, respectively, and then conform to what has been just prescribed.

The forge and battery-wagon having been inspected, each is closed by the proper artificers, who resume their posts. If they have horses, after closing the forge and battery-wagon they mount, return to their posts, and draw sabre.

The inspection of the battery-wagon being completed, the captain returns to the front and centre of the battery, faces toward it, and commands:


At the command dismount, all the officers and mounted men dismount; the horses of the captain, chiefs of platoon, and chief of caissons, are held by the trumpeters, assisted by the guidon if necessary.

At the fourth command, each cannoneer takes his knapsack from the carriage, returns to his post, places his knapsack on the ground, flap upward, the great-coat six inches from the feet, opens his knapsack, turning the flap toward the feet, the flap resting on the great-coat, and then stands at attention; each mounted man unstraps his valise from the saddle, and places it at his feet in the posi-
tion of stand to horse, opens his valise, and then stands to horse.

The inspector, accompanied by the captain, then inspects the knapsacks and valises, passing through the battery as before prescribed, each chief of platoon accompanying him during the inspection of his platoon. The captain then commands:

REPACK KNAPSACKS AND VALISES:

At this command, the knapsacks and valises are closed and strapped in their proper places; the cannoneers then resume their posts and the drivers stand to horse.

The knapsack of each cannoneer rests vertically on the foot-boards of the chest on which he mounts, so as to be under his legs, the flap from the chest; the knapsacks are secured to the chest by means of a strap which is passed in front of the knapsacks, and is fastened to the ends of the chest.

The knapsacks of the first-sergeant; quartermaster-sergeant, chiefs of section, trumpeters, guidon, and the artificers when mounted, are usually inspected in quarters; on the march their knapsacks, unless otherwise prescribed by the captain, are carried on the foot-boards of the limber chests of the forge and battery-wagon, and in the baggage-wagons.

The knapsacks and valises having been inspected, the officers mount; the captain then commands:

1. **Drivers**, 2. **Prepare to Mount**, 3. **Mount**.

At the third command, all the mounted men mount. The inspection being completed, the captain, upon an intimation from the inspector, forms line, marches the battery to its park, and dismisses it.
In garrison, the knapsacks and valises may be inspected in quarters.

972. The battery will be frequently inspected in full marching order—the men in blouses, and equipped with haversacks and canteens; knapsacks and valises packed; overcoats, when not worn, rolled and strapped to the knapsacks or saddles; horses equipped with nose-bags and halters; caissons loaded with a day's forage.

INSPECTION OF A BATTERY DISMOUNTED.

973. The captain causes the ranks to be opened, and then commands: 1. Draw, 2. Sabre, 3. Inspection, 4. Arms.

The captain, as soon as inspected, returns sabre and accompanies the inspector, who, having inspected the chiefs of platoon, passes around the left of the battery, and inspects the chief of caissons; the inspector next inspects the front rank, the rear rank, and the line of non-commissioned file-closers, beginning on the right of each, and returning by its left and rear; the inspection is conducted as explained in the School of the Soldier Dismounted. During the inspection of the ranks, the lieutenants stand at place rest, the chiefs of platoon facing about.

At inspection of quarters, the inspector is accompanied by all the officers, or by such of them as he may designate; the men, with gloves and accoutrements (sabres in the scabbard), stand covered in front of their respective bunks; in camp, they stand in front of their tents; the senior non-commissioned officer, upon the approach of the inspector, commands: 1. Battery (platoon or section), 2. Attention.

On the completion of the inspection, the captain closes the ranks and dismisses the battery.
MUSTER OF A BATTERY.

974. Muster, when practicable, is preceded by a review and inspection.

The inspection being completed, the captain commands: *Attention to muster.*

The mustering officer, or captain, then calls the names on the roll; each man as his name is called answers: *Here.* Each cannoneer as he answers to his name steps a yard to his right or left, according as he is on the right or left of the piece; the roll being called, each cannoneer resumes his post; each mounted man as he answers to his name dismounts and stands to horse, the mounted men remount at the commands for the drivers.

The captain provides himself with the roll of his battery, and with a list of absentees alphabetically arranged.

After muster, the presence of men reported in hospital, and on guard, is verified by the mustering officer, who is accompanied by the captain.

975. If the battery be mustered dismounted, the ranks are opened and the sabres drawn; each man after answering to his name returns his sabre.

GUARD-MOUNTING OF A BATTERY.

976. At the *assembly of guard details*, the men warned for stable-and-park guard duty fall in on the battery parade-ground, in two ranks facing to the right; the non-commissioned officers and supernumerary fall in as file-closers; the first-sergeant then faces the detail to the left, verifies it, opens the ranks, causes sabres to be drawn, inspects the dress and general appearance of the men, replaces by the supernumerary any man whose condition makes him
unfit to march on guard, and then closes the ranks. If the supernumerary be no longer required, he is dismissed.

The trumpeters take post on the battery, or garrison, parade-ground.

At adjutant's call, the new battery-officer of the day, who mounts the guard, takes post so as to be six yards in front of, and facing, the centre of the guard when formed.

The first-sergeant marches his detail to the parade-ground, the trumpeters sounding a march in quick time, and halts the detail in line so that the right file of the front rank shall be two yards to the left of the left trumpeter; he then places himself two yards in front of the centre of the detail, salutes, and reports to the officer: Sir! The detail is correct; or, Sir! (So many) non-commissioned officers or privates are absent; he then faces to the left and takes post two yards to the left of the front rank.

The officer then draws sabre, and commands:

1. Rear open order, 2. March.

At the command march, the ranks are opened; the front rank dresses to the right, the rear rank steps back three yards, halts, and dresses to the right; the senior non-commissioned officer places himself on the right of the front rank; the other non-commissioned officers three yards in rear of the rear rank. The officer verifies the alignment of both ranks and commands: Front; he then places himself six yards in front of, and facing, the centre of the guard, commands: 1. Inspection, 2. Arms, returns his sabre, and inspects the guard.

If any man do not present a creditable appearance, the officer directs the first-sergeant to replace him after the guard is mounted; he also, when so directed, selects as
orderly for the commanding officer the soldier who is neatest in general appearance.

The inspection being finished, the officer places himself six yards in front of, and facing, the centre of the guard, draws his sabre, and commands:

1. **Parade**, 2. **Rest**, 3. **Sound off**.

The trumpeters sound off, remaining on the right of the guard.

The officer then commands:


At the ninth command, the guard moves to its post, preceded by the trumpeters who sound a march in quick time; the senior non-commissioned officer marches near its left and rear, so as to observe its movements; if there be a file-closer, he takes his place as guide; the officer and first-sergeant return sabre and retire.

As the new guard approaches the guard-house the old guard is formed in line, its commander on the right of the front rank; when the trumpeters of the new guard arrive nearly opposite its left, the commander of the old guard commands:

1. **Present**, 2. **Sabre**.

The new guard having passed, he commands:

1. **Carry**, 2. **Sabre**.

The new guard marches in quick time past the old guard, the commander saluting.

The trumpeters having marched three yards beyond the right of the old guard, change direction to the right, ar
followed by the guard, change direction to the left when on a line with the file-closers of the old guard; the changes of direction are without command. The commander of the new guard halts on the line of the front rank of the old guard, and allows his guard to march past him; when its rear, after having changed direction to the left, approaches, he halts the guard, faces it to the left, places himself three yards to the right of the old guard and in line with its front rank, and then dresses the guard to the left; the trumpeters are two yards to the right of its front rank.

The new guard being dressed, the commander of each guard commands: 1. Present, 2. Sabre, salutes, and then commands: 1. Carry, 2. Sabre.

The commander of the new guard now divides the guard into three reliefs, numbers them first, second, and third, from right to left, and directs a list of the guard to be made; he then takes possession of the guard-house, or guard-tent, and the articles and prisoners in charge of the guard.

While the sentinels are being relieved, the two guards stand at place rest, and the commander of the old guard gives to the commander of the new all the information and the instructions relating to his post.

The first relief having been designated, its corporal commands: Call off. Beginning on the right, the men call off alternately in the rear and front rank: one, two, three, four, and so on; the corporal then commands:


The corporal marches on the left, and near the rear file, in order to observe the march. The corporal of the old guard marches on the right of the leading rank, and takes command when the last one of the old sentinels is relieved, changing places with the corporal of the new guard.

When the relief arrives at fifteen yards from a sentinel,
he halts and faces to it, sabre at a carry; at six yards from him, the corporal commands:

1. Relief, 2. Halt.

The corporal then adds, according to the number of the post:

1. No. (——), 2. Post.

At the command post, the two sentinels approach each other, and the old sentinel, under the supervision of both corporals, whispers his instructions to the new sentinel; both then come to attention.

The corporal then commands:


As the relief passes, the old sentinel takes his place in its rear; the other sentinels are relieved in a similar manner.

The sentinel at the guard-house is the first relieved, and is left behind.

The sentinels of the old guard, having come in, form on its left, and both guards are brought to a carry; the trumpeters place themselves two yards to the right of the old guard on line with the front rank; the commander of the old guard places himself two yards in front of its centre; the commander of the new guard places himself on the right of its front rank; the commander of the old guard then marches it with the guide right, six yards to the front, when he commands: 1. By the right flank, 2. March. At the command march, the guard faces to the right, the trumpeters begin to sound, and the guard marches in quick time past the new guard, which stands at present sabre, the commanders of both guards saluting; the old guard is then marched to the battery parade-ground and dismissed.
The new guard is brought to a carry as soon as the old guard has passed.

The commander of the guard then makes himself acquainted with all the instructions for his post, visits the sentinels, and questions them and the non-commissioned officers relative to the instructions they have received from the old guard.

The officers of the day visit and inspect the guard-house, or tents, while the old guard is being relieved, verify the number of prisoners, and then proceed to the office or presence of the commanding officer, who receives the report of the old officer of the day, relieves him, and gives his instructions to the new officer of the day.

In visiting the guard-house, each officer of the day is saluted by his own guard, its commander commanding:


When other officers entitled to a salute approach, the senior commander of the two guards commands:


In rendering honors, the commander of the guard presents sabre and carries sabre with it, standing on the right of the front rank.

Undress guard-mounting.

977. In bad weather, at night, or after long marches, undress guard-mounting will replace dress guard-mounting. It is conducted on the same principles as dress guard-mounting; the music may be dispensed with, at the discretion of the commanding officer.

FUNERAL HONORS.

978. The funeral honors of general officers, and officers
of foot-artillery, are the same as prescribed for officers in Infantry Tactics.

979. The escorts for officers of light artillery are as follows—Colonel, twelve pieces; lieutenant-colonel and major, eight pieces; captain, six pieces; lieutenant, two pieces; enlisted man, one piece. If more convenient, the caissons need not accompany their pieces.

980. An officer's escort, when practicable, is commanded by an officer of the same grade; that of an enlisted man is commanded by a sergeant.

981. The escort is formed with the centre opposite the tent or quarters of the deceased, the detachments in front, the trumpeters on that flank of the escort toward which it is to march.

Upon the appearance of the remains, the commander commands:


At the second command, the officers and non-commissioned officers, whose sabres are drawn, present sabre, and the trumpeters sound an appropriate air; sabres are then carried, after which the coffin is taken to the flank of the escort opposite the trumpeters; the cannoneers are then posted at their pieces, and the escort is formed in column of platoons or sections.

In horse-batteries, the detachments are posted in rear.


The procession being formed, the commander of the escort puts it in march.
The escort marches slowly to solemn music, and, on arriving at the grave, is formed in line with the centre opposite the grave; the detachments are next brought to the front; the remains are at the same time brought and placed over the grave, after which sabres are presented, the trumpeters sounding an appropriate air. The music having ceased, sabres are carried, and the coffin, by the direction of the commander of the escort, is lowered into the grave.

The commander next commands: 1. Parade, 2. Rest.

At the second command, the detachments execute parade rest and incline the head.

The funeral services are now completed, after which the commander commands: 1. Battery (or ———), 2. Attention, orders the cannoneers to their posts, and then fires three salvos with blank cartridges.

The escort is then formed into column, marched to the point where it was assembled, and dismissed.

The funeral ceremony for an enlisted man is the same as for an officer, except that the commands present and carry sabre are omitted; the sergeant in command of the escort presents sabre on the appearance of the remains at the quarters of the deceased, and also when the remains are placed over the grave.

When it is impracticable for the pieces to approach the grave, they are left outside the inclosure. The officers, non-commissioned staff officers, first sergeants, quarter-master-sergeants, and trumpeters, dismount, turn over their horses to the drivers, and all except the trumpeters draw sabre; the detachments are next formed in column of detachments; the officers and non-commissioned officers whose sabres are drawn reverse sabre; the remains are then escorted to the grave, where line is formed and the same ceremonies are performed as before; the officers
and non-commissioned officers whose sabres are reversed return to the carry at the command halt; at the commands parade, rest, they stand at parade rest, inclining the head. If the escort consist of more than one battery, each captain halts his battery on wheeling into line, dresses it toward the marching flank, and then resumes his post. The ceremony being completed, the detachments are marched to the guns and three salvos are fired.

In all funeral ceremonies, six pall-bearers may be selected from the grade of the deceased, or the grades next above or below it. If a commissioned officer, the coffin is borne by six non-commissioned officers; if a non-commissioned officer or private, by six privates.

At the funeral of a mounted officer, his horse, in mourning caparison, follows the hearse.

When necessary to escort the remains from the quarters of the deceased to the church, before the funeral service, sabres are presented upon receiving the remains at the quarters, and also as they are borne into the chapel.

The commander of the escort, previous to the funeral, gives the clergyman and pall-bearers all needful directions.

GENERAL RULES FOR REVIEW OF A BATTALION AND LARGER BODIES OF ARTILLERY.

982. A flag is planted to indicate the post of the reviewing officer while the batteries are passing in review.

The staff of the reviewing officer is in single rank, six yards in his rear; his flag and orderlies place themselves three yards in rear of the staff.

When other officers and personages accompany the reviewing officer, they place themselves on the left of the staff of the reviewing officer, their staff and orderlies placing themselves in their rear.
The trumpeters of each battalion are consolidated, and posted in single or double rank, the left of the front rank fourteen yards to the right of the guidon of the right battery.

Battalions are arranged in line from right to left, according to the rank of battalion commanders, the senior on the right; if in three lines, the senior commander is in front.

Brigades are arranged in like manner.

When more than one brigade is to be reviewed the staff-officers, after the reviewing officer passes along the front of each brigade, may remain near its left while the reviewing officer goes to receive the salute from the next brigade; on his return, they rejoin him and accompany him as before.

The staff-officers in passing around the batteries, ride in one or more ranks, according to the number.

Before the head of the column approaches the post of the reviewing officer, he goes wherever he can best observe the movements of the batteries.

Battalion and battery commanders repeat the commands.

Whenever the battalion commander faces toward the line to give commands, the captains face toward it at the same time, they also resume their front at the same time with the battalion commander. Captains and battalion commanders face toward the line in the same manner with the brigade commander when the review is by brigade.

Mounted officers in facing toward the line, and in resuming their front, always execute a left about.

Brigade commanders and their staff-officers draw sabre when they take their place in column before passing in review; they return sabre immediately after placing themselves on the right of the reviewing officer. In reviews
of brigades, each battery, after its rear has passed the reviewing officer thirty yards, takes the trot for one hundred yards, in order not to interfere with the march of the column in rear.

After the review of a brigade, the battalions, unless otherwise directed, return to their camps by the most practicable route, being careful not to delay the march of the battalions in rear.

REVIEW OF A BATTALION.

983. The battalion being in line, its commander executes a left about and commands:

1. Prepare for review.

At this command, each captain adds: 2. Action, 3. Front, 4. Right, 5. Dress, 6. Front, 7. Draw, 8. Sabre, which are executed as prescribed for the review of a battery. The captains having taken their posts, the battalion commander faces to the front.

The reviewing officer now approaches the battalion commander, and halts at thirty yards from him to receive the salute.

The battalion commander then faces toward the line and commands:


Sabres being presented, the battalion commander executes a left about and salutes. The reviewing officer having acknowledged the salute, the battalion commander faces toward the line and commands:


He then joins the reviewing officer, who proceeds to
the right of the trumpeters, and, passing in front of the officers to the left of the line, returns to the right, passing in rear of the chiefs of caisson.

The trumpets are sounded while the reviewing officer is going round the battalion, until he leaves the right to return to his station; the battalion commander returns to his post in front of the centre and commands:


Executed in each battery as prescribed in the review of a battery, each captain, at the command halt, causes his cannoniers to mount, and places himself with the croup of his horse four yards in front of the head of the horse of the chief of his leading platoon; the adjutant and sergeant-major place themselves fourteen yards from the left flank of the column, the former abreast of the leaders of the leading carriage of the column, the latter abreast of the leaders of the rear carriage of the column; the trumpeters take post with the croups of the rear-rank horses fourteen yards in front of the head of the horse of the captain of the leading battery.

The battalion commander then commands:


At the third command, the adjutant and sergeant-major remain on the left flank of the column.

At the command march, the column passes in review according to the principles prescribed for the review of a battery, except that each captain remains at the head of his battery after saluting the reviewing officer; the battalion commander, immediately after the second change of direction, places himself with the croup of his horse four yards in front of the head of the horse of the captain of
the leading battery, and, having passed the reviewing officer, places himself on his right, where he remains until the rear battery has passed, when he rejoins the battalion.

The trumpeters begin to sound when at forty yards from the reviewing officer and wheel out of the column as previously explained. The head of the column having executed a second change of direction to the left, after passing the reviewing officer, the battalion commander commands: \textit{Guide left}; and, when the battalion arrives on the original ground, he wheels it into line to the left, prepares it for review as before, presents sabre, and salutes; the acknowledgment of the salute by the reviewing officer terminates the review.

If desirable to pass in review a second time, and at a trot, the battalion conforms to the principles prescribed for the review of a battery at a trot.

984. The battalion may be formed in column of batteries at full distance, and pass in review according to the principles prescribed for the review in column of platoons; or, having begun to march in review, the battalion commander may close the batteries to five yards' interval, on the first section, and then command:

\begin{enumerate}
  \item \textit{Close to wheeling distance},
  \item \textit{Trot},
  \item \textit{March}.
\end{enumerate}

The wheeling distance is thirty-five yards.
On wheeling into line with diminished intervals, sabres are presented without executing \textit{action front}.

\textbf{Review of a battalion with diminished intervals.}

985. The battalion is formed in line, the batteries closed to five yards' interval, the interval between batteries being twenty-eight yards.

The review is conducted on the principles previously explained, except that the captains omit the commands.
action, front, right, dress, front; the battalion passes in review in column of batteries with diminished intervals.

REVIEW OF A BRIGADE.

986. The brigade is formed in line with an interval of eighty-two yards between battalions; the general takes post facing to the front twenty-eight yards in advance of the line of battalion commanders opposite the centre; his staff takes post in single rank, six yards in his rear; the non-commissioned staff, trumpeter, and flag, the latter on the left, three yards in rear of the staff.

On the arrival of the reviewing officer, the general causes his trumpeter to sound the attention, which being repeated in each battalion, each battalion commander prepares his battalion for review.

The reviewing officer having halted at thirty yards from the general, the general and his staff draw sabre; the general then faces the line, commands: 1. Present, 2. Sabre, resumes his post and salutes the reviewing officer. The salute being acknowledged, he faces about and commands: 1. Carry, 2. Sabre; he and his staff then return sabre and join the reviewing officer, the general placing himself on his right, the staff placing themselves on the right of the staff of the reviewing officer.

The reviewing officer then goes to the right of the line, passes in rear of the line of battalion commanders to the left, and returns in rear of the line to the right.

The trumpeters of each battalion sound while the reviewing officer is passing in front and in rear of their battalion.

When the reviewing officer, having passed around the brigade, returns to its right, the general causes the attention to be sounded.
At this signal, each battalion commander limbers to the front, forms column of platoons, or batteries, to the right, commands: 1. Pass in review, 2. Forward, 3. Guide right, and then places himself at the head of his battalion.

The general then causes forward to be sounded, which being repeated, the brigade marches in review, conforming to the principles prescribed for the review of a battalion.

When the head of the column approaches the post of the reviewing officer, the general, followed by his staff and orderlies, places himself twenty-eight yards in front of the trumpeters of the leading battalion; the general having saluted places himself on the right of the reviewing officer; the staff salute and return to the carry at the same time as the general, and then place themselves on the right of the staff of the reviewing officer, the non-commissioned staff and trumpeter place themselves on the right of the orderlies of the reviewing officer; the trumpeters of each battalion wheel out of the column and sound the march until the rear of their battalion has passed, when they return to the head of the battalion; the battalion commanders remain at the head of their battalions, and after passing in review, unless otherwise directed, conduct their battalions to camp.

The rear of the column having passed, the general and his staff salute the reviewing officer. The acknowledgment of the salute terminates the review.

The brigade for review may be formed in line with closed intervals, or, it may be formed in three lines with full or closed intervals.

If formed in three lines, the distance between battalions is eighty-two yards. The reviewing officer having passed around the batteries, all the battalions are formed in column; the battalions in the second and third lines are
put in march in time to follow the battalion preceding at the proper distance.

987. When artillery, cavalry, and infantry, are reviewed in line, they are arranged from right to left in the following order: first, infantry; second, artillery; third, cavalry; if reviewed with infantry or with cavalry only, the artillery is posted on the left.

988. When artillery is reviewed with large bodies of infantry or cavalry, should the reviewing officer not go in front of the brigade commanders to receive the salute, the commander of the artillery, facing his line, will present sabre and salute as the reviewing officer arrives opposite his right; he then causes sabres to be carried and resumes his front.

DRESS-PARADE OF A BATTALION DISMOUNTED.

989. At the assembly, the batteries form under arms on their respective parade-grounds, and are inspected by their captains; the inspection being completed, adjutant's call is sounded, at which the line is formed on the battalion parade-ground.

The line is formed on the same principles as in the School of the Battalion, except that in each battery two file-closers, called markers, replace the principal guides; if necessary, the first sergeant and quartermaster-sergeant are used as markers. The batteries are dressed up to the line so that the breasts of the men opposite the markers shall touch their arms; the interval between the quartermaster-sergeant of one battery and the first-sergeant of the battery next on the left is two yards.

The trumpeters take post on the right of the battalion, the left of the front rank twelve yards to the right of the first-sergeant of the right battery.
The adjutant takes post three yards to the right of the first-sergeant of the right battery; the sergeant-major takes post three yards to the left of the quartermaster-sergeant of the left battery.

The commanding officer takes his post at a convenient distance in front of the centre, facing the line.

The adjutant, having commanded *guides posts*, directs the first captain to bring his battery to *parade rest*. The captains, commencing on the right, successively face about and command: 1. *Parade*, 2. *Rest*, resume their front, and take the position of parade-rest; the adjutant then takes his post, commands: *Sound off*, and takes the position of parade rest.

The trumpeters, beginning on the right, sound a march in quick time, passing in front of the captains to the left of the line, and back to their post on the right, when they cease; the adjutant then steps two yards to the front, faces to the left, and commands:


Having aligned the non-commissioned officers who mark the alignment for the rear rank, the adjutant steps four yards to the front of the front rank, faces to the left, and commands:

4. *March*.

At which the ranks are opened.

The adjutant, having verified the alignment of the officers, the ranks, and the file-closers, returns to the right of the front rank, faces to the left, commands: *Front*, and then passes in rear of the line of battery-officers to the centre of the battalion, turns to the right, and marches to a point half-way between the line of officers and the commanding officer, when he halts, faces about, and commands:
1. *Present*, 2. *SABRE.*

At the second command, the officers and men present sabre. The adjutant then faces about, salutes the commanding officer, and reports: *Sir! The parade is formed.* The commanding officer returns the salute with the right hand, and directs the adjutant: *Take your post, Sir!* The adjutant takes his post three yards to the left and one yard to the rear of the commanding officer, passing by his right and rear.

The commanding officer, while the trumpets are sounding, stands at parade rest, with his arms folded, in which position he continues till sabres are about to be presented, when he comes to attention. The adjutant having taken his post, the commanding officer draws sabre, commands: 1. *Carry*, 2. *SABRE*, and adds such exercises in the manual of the sabre as he may desire, concluding with *carry sabre.* He then directs the adjutant to receive the reports, and returns sabre.

The adjutant passes by the right of the commanding officer, advances toward the line, halts half-way between him and the line of officers, and commands:

1. *First-sergeants*, 2. *To the front and centre*, 3. *MARCH*  
   *(or, double time, March).*

At the second command, the first-sergeants step two yards to the front and face toward the centre; the chief trumpeter at the same time faces to the left; at the third command, the first-sergeants and the chief trumpeter march to the centre, and successively face to the front; the adjutant then commands:

**Report.**

At this command, the chief trumpeter and the first-ser-
geants, beginning on the right, successively salute and report; the chief trumpeter, Trumpeters present, or accounted for, or, (So many) trumpeters, absent; the sergeants, Battery (A, etc.) present, or accounted for, or, (So many) sergeants, corporals, or privates, absent.

The reports being made, the adjutant commands:

1. First-sergeants, 2. To your posts, 3. March (or double time, March).

At the command march, the first-sergeants and chief trumpeter face outward, and resume their places.

The adjutant then faces about, salutes the commanding officer, and reports: Sir! All are present, or accounted for; or, Sir! (So many) officers or enlisted men are absent. The commanding officer acknowledges his salute, and directs: Publish the orders, Sir! at which the adjutant faces about and commands:

Attention to orders.

He then reads the orders, after which he faces about, salutes the commanding officer, and reports: Sir! The orders are published. The commander acknowledges the salute, and then directs: Dismiss the parade, Sir! at which the adjutant faces about and commands:

Parade is dismissed.

At this command, all the officers return sabre and face toward the centre; the officers then step off at the same time with the adjutant, close upon the centre, and successively face to the front. Each chief of caissons, if an officer, places himself in front or in rear of the chief of the left platoon of his battery, according as the battery is in the right or left wing; the two officers nearest the centre preserve an interval for the adjutant, who passes through the
interval a yard to the rear, when he halts and faces about; all the officers having faced to the front, the adjutant steps into his place and commands:


At the third command, they march to the front, dressing on the centre, the trumpeters playing; on approaching the commanding officer, the adjutant commands:

1. **Officers**, 2. **Halt**.

At the command **halt**, given at six yards from the commanding officer, the music ceases, and the officers halt, and salute with the right hand. The hands remain at the visor till the salute is acknowledged, and drop at the same time with the hand of the commanding officer. The commanding officer then gives such instructions as he may deem necessary, which concludes the ceremony.

As the officers disperse, the music is resumed; the first-sergeants step to the front, close the ranks of their respective batteries, and march them to the battery paradegrounds, where they are dismissed; the trumpeters continue to sound till the batteries clear the battalion paradeground.

When the line at parade is very short, the trumpeters may sound a march in common time; or they may sound to the left in common time, and back to the right in quick time.

At parades, dismounted, a non-commissioned officer, in command of his battery, places himself on its right at the command **guides posts**.

At parade, before bringing his battery to **parade rest**, he steps two yards to the front, and faces to the left; having given his commands, he faces to the left, steps into his place, faces about, and then comes to **parade rest**.
990. Dress parades dismounted are not held on days when there is mounted drill, nor in the evening, as this interferes with stable-duty.

UNDRESS PARADE OF A BATTALION DISMOUNTED.

991. Each battery forms on its own parade-ground, as prescribed for undress parade of a battery, except that the officers in command stand at parade rest, facing to the front.

The adjutant assigns the trumpeters a position, and, when all the batteries have come to parade rest, he commands: Sound off, and then comes to parade rest.

The retreat being sounded, the officer in charge of each battery faces about, calls the battery to attention, and directs the first-sergeant to dismiss it.

When orders are to be published to the battalion, the batteries are closed in and dressed by the officers in command of them on a battery previously designated, the interval between the first-sergeant of one battery and the quartermaster-sergeant of the battery next on the right being two yards; the trumpeters take post on the right of the line.

The line being formed, the adjutant, in front of the centre and facing the line, commands:


At the third command, the trumpeters, remaining in place, sound the retreat, the adjutant standing at parade rest. The adjutant then calls the battalion to attention, publishes the orders, and commands:


Dismiss your batteries.

The officers retire, and the first-sergeants march their batteries to their respective parade-grounds and dismiss them.

At undress parade of a battalion dismounted, each officer superintending the battery roll-call reports to the adjutant, or other officer designated, the result of the roll-call; the adjutant, or other officer designated, reports the result of the roll-call to the commanding officer.
ORGANIZATION OF ARTILLERY.

992. Artillery troops are divided into Light Artillery, and Foot or Heavy Artillery.

993. Light Artillery troops man the batteries which manoeuvre with armies on the field of battle. Foot Artillery troops serve siege and sea-coast guns, and perform the artillery duties of an army reserve.

994. Light Artillery is divided into Mounted Artillery which usually serves with infantry, and Horse Artillery which ordinarily serves with cavalry.

995. The Light Artillery of an army consists of the batteries attached to the infantry and cavalry arms, together with those batteries which are united independently and constitute the Artillery Reserve. The Foot Artillery of an army consists of the batteries which man the guns of position and the siege-train, and of those which escort and guard the ammunition and supply trains of the artillery.

996. The proportion of light artillery is usually from one to four pieces to one thousand men, depending upon the character of the troops and the nature of the country in which they are to operate. As a rule, the greater the efficiency of the infantry the less will be the proportion of light artillery required; in a broken and well-wooded country, two guns to a thousand men is a maximum.

997. The light artillery of an army is organized into battalions of from two to five batteries, commanded by a field-officer, and into brigades of two or more battalions, commanded by a brigadier-general.
998. An artillery brigade is attached to each infantry corps, and a small artillery brigade to each cavalry corps.

999. The Artillery Reserve consists of one or more brigades; it is composed of mounted and horse batteries in suitable proportions, and is commanded by a general officer, who is under the immediate orders of the chief of artillery of the army.

1000. In smaller commands, a battalion may be attached to an infantry division, or a single battery to an infantry or cavalry brigade.

1001. In the artillery brigade of an infantry corps, each battalion of artillery usually contains at least one mitrailleur battery, or the mitrailleur batteries of the corps may be organized into a single battalion.

Composition of light batteries.

1002. A battery consists of a fixed number of pieces and caissons, of a traveling forge and battery-wagon, together with a sufficient number of officers and men, and of horses, for the efficient service of the battery.

1003. A piece consists of a cannon mounted on a two-wheeled gun-carriage, to which is attached another two-wheeled carriage called a limber, which facilitates the transportation of the cannon, and carries a portion of the ammunition. A caisson is a carriage specially devised for transporting ammunition; it consists of a two-wheeled body, to which is attached a limber in all respects similar to that of the piece.

1004. The traveling forge and the battery-wagon are carriages for the transportation of tools and stores; the forge contains blacksmith’s tools, and stores for shoeing and for ordinary repairs in iron; the battery-wagon contains wheelwright’s and saddler’s tools, stores for ordinary repairs in wood and leather, and spare matériel.
1005. The pieces and carriages are made as light as is compatible with strength and the nature of the service they have to perform.

**Organization of light batteries.**

1006. A battery is maintained on one of the following footings:

1. For instruction.
2. For the march, or in a state of preparation for active service.
3. For war.

<table>
<thead>
<tr>
<th>Mounted Battery</th>
<th>Instruction, 4 Guns</th>
<th>March, 4 Guns</th>
<th>War, 6 Guns</th>
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<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Drivers</td>
<td>24  48</td>
<td>30  60</td>
<td>42  84</td>
<td></td>
</tr>
<tr>
<td>Cannoneers</td>
<td>54</td>
<td>62</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>Spare horses</td>
<td>7</td>
<td></td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>4101</td>
<td>65</td>
<td>4115</td>
<td>88</td>
</tr>
</tbody>
</table>

*Remarks:*

- Commanding platoons and the caissons.
- First - sergeant, quartermaster - sergeant, veterinary and stable sergeant.
- Chiefs of section.
- Gunners and caisson corporals.
  - a. 2 blacksmiths, 1 saddler, 1 wheelwright;
  - b. 8 blacksmiths, 1 saddler, 2 wheelwrights.

One-eighth additional.
1007. The men should be intelligent, active, and muscular, and not less than five feet five inches, nor more than six feet, in height; very large men are specially undesirable; the great majority should be men accustomed to horses; a suitable proportion must be mechanics.

1008. If a public horse be allowed to each subaltern, the number of horses in the above table will be proportionately increased.

1009. The forge and battery-wagon, when not horsed, must be kept with the battery and equipped with the proper tools and stores.

1010. On the war footing, when there is no ammunition and supply train for the artillery, an additional forge, battery-wagon, and other carriages, with their supplies, and a full campaign allowance of ammunition, must accompany the battery, and be in charge of the captain.

1011. In horse batteries, in addition to the number of horses above prescribed, twelve saddle-horses (including one spare horse) are required for each gun detachment.

1012. Horse batteries on the war footing have four guns; they require five mounted artificers, viz.: three blacksmiths, one saddler, and one wheelwright.

1013. Mitrailleur batteries have from six to ten pieces. The inch mitrailleur requires six or four horses; the half-inch, four or two horses; the number of drivers corresponds to the number of pairs.
PIECES.

1014. The terms *cannon* and * ordnance* are applied to all heavy fire-arms which are fired from carriages, in contradistinction to * small-arms*, which are fired from the hand.

1015. The term *piece* is applied to cannon; it also used to designate a cannon in union with its carriage, with or without the limber.

1016. The light artillery of the United States now comprises the following pieces, viz.: *three-inch rifle* and *three-and-one-half-inch rifled-guns*; *half-inch and one-inch mitrailleurs*; and the *twelve-pounder smooth-bore gun*. A .45-inch mitrailleur has just been adopted (1874); it is intended to ultimately replace the half-inch mitrailleur.

1017. The *three-inch rifle* was adopted in 1861. It is made of wrought-iron, by wrapping boiler-plate round an iron bar, so as to form a cylindrical mass, which is brought to welding heat and passed through rollers, so as to unite it solidly; the trunnions are afterward welded on, and the piece is bored and turned to its proper size and shape. The method originated at the Phoenixville Iron-Works, Pa.

1018. The model for the *three-and-one-half-inch rifle* was adopted in 1870. It is to be made of wrought-iron or bronze, and in its general appearance will closely resemble the three-inch rifle.

1019. The *mitrailleurs* are Gatling's, and were adopted in 1868; they are made of steel, some of the smaller parts being of brass.
1020. The *twelve-pounder*, or *Napoleon gun*, adopted in 1857, is still (1874) retained in the United States service, though abandoned by all other civilized nations. It is cast in gun-metal or bronze, which consists of ninety parts of copper and ten of tin, allowing a variation of one part more or less.

*Description and nomenclature of light guns.*

1021. (*Pl. 1.*) The *bore* (1) is the hollow cylinder which receives the charge.

The *mouth* (2) is that part of the bore nearest the front of the piece.

The *bottom of the bore* (3) is its extreme rear; in the three inch rifle, it is a semi-elliptical surface. The bores of rifled-guns have *grooves*; the intervals between the grooves are called *lands*; the grooves and lands are of equal width.

The *vent* is a cylindrical hole, perpendicular to the *axis of the piece* (4), near the bottom of the bore, through which fire is communicated to the charge. The surface of the piece in the immediate vicinity of the exterior orifice of the vent is called the *vent-field*.

The *body* (5) is that part of the piece in rear of a plane perpendicular to the *axis of the piece* and tangent to the front part of the *trunnions* (6, 6), or projecting cylinders at the sides of the
PIECES.

piece, which support it on its carriage; their axes are in a line perpendicular to the axis of the piece, and in the same plane with it.

The rimbases (7, 7) are the short masses of metal which unite the trunnions with the gun; their ends, or the shoulders of the trunnions, are planes parallel to each other and perpendicular to the axis of the trunnions.

The breech (8) is that part of the piece in rear of a plane passing through the vent and perpendicular to the axis of the piece. The base of the breech is the plane, or curved, surface at the rear of the piece. The seat for the pendulum-hausse is screwed into the base of the breech. The breech includes the cascabel (9), which consists of a knob terminating the rear of the piece, and of a neck, or narrow part, which unites the knob to the base of the breech.

When the body of the gun is strengthened by a band, or jacket, this addition is termed a reinforce.

The chase (10) is that part of the gun in front of the trunnions. The muzzle (11) is the general term for the front of the gun; if the chase be enlarged at the muzzle, the enlargement is called the swell of the muzzle, and the part of the chase where the swell begins is called the neck. The front, or muzzle, sight is screwed into the muzzle, or into the swell of the muzzle at its highest point. The face (12) is the perpendicular plane terminating the front of the gun.

1022. Preponderance is the excess of the weight of the piece in rear of the trunnions over that in front; it is measured by the lifting power in pounds, which must be applied at the base of the breech to balance the piece when suspended freely on the axis of the trunnions. It is decided to dispense with preponderance in all guns hereafter cast.
Description and nomenclature of mitrailleurs.

1023. (Pls. 2 and 8.) The breech-loading rifled barrels (1) are fastened together by a front barrel-plate (2) and a rear barrel-plate (3). The carrier-block (4), a hollow cylinder which carries the cartridges, is directly behind the barrels. The lock-cylinder, another cylinder behind the carrier-block, contains the locks (one to each barrel). The barrels, carrier-block, and lock-cylinder, revolve around a common axis called the main-shaft (5), which is turned by the hand-crank (6). The lock-cylinder revolves within a breech-casing (7), forming the body of the gun and closed in rear by the cascabel plate (8). The breech-casing is fastened to the frame (9) by the casing-screws (10). The cartridges are inserted in the hopper (11), and pass successively into the channels of the carrier-block, whence they are thrust into the barrels by the lock-tubes, or plungers, and held there until exploded by the firing-pins. The cartridge-shell stop is attached to the hopper. The other parts are the trunnions (12); rear-sight (13); front-sight (14); face (15); socket, for head of elevating-screw; socket guide-plate and screw; locking-block for locking bolt; plug for removing locks; traversing-screw; regulating nut, on traversing-screw; thumb-spring for regulating nut; crank-stop;
hinges; hopper-spindle; hopper-grooves; hopper-spring catch.

1024. The following parts are within the breech-casing: lock-cylinder; rear-guide nut; cocking-ring; cocking-knob; cocking-device; cocking-ring clamps; spiral cam; diaphragm; diaphragm-plug; gear-wheel; pinion; rear cam screw; crank-shaft; worm; worm-gear.

Each lock consists of a lock-butt, lock-tube or plunger, lock-hammer, lock-spring, firing-pin, and extractor.

To take the one-inch mitrailleur apart.

1025. Block up frame and barrels; take off hopper; take off cascabel plate; take pin out of pinion, turn crank downward, and then remove crank-shaft; take out rear-sight, and then remove large gear-wheel; take out rear plug in diaphragm, and gently revolve the piece until a lock presents itself on a line with the hole in the diaphragm, through which the locks are successively removed; take out large screws on sides of breech-casing, and remove casing to the rear. Be careful to have the lock-cylinder and piece supported, so as to keep the centre line of main-shaft parallel to top of frame; this is necessary to prevent the inner breech or rear of the piece from dropping when the casing is removed. The large rear nut, on the shaft in rear of the lock-cylinder, and which serves as a guide for the rear-ends of the locks, is made fast by a tapered pin and a left-handed screw; to remove this nut, the pin is taken out and the nut turned to the right. The lock-cylinder and carrier-block are then taken off. The spiral cam need not come out of the casing in taking the mitrailleur apart.
To put the one-inch mitrailleur together.

1026. Put main-shaft in place, through the plates which hold the barrels, and then replace carrier-block, lock-cylinder, and large rear nut; screw up this nut tightly and put tapered pin through the nut and shaft; place the mitrailleur in the frame, and let front end of main shaft rest in the hole designed for it, in the front of frame; take care to keep the centre of main-shaft in the plane of top of frame. When the piece is in this position, push the cocking-ring over the lock cylinder and let it hang loosely round the carrier-block; raise the breech slightly, and push the breech-casing over the lock-cylinder, etc., to its place; screw casing to frame, and put cocking-ring in its proper place; revolve the piece to the right or left, so that the places for the locks will come on a line with the hole in the diaphragm, through which the locks are successively inserted and placed in proper position; then insert screw-plug to close the hole through diaphragm; put on cog-wheel; replace crank-shaft, pinion, and tapered pin; then put on rear-sight, and screw on butt-plate and hopper.

Care of pieces.

1027. The bore is kept as dry as possible by depressing the piece and using a vent-cover and tompond. Great care must be taken not to bend or injure the front-sights, as it affects the accuracy of pointing. After firing, the bore of the gun must be washed out, and the piece depressed.

Steel guns are bronzed or lackered on the exterior.

1028. Mitrailleurs are kept cleaned and oiled to prevent them from getting rusty; after marching over dusty roads and, if possible, before going into action, the barrels and carrier-block are thoroughly wiped and the parts oiled, the crank being reversed to avoid unnecessary snapping.
### 1029. Principal dimensions and weight of pieces.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2-inch.</td>
<td>3-½-inch.</td>
<td>½-inch.</td>
<td>1-inch.</td>
<td>Inches.</td>
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<tr>
<td>Diameter of bore</td>
<td>3.</td>
<td>3.5</td>
<td>.5</td>
<td>1.</td>
<td>4.62</td>
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<tr>
<td>Length of bore</td>
<td>65</td>
<td>65</td>
<td>88</td>
<td>88</td>
<td>68.6</td>
</tr>
<tr>
<td>Whole length of piece</td>
<td>72.7</td>
<td>73.84</td>
<td>58</td>
<td>68.15</td>
<td>72.55</td>
</tr>
<tr>
<td>Greatest exterior radius of base of breech</td>
<td>4.85</td>
<td>5.6</td>
<td>_</td>
<td>_</td>
<td>5.5</td>
</tr>
<tr>
<td>Greatest exterior radius of breech-casing</td>
<td>_</td>
<td>_</td>
<td>8.81</td>
<td>6.5</td>
<td>_</td>
</tr>
<tr>
<td>Length of front-sight</td>
<td>1.85</td>
<td>2.25</td>
<td>_</td>
<td>2.5</td>
<td>_</td>
</tr>
<tr>
<td>Length of trunnions</td>
<td>2.8</td>
<td>3.25</td>
<td>2.25</td>
<td>2.8</td>
<td>3.25</td>
</tr>
<tr>
<td>Diameter of trunnions</td>
<td>8.67</td>
<td>4.2</td>
<td>2.7</td>
<td>8.67</td>
<td>4.2</td>
</tr>
<tr>
<td>Depth of grooves</td>
<td>.075</td>
<td>.075</td>
<td>.01</td>
<td>.01</td>
<td>_</td>
</tr>
<tr>
<td>Twist of grooves</td>
<td>1 in 10 ft.</td>
<td>1 in 12 ft.</td>
<td>1 in 42 inch</td>
<td>1 in 6 ft.</td>
<td>_</td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>830</td>
<td>1,156</td>
<td>865</td>
<td>1,006</td>
<td>1,230</td>
<td></td>
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<tr>
<td>Preponderance</td>
<td>40</td>
<td>None.</td>
<td>45</td>
<td>110</td>
<td>105</td>
<td></td>
</tr>
</tbody>
</table>

In bronze, the weight of the three and one-half inch rifle is 1,299 lbs.

1030. There are seven grooves in the three-inch and three-and-one-half-inch rifles, and six grooves in the barrels of the mitrailleurs.

1031. In the twelve-pounder, the windage, or difference between diameters of bore and projectile, is 0.1 inch.
CARRIAGES.

Gun-carriages.

1032. There is a gun-carriage for the three-inch rifle, which with slight modifications is adapted to the one-inch mitrailleur; one for the half-inch mitrailleur; and one for the twelve-pounder. The corresponding parts of these carriages differ only in their dimensions.

1033. Wheels. There are three kinds of wheels, viz.: No. 1, for the three-inch rifle and one-inch mitrailleur gun-carriages, for caissons, forges, battery-wagons, and all limbers except those of the half-inch mitrailleur; No. 2, for the twelve-pounder gun-carriages; No. 3, for the half-inch mitrailleur gun-carriages, caissons, and limbers. Wheels Nos. 1 and 2 are of the same form and height, fit on the same axle-arm, and differ only in the dimensions of their parts, strength, and weight.

It is proposed that a single pattern of wheel be used hereafter for all light artillery carriages except those for the half-inch mitrailleur.

Nomenclature of the gun-carriage.

1034. (Pls. 1 and 2.) Stock (1), of squared wood in two pieces; it serves to connect the gun-carriage with the limber, and to direct the piece; it includes the head (2), to which the sponge-bucket ring is attached; groove (3); trail
CARRIAGES.

(4) or curved part of the stock, which rests on the ground when the piece is unlimbered; rounding of the trail (5); trail-plate (6), a piece of iron fastened to the end of the trail and terminated by a very strong ring, called the lunette (7) which receives the pindle-hook by which the limber is attached; pointing-rings, large (8), and small (9), which receive the handspike; trail-handles (10), on each side of the stock for the purpose of raising it; prolonge-hooks (11), on which the prolonge is coiled; wheel-guard plates (12).

Lock-chain (13), used to keep the wheel from turning; it is on the side of the carriage, and has an eye-plate and bolt; sponge-and-rammer stop (14); sponge chain and hasp (15); ear-plate for sponge chain and hasp (16); ear-plate to support worm (17); key-chain and key; elevating-screw (18); it has a handle with four prongs; elevating-screw box; elevating-screw bed (19); rondelles (20), which connect cheeks and stock; cheeks (21), two pieces of wood between which the gun rests; washer-hooks for handspike (22); washer-hook for lock-chain (23); under-strap (24); right sponge-hook (25); sponge and worm hook (26); handspike-rings (27); trunnion-plates (28), into the beds, or depressions, of which the trunnions fit; cap-squares (29); cap-square chain (30); key-chain and key (31). Axle, including axle-body (32), of wood; axle-tree (33), of iron; axle-arm (34), the rounded extremities of the axle-tree on which the wheels revolve; linch-pin (35); linch-pin washer and hook. Wheels (36); each includes, nave (37); nave-bands (38); nave-box; spokes (39); felloes (40); tire (41).

1035. Cannoneers' seats, on the axle between the cheeks and wheels; each consists of an iron chair supported on a rectangular bar inserted in a vertical iron socket, and resting on a strong steel spring; the socket is supported by
two brass braces fastened to the axle by axle-straps; to an iron cross-piece at the top of the socket are attached two iron braces which help to support the iron foot-rest attached to the brass braces. The chair has arms and faces to the trail.

Nomenclature of gun-carriage for mitrailleurs.

1036. Stock; head; groove; trail; rounding of trail; trail-plate; lunette; pointing-ring; pointing-socket; trail-handles; wheel-guard plate; elevating-screw; elevating-screw box; elevating-screw bed; rondelles; cheeks; washer-hooks for handspike; under-straps; handspike-rings; cap-squares; cap-square chains; key-chains and keys; trunnion-beds; trunnion swivel; trunnion-swivel friction-bed; frame for traversing-apparatus or traversing-arm; traversing-fork; traversing-fork spring (spiral); traversing-fork handle; traversing-fork clamp-screw; traversing-fork case, with slot for handle; locking-bolt, connected with traversing-fork by a locking-lever; locking-bolt case; stock-seat, with hinge and prop; drag-hooks; elevating-screw nut; elevating-nut handle; elevating-clamp screw; rod-case and keys; axle; wheels.

Limbers.

1037. All limbers are similar; the limber-chests of gun-carriages and caissons contain ammunition and implements; those of forges and battery-wagons contain tools and stores.

Nomenclature of the limber.

1038. (Pls. 3 and 4). Pole (1), including pole-pad (2); pole-straps (3), by which the pole is guided when the team is hitched; pole-strap iron (4); pole-yoke (5); muff and
collar (6); pole-yoke branches (7); to which are attached sliding rings (8); splinter-bar (9), to which the wheel-horses are hitched, by four trace-hooks (10); end-bands (11); middle-bands; pole-prop (12), including socket, fer-

rule, and chain); hounds (13), pieces of wood, upon which the chests rest, connecting the axle-body with the splinter-bar; forks (14), pieces of wood, between the hounds, forming an opening in which the pole is placed; fork-strap (15); foot-boards (16); foot-board brackets (17); chest (18); chest-handles (19); cover (20), of wood; cover-plate (21), of copper; turn-buckle (22); hasp (23); back-stay (24); front-stay (25); stay-pins (26); stay-pin keys (27); under-strap; pintle-hook (28), on rear part of axle-tree, which attaches the limber to the carriage; pintle-hook key (29); axle; wheels.
1039. The four trace-hooks are sometimes attached to the ends of the splinter-bar traces, which are strong leather straps, parallel to the splinter-bar; each works over two pulleys, attached to the end and middle bands; the pulleys are wrought-iron disks, turning on vertical bolts, passing through the rounded ends of the bands, which project three inches beyond the splinter-bar.

Caissons.

1040. All caissons have the same external form, and, ex-
except those for the half-inch mitrailleur, the same dimensions. The caisson body consists of a frame, mounted on wheels, which carries two chests, a spare wheel, and other spare parts, tools, etc.

**Nomenclature of the caisson-body.**

1041. (Pls. 5 and 6). *Stock* (1), or *middle-rail*; it hr.
an iron lunette on its front end; side-rails (2); front foot-board (3); rear foot-board (4); middle-chest (5); rear-chest (6); spare-wheel axle (7); it has a body, two ribs, and a chain and toggle (8) to secure the wheel; there are also two stays for the axle; lock-chains (9), fastened to lock-chain bridles under the front ends of the side-rails, and held up by lock-chain hooks fastened to the outside of the side-rails; spare-pole (10), spare-pole key, key-plate, chain and pin (11); the key-plate is fastened on the underside of the lunette; the key is attached to the left side of the stock by a chain and eye-pin; carriage-hook (12), for attaching a carriage that has lost its limber; wheel-guard plates (13); spare-pole ring (14), held by the axle-strap; ring-bolt (15) for spare hand-spike; key-plate and key, on the right side of the middle-rail; key-plate, chain, and key (16), for the shovel-handle, or the inside of the right-side rail; middle assembling-bar (17), of iron; it has two ears in the middle to serve as stay-plates for the middle chests, and a slot (18) for the axe on the right of the middle-rail; rear assembling-bar (19); it supports the spare-wheel axle, and has a slot (20) for the pick-axe on the left of the middle-rail. Axle, the axle-body (21), being notched to receive the middle-rail and tenoned to fit into the notches in the side-rails; staples for tool-handles (22); they are driven into the top of the axle-body, in front of the iron axle-tree, one for the shovel-handle near the right side-rail, the other for the handle of the pick-axe on the left of the middle-rail. Wheels.

**Traveling-forges and battery-wagons.**

1042. There are two forges, one for the service battery, designated by the letter "A;" and one for the general reserve, designated by the letter "B."
CARRIAGES.

There are also two battery-wagons; that for the service battery is designated by the letter "C;" that for the general reserve by the letter "D."

The forge and battery-wagon of the general reserve differ from those of the service battery only in their equipment; they are designed for more extensive repairs than can be made in the battery. The form of the battery-wagon now in use (1874) is objectionable, and improvements with a view to a better distribution of weight have been suggested and tested.

**Nomenclature of the traveling-forgé body.**

1043. (Pls: 7 and 8.) Lunette (1); prop (2); vice (3); stock (4); wheel-guard plates (5); stock-stirrup (6); fire-place (7); back of fire-place (8); air-back (9); wind-pipe (10); bellows (11); ribs (12); hinges (13); hook (14); fulcrum (15); hook and staple (16); roof of bellows-house (17); bows (18); studs (19); girders (20); end-boards (21); bottom-boards (22); side-rail (23); lock-chain hook (24); coal-box (25); lid, or roof (26); handles (27); hinges (28); turnbuckle and hasp (29).

**To put the bellows in place.**

1044. Remove the coal-box from the back of the bellows-house; take out the two stay-plates at the lower ends of the rabbets in the brades; put the projecting ends of the upper bellows' arms in the rabbets, and slide them up until the ends of the lower arm come into their places; put on the stay-plates, and fasten them down with the thumb-nuts; screw the brass elbow-pipe into its place, through the hole in the sheet-iron front of the bellows-house; put
in the copper pipe, and screw up the collar which connects it with the elbow-pipe.

Plate 7.

Nomenclature of the battery-wagon body.
1045. Lunette; stock; wheel-guard plate; lock-chain;
lock-chain bridle; lock-chain hook; studs; side-rails; upper-rails; hinges; bows; cover-boards; cover-strap and turnbuckle; hasp; side-boards; stays; bottom-rails; bottom-boards; cross-bars; forage-rack, including chains, sides, and bars.

Care of carriages.

1046. Carriages in park are covered with paulins to protect them from the weather; in the hot season, the sun is apt to crack the naves of the wheels, if left exposed.

In garrison, or camp, all carriages are closely examined by the proper mechanics at least once a week; losses are supplied, injuries repaired, fastenings kept secure, and nuts screwed up tight. On the march, this inspection is made daily.

Except for some particular purpose, elevating-screws will not be run up more than half their length; on the march, they are covered with a bit of canvas or old flannel to prevent clogging with dirt.

If a battery is to march, the pintle-hooks and lunettes are greased.

The axle-arms are kept greased. The best grease for this purpose is coarse sweet-oil and tallow, melted together in equal parts; next to this, old soft lard; if neither of these can be had, slush may be used. Black lead is mixed with the grease.

Carriages are kept painted. A priming of lead-color and two coats of olive-color are applied to new woodwork, and one coat of lead-color and one of black to the iron-work.
### 1047. Weight of pieces and caissons equipped for service.

<table>
<thead>
<tr>
<th>PIECE</th>
<th>3-inch rifle</th>
<th>3.5 inch rifle</th>
<th>Mitrailleurs</th>
<th>12-pdr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piece</td>
<td>830</td>
<td>1,012</td>
<td>1,280</td>
<td>1,280</td>
</tr>
<tr>
<td>Gun-carriage, without wheels</td>
<td>540</td>
<td>736</td>
<td>786</td>
<td>786</td>
</tr>
<tr>
<td>Two cannoneers' seats</td>
<td>106</td>
<td>106</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Two wheels</td>
<td>360</td>
<td>360</td>
<td>335</td>
<td>335</td>
</tr>
<tr>
<td>Limber, without wheels</td>
<td>335</td>
<td>335</td>
<td>335</td>
<td>335</td>
</tr>
<tr>
<td>Two wheels</td>
<td>360</td>
<td>360</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>Limber-chest</td>
<td>185</td>
<td>185</td>
<td>182</td>
<td>182</td>
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<tr>
<td>Ammunition, packed</td>
<td>825</td>
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<td></td>
<td></td>
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<tr>
<td>Implements and equipments</td>
<td>95</td>
<td>98</td>
<td></td>
<td></td>
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<tr>
<td>Gun-covers</td>
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<td></td>
<td>54</td>
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<td>Pole-straps</td>
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<td>4</td>
<td></td>
<td>4</td>
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<tr>
<td><strong>Total weight</strong></td>
<td><strong>3,791</strong></td>
<td><strong>1,546</strong></td>
<td><strong>3,342</strong></td>
<td><strong>3,978</strong></td>
</tr>
<tr>
<td><strong>Number of rounds in each limber</strong></td>
<td><strong>72</strong></td>
<td><strong>1,560</strong></td>
<td><strong>432</strong></td>
<td><strong>82</strong></td>
</tr>
</tbody>
</table>

### Caisson.

<table>
<thead>
<tr>
<th>CAISSON</th>
<th>3-inch rifle</th>
<th>3.5 inch rifle</th>
<th>Mitrailleurs</th>
<th>12-pdr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body, without wheels</td>
<td>432</td>
<td>216</td>
<td>432</td>
<td>432</td>
</tr>
<tr>
<td>Two wheels</td>
<td>360</td>
<td>178</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>One chest</td>
<td>185</td>
<td>226</td>
<td>364</td>
<td>364</td>
</tr>
<tr>
<td>Ammunition, packed</td>
<td>825</td>
<td>576</td>
<td>980</td>
<td>980</td>
</tr>
<tr>
<td>Limber, without wheels</td>
<td>335</td>
<td>194</td>
<td>335</td>
<td>335</td>
</tr>
<tr>
<td>Two wheels</td>
<td>360</td>
<td>178</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>Limber-chest</td>
<td>185</td>
<td>178</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>Ammunition, packed</td>
<td>825</td>
<td>288</td>
<td>490</td>
<td>490</td>
</tr>
<tr>
<td>Implements and spare parts</td>
<td>262</td>
<td>85</td>
<td>262</td>
<td>262</td>
</tr>
<tr>
<td>Pole-strap</td>
<td>54</td>
<td>54</td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>Pole-straps</td>
<td>4</td>
<td>4</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Total weight</strong></td>
<td><strong>3,819</strong></td>
<td><strong>2,065</strong></td>
<td><strong>3,536</strong></td>
<td><strong>3,815</strong></td>
</tr>
<tr>
<td><strong>Number of rounds in caisson and limber</strong></td>
<td><strong>144</strong></td>
<td><strong>10,200</strong></td>
<td><strong>2,952</strong></td>
<td><strong>96</strong></td>
</tr>
<tr>
<td><strong>Total number of rounds for each piece</strong></td>
<td><strong>216</strong></td>
<td><strong>11,760</strong></td>
<td><strong>8,024</strong></td>
<td><strong>128</strong></td>
</tr>
</tbody>
</table>
CARRIAGES.

With splinter-bar traces and pulleys, the total weight of each carriage is increased 11.5 lbs.

In the three-inch rifle, when there are five divisions in each half-chest, the total weight of the piece is 3,648 lbs.; that of the caisson 4,245 lbs., the number of rounds in its three chests being 240.

1048. **Weights of forges and battery-wagons equipped for service.**

<table>
<thead>
<tr>
<th>FORGE</th>
<th>For the battery</th>
<th>For the reserve</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body complete, without wheels</td>
<td>997</td>
<td>997</td>
</tr>
<tr>
<td>Two wheels</td>
<td>860</td>
<td>860</td>
</tr>
<tr>
<td>Anvil and water-buckets</td>
<td>118</td>
<td>118</td>
</tr>
<tr>
<td>Stores in iron-room</td>
<td>820</td>
<td>455</td>
</tr>
<tr>
<td>Stores in coal-box</td>
<td>255</td>
<td>255</td>
</tr>
<tr>
<td>Limber-body, without wheels</td>
<td>835</td>
<td>835</td>
</tr>
<tr>
<td>Two wheels</td>
<td>860</td>
<td>860</td>
</tr>
<tr>
<td>Limber-chest, empty</td>
<td>158</td>
<td>158</td>
</tr>
<tr>
<td>Stores and tools in the limber</td>
<td>480</td>
<td>882</td>
</tr>
<tr>
<td><strong>Total weight</strong></td>
<td><strong>3,888</strong></td>
<td><strong>3,870</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BATTERY-WAGON</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Body complete, without wheels</td>
<td>910</td>
<td>910</td>
</tr>
<tr>
<td>Two wheels</td>
<td>860</td>
<td>860</td>
</tr>
<tr>
<td>Stores in wagon-body</td>
<td>1,289</td>
<td>2,588</td>
</tr>
<tr>
<td>Limber-body, without wheels</td>
<td>835</td>
<td>835</td>
</tr>
<tr>
<td>Two wheels</td>
<td>860</td>
<td>860</td>
</tr>
<tr>
<td>Limber-chest, empty</td>
<td>158</td>
<td>158</td>
</tr>
<tr>
<td>Stores and tools in the limber</td>
<td>102</td>
<td>209</td>
</tr>
<tr>
<td><strong>Total weight (exclusive of forage)</strong></td>
<td><strong>3,574</strong></td>
<td><strong>4,915</strong></td>
</tr>
</tbody>
</table>
AMMUNITION.

Gunpowder.

1049. Gunpowder is composed of nitre (saltpetre), charcoal, and sulphur; the proportion of the ingredients and the size of the grain vary with the uses for which it is destined.

Gunpowder for the military service is composed, by weight, of seventy-six parts of nitre, fourteen parts of charcoal, and ten of sulphur. It is glazed, to enable it to resist the effects of shaking in transportation, and of exposure to moisture. Five varieties of gunpowder, differing only in the size of the grain, are used in service.

1050. Gunpowder burns at a temperature of from 575° to 600° Fahrenheit. If made of pure materials, well glazed, and kept in proper casks in a dry magazine, it absorbs less than one per cent. of moisture in from ten to fifteen years; if freely exposed to air saturated with moisture, it will absorb two per cent., or more, in twenty-four hours.

Proof of gunpowder.

1051. The projectile force is ascertained by means of Electro-Ballistic machines, or the Schultz Chronoscope; the last is the instrument generally used in service. The powder to be tested is fired from the cannon for which it is made with service charges and projectiles. One pound of mortar-powder, fired with solid shot from the three-inch rifle, gives a minimum initial velocity of 1,000 feet, and a maximum pressure of 50,000 pounds to the square inch.
Charges of gunpowder.

1052. The charges are contained in *cartridge-bags* made of woolen material free from any mixture of cotton, and of sufficiently close texture to prevent the powder from sifting through.

<table>
<thead>
<tr>
<th>PIECE</th>
<th>3-inch.</th>
<th>3.5-inch.</th>
<th>Mitrailleur.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder used.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>1 lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case-shot</td>
<td>1 lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td>1 lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid-shot</td>
<td>1 lb.</td>
<td></td>
<td>17 oz.</td>
</tr>
</tbody>
</table>

1053. *Mitrailleur* ammunition is put up in metallic cases; it is primed, fixed, and ready for immediate use.

Projectiles.

1054. *Rifle* projectiles are designated by the diameter of the bore of the piece in which they are to be used; their shape is oblong; they are not attached to their cartridges.

1055. (*Pls. 1 and 2.*) *Smooth-bore* projectiles are designated by the weight in pounds of the solid-shot of the same diameter; their shape is spherical, with the exception of canister, which is cylindrical in form; they are *fixed*, or attached to their cartridges by wooden disks called *sabots*. 
1056. A projectile and its cartridge constitute a round of ammunition.

1057. The projectiles used in light batteries are shell, case-shot, canister, and solid-shot.

1058. A shell is a hollow, cast-iron projectile, made strong enough to penetrate earthworks, wooden buildings, etc., without breaking; it is loaded with a bursting charge of rifle or musket powder, which gives great force to the fragments. Fire is communicated to the charge by means of a fuse inserted in the hole by which the shell is loaded; the time of the explosion is regulated by the preparation of the fuse.

1059. A case-shot is a hollow, cast-iron projectile, filled with musket-balls, and with thinner walls than those of the shell. A tube is inserted in the fuse-hole, the balls are introduced, and melted sulphur or resin is poured in to fill up the interstices and keep the balls in position; after this has solidified the tube is withdrawn, leaving a vacant space for the charge, which is only large enough to burst the case, and disperse its contents. Fire is communicated to the charge as explained for the shell.

1060. A canister shot consists of a hollow tin cylinder, filled with cast-iron or lead balls, which vary in size and number with the calibre and kind of piece; the cylinder is closed at the bottom by a thick cast-iron plate, and at the top by one of sheet-iron. A canister shot for the three-inch rifle contains from one hundred to one hundred and fifty balls, that for the twelve-pounder, twenty-seven balls; the interstices between the balls are filled with sawdust. Canister shot for rifled guns has an expanding metallic sabot or cup.

1061. A solid-shot is made of cast-iron.
AMMUNITION.

1062. Charges for projectiles.

<table>
<thead>
<tr>
<th>Powder required to fill the shell</th>
<th>Hotchkiss</th>
<th>Ordnance</th>
<th>Absterdam</th>
<th>Eureka</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 oz.</td>
<td>10 oz.</td>
<td>8 oz.</td>
<td>8 oz.</td>
<td></td>
</tr>
<tr>
<td>Bursting-charge for case-shot....</td>
<td>1 &quot;</td>
<td>1 &quot;</td>
<td>2 &quot;</td>
<td>1 &quot;</td>
</tr>
<tr>
<td>No. of balls in case-shot.........</td>
<td>24.</td>
<td>49.</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Weight of loaded case-shot....</td>
<td>9.</td>
<td>10.5</td>
<td>11.5</td>
<td>11.77</td>
</tr>
</tbody>
</table>

19-pdr.

Principal kinds of rifle projectiles.

1063. There are many varieties of rifle projectiles, and of each variety there are several modifications. The projectiles now deemed the best are the Hotchkiss, the Ordnance, the Absterdam, and the Eureka.

1064. (Pl. 3.) The Hotchkiss consists of two pieces of cast-iron, a body and a cup covering the base of the body; between these is placed a band or ring of lead, which is compressed by the discharge so that it takes the grooves.

1065. (Pl. 4.) The Ordnance consists of a cast-iron body, with a sabot composed of an alloy of lead and tin, which is cast on the base of the projectile, and is held in position by undercuts and dovetails.

1066. The best form of the Absterdam is cast in a single piece, and has an expanding ring of brass which projects three-eighths of an inch beyond the base of the projectile.

1067. The Eureka consists of a cast-iron body in one piece, with a brass sabot; the sabot is an annular disk, in
tended to move upon the frustum of a cone, with an expanding cup in rear to take the grooves.

Fuses.

1068. (Pl. 5.) The percussion-fuse is used for rifle-shells. There are many varieties, all consisting essentially of a brass or pewter fuse-plug, or case, which contains an iron or steel plunger, terminated by a nipple carrying a common percussion-cap; the plunger is held in its place at the lower end of the fuse-plug by a collar, screw, wire, or other mechanical device; when the projectile strikes, the plunger breaks loose and is driven forward with such force as to explode the cap and ignite the charge.

1069. (Pl. 6.) The time-fuse is used for shells and for rifle case-shot. It consists of a cylindrical column of burning composition packed in a paper case, gradually increasing in thickness from its lower to its upper, or outer, extremity; to insure ignition it is primed with rifle-powder at the larger end. Burning composition has the same ingredients as gunpowder, the proportions being varied to suit the required rate of combustion; pure mealed powder gives the quickest composition; by adding certain proportions of sulphur and nitre, the composition burns more slowly. The rate of burning also depends upon the density of the composition, and upon the purity and thorough mixture of the materials. The composition is compressed, or driven, in a press.

Time-fuses are of different lengths, burning from four to forty seconds; they are graduated in seconds on the outside of the case, and can be cut to a length corresponding to
any intermediate time of flight. Time-fuses are packed in wooden blocks (five to a block), covered with paper, upon which are marked the contents, time of burning, place and date of fabrication. The number of fuses should be at least one-fourth greater than the number of rounds.

1070. To cut the time-fuse. Place the fuse in the fuse-block so that the mark at which the fuse is to be cut coincides accurately with the edge of the block; cut off the fuse close to the block with the fuse-cutter, which is a sharp thin knife, preferably a shoe-knife.

1071. (Pls. 7 and 8.) The Bormann fuse is used for spherical case-shot. It consists of a circular metallic disk, about an inch and one-half in diameter, and half an inch thick; on the exterior are several turns of a stout thread, by which the disk is screwed into the shell. The composition filling (mealed powder) is compressed into a circular groove near to and concentric with the circumference of the disk; the end of the composition is directly under the zero of the graduation and communicates, by a canal filled with musket-powder, with a small magazine in the centre of the disk; this magazine is filled with rifle-powder, and slightly closed on the lower side so as to yield in that direction to the explosion. The composition is protected from moisture or accidental ignition by a covering of soft metal, on which are legibly marked the time graduations in quarter-seconds; beginning at the entrance to the magazine, on the left end of the composition, the
first mark is for three-quarters of a second; the last mark is for five and a quarter seconds. The fuse rests on a thick iron plate, with a hole in its centre to let the flame, upon the explosion of the magazine, pass from the fuse into the interior of the shell; this plate is screwed into an orifice prepared for its reception, and closes the lower part of the fuse-hole; the fuse is then screwed firmly into its place.

When the fuse is to be used, the thin covering of metal above the composition is cut at the desired point so as to lay bare the upper surface and expose it to the flame of the discharge; the combustion of the composition occupies the assigned time, when fire is communicated to the magazine through the canal; the explosion drives the flame downward through the orifice in the iron plate, and ignites the charge in the interior of the projectile.

1072. To cut the Bormann fuse. Place the projectile between the knees, fuse uppermost, and support it with the left hand; hold the fuse-gouge in the right hand; place the left corner of its edge close to, and on the right of, the graduated mark indicating the time desired; then cut away gradually until the composition is exposed for a length about equal to the width of the gouge. Take great care not to expose the composition to the left of the proper mark, and avoid beginning the cut too close to it, for after the composition is once exposed it is very easy to pare away to the left if the cut be not accurate. When time permits, it is well to expose the composition fully by enlarging the opening toward the right.

1073. The Wright fuse, a modification of the Bormann fuse, extends the time of burning to twelve seconds, and has given excellent results.
AMMUNITION.

Friction-primers.

1074. (Pl. 9.) A primer is a small tube filled with rifle-powder, which is ignited by the friction caused by pulling a rough wire briskly through a composition contained in a still smaller tube inserted perpendicularly in the primer tube, near its top, and soldered to it; the wire is pulled by means of a lanyard. The composition consists of one part of potassium chlorate and of two parts of antimonial sulphide; they are moistened with a weak solution of gum-arabic, and mixed together while wet.

Friction-primers are packed in wooden blocks (five to a block), covered with paper, upon which are printed the place and date of fabrication. The number of friction-primers should be one-half greater than the number of rounds.

1075. Weights of projectiles and rounds of ammunition.

<table>
<thead>
<tr>
<th>Shell</th>
<th>3-inch rifle</th>
<th>12-pounder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hotchkiss</td>
<td>Grinard</td>
</tr>
<tr>
<td>lb.</td>
<td>8.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Case-shot</td>
<td>9.</td>
<td>10.5</td>
</tr>
<tr>
<td>Canister</td>
<td>7.5</td>
<td>10.</td>
</tr>
<tr>
<td>Solid shot</td>
<td>10.</td>
<td>9.5</td>
</tr>
<tr>
<td>Round of ammunition</td>
<td>Shell</td>
<td>9.5</td>
</tr>
<tr>
<td></td>
<td>Case-shot</td>
<td>10.</td>
</tr>
<tr>
<td></td>
<td>Canister</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>Solid shot</td>
<td>11.</td>
</tr>
</tbody>
</table>
**Packing-boxes for ammunition.**

1076. Ammunition is issued to batteries from the arsenals, prepared for immediate use; it is packed in boxes which are painted on the outside of different colors, to indicate the contents. Those for solid shot are painted olive; for shell, black; for case-shot, red; for canister, light drab. The kind of ammunition is also marked on each end in large white letters; the place and date of fabrication are marked on the inside of the cover.

1077. When ammunition is received it should be at once gauged to the pieces, and its condition examined.

1078. **Capacity and weight of packing-boxes.**

<table>
<thead>
<tr>
<th>Kind of Ammunition</th>
<th>No. of rounds</th>
<th>Weight of empty box, l's.</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-inch rifle</td>
<td>10</td>
<td>20</td>
<td>Each box contains a port-fire and half a yard of slow match. Empty boxes for 12-pounder canister weigh twenty-four pounds.</td>
</tr>
<tr>
<td>8.5-inch rifle</td>
<td></td>
<td></td>
<td>There are twenty rounds in each package, and fifty packages in each box. The boxes are musket-cartridge boxes.</td>
</tr>
<tr>
<td>12-pounder</td>
<td>8</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>1/4 inch Solid shot</td>
<td>1,000</td>
<td>13</td>
<td>This ammunition is in paper packages, each containing five rounds; there are twenty-five packages of shot, or twenty of canister, in each box.</td>
</tr>
<tr>
<td>1 inch Solid shot</td>
<td>125</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td>100</td>
<td>9.5</td>
<td></td>
</tr>
</tbody>
</table>

**Chests for ammunition.**

1079. The same kind of chest is used for the limber and
caisson, its interior arrangement depending upon the calibre and description of the piece. The right half of a chest is the half to the right hand of a person facing the lock-side of the chest; the left half is the half to his left hand.

1080. Beginning at the main partition through the middle of the chest and perpendicular to the lock-side, the divisions formed by the lower partitions parallel to the main partition are designated in each half, first, second, third, etc.

1081. Each chest has one or more trays resting on the partitions in the half-chests; in mitrailleur-chests, the trays in the half-chests rest upon each other, the lowest trays resting on the bottom of the chest. Trays are of wood or metal; the wooden trays are shallower than the metallic.

1082. Wooden trays. They contain implements, friction-primers, and fuses; in mitrailleur-chests, they contain implements and feed-cases; to facilitate lifting, there are three finger-holes bored in the inner sides of the ends; a hole is also bored through the bottom to let the air escape when the tray is lifted out, or replaced in the chest; trays which are to contain friction-primers have a partition parallel to the main partition of the chest and close to the air-hole, the primers being kept in the division into which the air-hole does not open.

1083. Metallic trays. They are made of copper and contain implements, friction-primers, fuses, and cartridges; they are lifted by wire handles at the ends.

1084. Chest for three-inch rifle. Five or six divisions in each half-chest; six projectiles, points up, in each division. By the first method, 240 rounds may be carried in four chests. By the second method (Pls. 10 and 11), 216 rounds may be carried in three chests, there being no
rear-chest on the caisson. The removal of the rear-chest very much lessens the disparity of weight between the piece and caisson, distributes the load of the caisson to better advantage, and gives space for the stowage of forage.

When wooden trays are used, there is but one to each chest; when metallic trays are used, there are two trays to each half-chest, one large and one small; the small trays are about one-half the size of the large trays.

1085. Chest for the half-inch mitrailleur. In the piece limber-chest, each half-chest contains eight trays; each tray has five divisions formed by partitions parallel to the partition of the chest. Each caisson-chest contains eight trays.

1086. Chest for the one-inch mitrailleur. In the piece limber-chest each half-chest contains six trays; in the caisson-chests, each half-chest contains eight trays.

1087. Chest for twelve-pounder. Four divisions in each half-chest; four rounds of fixed ammunition, cartridges up, in each division; the divisions for shells and case-shot have bolsters; the division for canister has a higher partition than the other divisions; there is but one wooden tray to each chest; it belongs in the left half-chest.
1088. Ammunition carried in each chest.

<table>
<thead>
<tr>
<th>Kind</th>
<th>No.</th>
<th>W'ght, lbs.</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Three-inch rifle.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five divisions in half-chest.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td>6</td>
<td>60.</td>
<td>In 5th division, left half.</td>
</tr>
<tr>
<td>Time-shell</td>
<td>6</td>
<td>63.</td>
<td>In 4th &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Percussion-shell</td>
<td>36</td>
<td>378.</td>
<td>In 1st 2d, and 3d, left half; and 1st, 2d, and 3d, right half.</td>
</tr>
<tr>
<td>Case</td>
<td>6</td>
<td>69.7</td>
<td>In 4th division, right half.</td>
</tr>
<tr>
<td>Solid shot</td>
<td>6</td>
<td>60.</td>
<td>In 5th &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Cartridges</td>
<td>60</td>
<td>60.</td>
<td>Packed on the projectiles, or in the trays.</td>
</tr>
<tr>
<td>Friction-primers</td>
<td>120</td>
<td>1.3</td>
<td>In tray.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>692.0</td>
<td></td>
</tr>
<tr>
<td><strong>Three-inch rifle.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six divisions in half-chest.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td>6</td>
<td>60.</td>
<td>In 6th division, left half.</td>
</tr>
<tr>
<td>Time-shell</td>
<td>6</td>
<td>63.</td>
<td>In 5th &quot; &quot; &quot;</td>
</tr>
<tr>
<td>Percussion-shell</td>
<td>42</td>
<td>441.</td>
<td>In 1st, 2d, 3d, and 4th divisions, left half, and 1st, 2d, and 3d, right half.</td>
</tr>
<tr>
<td>Case</td>
<td>12</td>
<td>139.5</td>
<td>In 4th and 5th divisions, right half.</td>
</tr>
<tr>
<td>Solid shot</td>
<td>6</td>
<td>60.</td>
<td>In 6th division, right half.</td>
</tr>
<tr>
<td>Cartridge</td>
<td>60</td>
<td>60.</td>
<td>Packed on the projectiles, or in the trays.</td>
</tr>
<tr>
<td>Friction-primers</td>
<td>145</td>
<td>1.6</td>
<td>In tray.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>825.1</td>
<td></td>
</tr>
<tr>
<td><strong>Half-inch mitrailleur.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piece</td>
<td>1,580</td>
<td>158.</td>
<td>Each tray in the piece limber-chest holds five feed-cases, one in each of its divisions, except the lower tray right half, which has but four. Each feed-case carries twenty rounds.</td>
</tr>
<tr>
<td>Solid shot</td>
<td>79</td>
<td>39.5</td>
<td>Each caisson-chest contains eight trays; each tray carries twenty packages of cartridges, arranged in two rows.</td>
</tr>
<tr>
<td>limber-chest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed-cases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caisson-chest, Shot</td>
<td>2,880</td>
<td>288.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total for each gun</td>
<td>10,200</td>
<td>1059.5</td>
</tr>
</tbody>
</table>
Ammunition carried in each chest.—(Continued.)

<table>
<thead>
<tr>
<th>Kind</th>
<th>No.</th>
<th>W’ght, lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One-inch mitrailleur.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piece</td>
<td>360</td>
<td>270.</td>
</tr>
<tr>
<td>limber-chest</td>
<td>72</td>
<td>45</td>
</tr>
<tr>
<td>{ Solid shot</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed-cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Caisson-chest.</strong></td>
<td></td>
<td>315.</td>
</tr>
<tr>
<td>{ Solid shot</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>Canister</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>Total for each gun</td>
<td>2,592</td>
<td>1665.</td>
</tr>
</tbody>
</table>

**Twelve-pounder gun.**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid shot, fixed</td>
<td>12</td>
<td>184.8</td>
</tr>
<tr>
<td>Canister, fixed</td>
<td>4</td>
<td>67.6</td>
</tr>
<tr>
<td>Shell, fixed</td>
<td>4</td>
<td>48.7</td>
</tr>
<tr>
<td>Case, fixed</td>
<td>12</td>
<td>176.4</td>
</tr>
<tr>
<td>Spare cartridges, 2½ lbs.</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Friction-primers</td>
<td>43</td>
<td>.4</td>
</tr>
<tr>
<td>Slow match, yards</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Port-fires</td>
<td>4</td>
<td>.7</td>
</tr>
</tbody>
</table>

Each piece limber-chest contains twelve trays, each carrying three feed-cases; each feed-case carries twelve rounds.

Each caisson-chest contains sixteen trays; each tray carries nine packages of cartridges.

1089. In the three-inch rifle with five divisions to the half-chest, percussion-shell and case replace the canister and solid shot, respectively, in the middle and rear caisson-chests; when there are six divisions to the half-chest, time-shell and percussion-shell replace the canister and solid-shot, respectively, in the middle caisson-chest.

1090. The weights of the heaviest projectiles in table (Par. 1075) are used in estimating the weights of the three-inch ammunition in the above table.

1091. The ammunition for the half-inch mitrailleur is put up in packages of twenty rounds; each package weighs two pounds. The ammunition for the one-inch mitrailleur,
is put up in packages of five rounds; each package weighs three pounds, four ounces. As the slats in the trays of the one-inch mitrailleurs-chests are movable, the trays can be packed as will best suit the service required.

1092. The proportions specified in all of the above tables may be modified by the Chief of Artillery, if the nature of the service render it necessary.

To pack ammunition in the chests.

1093. The projectiles, or rounds, are arranged in proper position, and kept in place by filling the interstices with packing-tow. The tow is inserted in small portions and tightly packed down with a straight smooth stick prepared for the purpose.

1094. The partitions in the three-inch rifle-chests have been recently made somewhat thicker, with broad grooves or depressions opposite the position of each projectile; this arrangement permits the tow packing to be dispensed with, as it prevents lateral motion of the projectiles, their vertical motion being controlled by the cartridges or trays above.

1095. With wooden trays, the cartridges are placed on the projectiles; those in the half-chest under the tray are packed on their sides; those in the other half-chest are packed vertically.

1096. With metallic trays, the cartridges are packed vertically in three trays, one of the small trays being reserved for friction-primers, fuses, and implements.

1097. The piece limber-chest is always kept full at the expense of the caisson-chests, so that, in case of a sudden movement, there will always be a fair supply of ammunition with the piece; the caisson limber-chest is kept full at the expense of the middle or rear chests.
Care of ammunition in chests.

1098. Ammunition requires frequent airing; for this purpose, the paulins are taken off the carriages, and the chest-lids raised for several hours at a time in dry, sunny weather.

When time-fuses are necessarily removed from their packing-block, they are kept carefully wrapped in paper or tow, as the absorption of moisture prevents their burning accurately.

Friction-primers will be secured with the utmost care; if they be carelessly scattered about the trays, the gravest accidents may occur; a single primer falling through the air-hole among the projectiles may cause an explosion of the ammunition.

Friction-primers must be kept dry, as the chlorate is very hygrometric; before being used, they should, if possible, be exposed to the sun, or dried in small separate parcels near a fire.

The greatest pains must be taken to keep all articles out of the chests that do not properly belong in them. No loose iron is allowed in the chests, the implements being made fast in appropriate places on the lids or in the trays.
1099. Pieces are equipped with implements and articles for their service and protection, as well as with buckets for watering horses. Caissons are equipped with intrenching-tools, spare parts, watering-buckets, etc. The forge and battery-wagon are equipped with tools and stores.

1100. Implements and equipments for three-inch rifle and twelve-pounder guns.

<table>
<thead>
<tr>
<th>Kind</th>
<th>No.</th>
<th>Weight</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponges-and-rammers</td>
<td>2</td>
<td>8.00</td>
<td>On gun-carriage</td>
</tr>
<tr>
<td>Sponge covers</td>
<td>2</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td>Worm and staff</td>
<td>3</td>
<td>8.60</td>
<td>On limber</td>
</tr>
<tr>
<td>Handspikes</td>
<td>2</td>
<td>14.50</td>
<td>In hausse-pouch</td>
</tr>
<tr>
<td>Sponge-bucket</td>
<td>1</td>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>Prolonge</td>
<td>1</td>
<td>18.00</td>
<td></td>
</tr>
<tr>
<td>Tar-bucket</td>
<td>1</td>
<td>7.00</td>
<td></td>
</tr>
<tr>
<td>Watering-buckets</td>
<td>3</td>
<td>24.00</td>
<td>In trays</td>
</tr>
<tr>
<td>Pendulum-hausse</td>
<td>1</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Hausse-pouch</td>
<td>1</td>
<td>.05</td>
<td>In primer-pouches</td>
</tr>
<tr>
<td>Cartridge-pouches</td>
<td>2</td>
<td>8.72</td>
<td></td>
</tr>
<tr>
<td>Primer pouches</td>
<td>2</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>Thumstalls</td>
<td>2</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td>Lanyards</td>
<td>2</td>
<td>.10</td>
<td>In trays, or fastened to lid of chest.</td>
</tr>
<tr>
<td>Priming-wire</td>
<td>1</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Gunner’s gimlet</td>
<td>1</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Vent-punch</td>
<td>1</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Gunner’s pincers</td>
<td>1</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Fuse-wrench</td>
<td>1</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Fuse-block</td>
<td>1</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Fuse-cutter</td>
<td>1</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Fuse-gouge</td>
<td>1</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>Tow-hook</td>
<td>1</td>
<td>.60</td>
<td></td>
</tr>
</tbody>
</table>
Implements and equipments for three-inch rifle and twelve-pounder guns.—(Continued.)

<table>
<thead>
<tr>
<th>Kind</th>
<th>No.</th>
<th>Weight</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tompion and strap</td>
<td>1</td>
<td>.50</td>
<td>In the mouth.</td>
</tr>
<tr>
<td>Vent-cover</td>
<td>1</td>
<td>.37</td>
<td>Covering the vent.</td>
</tr>
<tr>
<td>Tarpaulin, large</td>
<td>1</td>
<td>54.00</td>
<td>Covering the carriage.</td>
</tr>
</tbody>
</table>

1101. The sponges-and-rammers for the twelve-pounder gun weigh 11.60 pounds.

1102. The sponge-bucket is made of sheet-iron; it is used in washing out the bore of the piece.

1103. The prolonge is a stout hemp rope with a toggle at one end, and a ring at the other; it has two intermediate rings into which the toggle is fastened when it is desired to shorten it. The prolonge should be twenty-four feet long, so as to serve as a picket-ropes in case of necessity.

1104. The tar-bucket is made of sheet-iron; it is used to carry grease for the wheels.

1105. Watering-buckets are made of gutta-percha or of sole-leather riveted at the seams.

1106. The priming-wire is used to prick a hole in the cartridge for the passage of the flame from the primer.

1107. The gunner’s gimlet, vent-punch, and gunner’s pincers, are used for removing obstructions in the vent; the gimlet may be carried in the primer-pouch.

1108. The fuse wrench is constructed either in the form of a cross, or T-shaped, so that it can unscrew the percussion-fuses, etc., in all the different kinds of ammunition with which the battery may be supplied.

1109. The tow hook is used in unpacking ammunition, and in taking projectiles from the chest.
EQUIPMENT OF CARRIAGES.

1110. Implements and equipments for three-inch rifle and twelve-pounder caissons.

<table>
<thead>
<tr>
<th>Kind</th>
<th>No.</th>
<th>Weight</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Felling-axe</td>
<td>1</td>
<td>6.00</td>
<td>In places provided for them on caisson-body</td>
</tr>
<tr>
<td>Shovel, long handle</td>
<td>1</td>
<td>4.75</td>
<td></td>
</tr>
<tr>
<td>Pickaxe</td>
<td>1</td>
<td>6.50</td>
<td></td>
</tr>
<tr>
<td>Spare handspike</td>
<td>1</td>
<td>7.25</td>
<td></td>
</tr>
<tr>
<td>Spare pole</td>
<td>1</td>
<td>25.30</td>
<td></td>
</tr>
<tr>
<td>Spare wheel</td>
<td>1</td>
<td>180.00</td>
<td></td>
</tr>
<tr>
<td>Gunner's gimlet</td>
<td>1</td>
<td>.08</td>
<td>In tray of limber-chest.</td>
</tr>
<tr>
<td>Vent-punch</td>
<td>1</td>
<td>.08</td>
<td></td>
</tr>
<tr>
<td>Gunner's pincers</td>
<td>1</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Fuse-wrench</td>
<td>1</td>
<td>.50</td>
<td>In limber-chest.</td>
</tr>
<tr>
<td>Fuse-block</td>
<td>1</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Fuse-cutter</td>
<td>1</td>
<td>.09</td>
<td>One in tray of limber-chest,</td>
</tr>
<tr>
<td>Fuse-gouge</td>
<td>1</td>
<td>.50</td>
<td>one in tray of rear-chest.</td>
</tr>
<tr>
<td>Tow-hooks</td>
<td>2</td>
<td>1.20</td>
<td>On the limber.</td>
</tr>
<tr>
<td>Tar-bucket</td>
<td>1</td>
<td>7.00</td>
<td></td>
</tr>
<tr>
<td>Watering-buckets, leather</td>
<td>3</td>
<td>24.00</td>
<td></td>
</tr>
<tr>
<td>Tarpaulin, large</td>
<td>1</td>
<td>54.00</td>
<td>Covering the carriage.</td>
</tr>
</tbody>
</table>
### Implements and equipments for mitrailleurs.

<table>
<thead>
<tr>
<th>Articles</th>
<th>One inch</th>
<th></th>
<th>Half-inch</th>
<th></th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Weight</td>
<td>No.</td>
<td>Weight</td>
<td>On gun-carriage</td>
</tr>
<tr>
<td>Handspikes</td>
<td>2</td>
<td>14.</td>
<td>2</td>
<td>4.69</td>
<td>As usual for guns</td>
</tr>
<tr>
<td>Prolonge</td>
<td>1</td>
<td>12.</td>
<td>1</td>
<td>4.25</td>
<td>In a tube under the gun, and secured by a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>key-pin attached to a chain</td>
</tr>
<tr>
<td>Tar-buckets, iron</td>
<td>1</td>
<td>9.5</td>
<td>1</td>
<td>9.5</td>
<td>In a loop, secured to right cheek of carriage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Over the gun</td>
</tr>
<tr>
<td>Watering-buckets, gutta-percha</td>
<td>3</td>
<td>15.</td>
<td>2</td>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>Cartridge-pouch</td>
<td>1</td>
<td>1.86</td>
<td>1</td>
<td>1.86</td>
<td></td>
</tr>
<tr>
<td>Front-sight cover, leather</td>
<td>1</td>
<td>0.09</td>
<td>1</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>Wiping-rod, brass</td>
<td>1</td>
<td>1.62</td>
<td>1</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Ejecting-rod</td>
<td>1</td>
<td>2.37</td>
<td>1</td>
<td>1.30</td>
<td></td>
</tr>
<tr>
<td>Oil-receiver</td>
<td>1</td>
<td>0.94</td>
<td>1</td>
<td>0.94</td>
<td></td>
</tr>
<tr>
<td>Gun-cover, canvas</td>
<td>1</td>
<td>5.</td>
<td>1</td>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>Lock, extra</td>
<td>1</td>
<td>7.06</td>
<td>1</td>
<td>2.06</td>
<td></td>
</tr>
<tr>
<td>Springs</td>
<td>3</td>
<td>1.06</td>
<td>3</td>
<td>.25</td>
<td>In recess beneath the lower tray, right-hand side in a special recess.</td>
</tr>
<tr>
<td>Extractor-hooks</td>
<td>3</td>
<td>.25</td>
<td>3</td>
<td>.09</td>
<td></td>
</tr>
<tr>
<td>Extractor-pins</td>
<td>3</td>
<td>.06</td>
<td>3</td>
<td>.03</td>
<td>In a box on rack.</td>
</tr>
<tr>
<td>Firing-plugs</td>
<td>3</td>
<td>.25</td>
<td>3</td>
<td>.09</td>
<td>In a tin-covered box.</td>
</tr>
<tr>
<td>Butt-gear pin</td>
<td>3</td>
<td>.09</td>
<td>3</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>Steel cut-offs</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td>In special rack, right-hand side of principal partition against back of right-hand tray.</td>
</tr>
<tr>
<td>Screw-driver and fork-wrench</td>
<td>1</td>
<td>.5</td>
<td>1</td>
<td>.38</td>
<td>Each in a special rack in the lower tray.</td>
</tr>
<tr>
<td>Eye-pin wrench</td>
<td>1</td>
<td>.15</td>
<td>1</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>Butt-gear extractors, pairs</td>
<td>1</td>
<td>1.38</td>
<td>1</td>
<td>1.19</td>
<td></td>
</tr>
<tr>
<td>Claw-hatchet</td>
<td>1</td>
<td>1.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Articles</td>
<td>One inch</td>
<td>Half-inch</td>
<td>Place</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>-----------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>Weight</td>
<td>No.</td>
<td>Weight</td>
<td>In piece limber-chest. On caisson body.</td>
</tr>
<tr>
<td>Claw-hatchet</td>
<td></td>
<td></td>
<td>1</td>
<td>1.38</td>
<td>1-inch mitrailleur. ½-inch mitrailleur.</td>
</tr>
<tr>
<td>Screw-wrench, 12 inch</td>
<td>1</td>
<td>2.31</td>
<td>1</td>
<td>2.31</td>
<td>In a tool-box attached to the under and left-hand side of the caisson-body, behind the axle; the claw-hatchet and screw-wrench on the floor of the box, the other articles in a special rack.</td>
</tr>
<tr>
<td>Chisel, 1½ inch.</td>
<td>1</td>
<td>.59</td>
<td>1</td>
<td>.59</td>
<td>In special rack, left-hand side of principal partition, against back of chest.</td>
</tr>
<tr>
<td>Screw-driver, hand</td>
<td>1</td>
<td>.31</td>
<td>1</td>
<td>.31</td>
<td>In a box, beneath rack on bottom of chest, against the back.</td>
</tr>
<tr>
<td>Gimlets</td>
<td>2</td>
<td>.06</td>
<td>2</td>
<td>.06</td>
<td>In a bag, in the tool-box.</td>
</tr>
<tr>
<td>Saddlers' punches</td>
<td>2</td>
<td>.25</td>
<td>1</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Cut nails, assorted</td>
<td>24</td>
<td></td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron tacks</td>
<td>50</td>
<td>.85</td>
<td>50</td>
<td>.85</td>
<td></td>
</tr>
<tr>
<td>Screws</td>
<td>24</td>
<td></td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leather thongs</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Twine, pieces</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1112. Implements and equipments for mitrailleur caissons.

<table>
<thead>
<tr>
<th>Articles</th>
<th>One inch.</th>
<th>Half-inch.</th>
<th>Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>Weight</td>
<td>No.</td>
</tr>
<tr>
<td>Tar-bucket, iron</td>
<td>1</td>
<td>9.5</td>
<td>1</td>
</tr>
<tr>
<td>Watering-buckets, gutta-percha</td>
<td>2</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Shovel, caisson</td>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Felling-axe, handled</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Pickaxe</td>
<td>1</td>
<td>5.5</td>
<td>1</td>
</tr>
<tr>
<td>Spade</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Felling-axe—head resting on axle-body, near right wheel, secured by hook hinged to side-rail, end of handle in leather loop.

Pickaxe—head and half separated; head near left side of caisson-stock, between axle-body and arm-chest; head upon body, near left wheel, in leather loop.

Spade—held by two hooks under the axle.
Equipment of traveling forge "A."

1113. The limber-chest is marked: Forge "A"; it contains five boxes for tools and stores, one shoeing-box, and one oil-can.

The boxes are made of white pine, .75-inch thick, with loose covers of the same thickness; the covers have fingerholes bored in each end.

<table>
<thead>
<tr>
<th>Designation of boxes.</th>
<th>Length</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Nos. 1 and 3</td>
<td>Inches</td>
<td>Inches</td>
<td>Inches</td>
<td>Lbs.</td>
<td>A partition at 4.5 in. from one end.</td>
</tr>
<tr>
<td>A No. 2. ....</td>
<td>17.8</td>
<td>18.25</td>
<td>7.5</td>
<td>8.25</td>
<td></td>
</tr>
<tr>
<td>A No. 4........</td>
<td>23.5</td>
<td>8</td>
<td>6.5</td>
<td>8</td>
<td>A partition for oil-can, at 5.25 in. from one end.</td>
</tr>
<tr>
<td>A No. 5........</td>
<td>39.8</td>
<td>9.8</td>
<td>6.5</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>Shoeing-box.</td>
<td>16.5</td>
<td>8</td>
<td>6.5</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>

Boxes Nos. 1, 2, and 3 are placed in the bottom of the chest; No. 1 to the left; No. 2 in the middle.

No. 4 is placed on the top of Nos. 1 and 2, against the left end and back of the chest; the division for the oil-can is on the left.

No. 5 is placed on top of Nos. 1, 2, and 3, against the front of the chest.

The shoeing-box is placed on No. 3, against the right end and back of the chest.

The oil-can is made of tin, to hold one quart; it is five inches square and four inches high, with a neck for a cork, one inch diameter and .5 inch high, near one corner. Weight .9 pound. It is marked: "A, Sperm-oil."

All tools and stores are securely packed with tow.
## Equipment of Carriages

<table>
<thead>
<tr>
<th>Contents of limber-chest. (Smith’s tools and stores.)</th>
<th>No.</th>
<th>Weight.</th>
<th>Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horseshoes, Nos. 2 and 3... lbs.</td>
<td>100</td>
<td>100.00</td>
<td>Box A 1.</td>
</tr>
<tr>
<td>Horseshoes, Nos. 2 and 3... lbs.</td>
<td>100</td>
<td>100.00</td>
<td>For A 8.</td>
</tr>
<tr>
<td>Horseshoe-nails, Nos. 2 and 3... lbs.</td>
<td>50</td>
<td>50.00</td>
<td>Box A 2, large division.</td>
</tr>
<tr>
<td>Washers and nuts, No. 2</td>
<td>80</td>
<td>5.25</td>
<td></td>
</tr>
<tr>
<td>Washers and nuts, No. 3</td>
<td>10</td>
<td>8.20</td>
<td></td>
</tr>
<tr>
<td>Washers and nuts, No. 4</td>
<td>4</td>
<td>2.15</td>
<td></td>
</tr>
<tr>
<td>Nails, No. 1, C... lbs.</td>
<td>1</td>
<td>1.00</td>
<td>In box A 2, 91.11 lbs.</td>
</tr>
<tr>
<td>Nails, No. 2, C... lbs.</td>
<td>1</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Tire-bolts...</td>
<td>20</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Keys for ammunition-chests...</td>
<td>5</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Linch-washers...</td>
<td>8</td>
<td>7.30</td>
<td></td>
</tr>
<tr>
<td>Linch-pins...</td>
<td>12</td>
<td>8.37</td>
<td></td>
</tr>
<tr>
<td>Chains, Nos. 1 and 2... feet.</td>
<td>2</td>
<td>1.54</td>
<td></td>
</tr>
<tr>
<td>Cold-shut S links, No. 3...</td>
<td>50</td>
<td>2.50</td>
<td>In box A 4, 28.52 lbs.</td>
</tr>
<tr>
<td>Cold-shut S links, No. 5...</td>
<td>12</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Hand cold-chisels...</td>
<td>2</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Hardie...</td>
<td>1</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Files, assorted, with handles...</td>
<td>12</td>
<td>10.00</td>
<td>In box A 5, 80.05 lbs.</td>
</tr>
<tr>
<td>Buttress...</td>
<td>1</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Hand-punches, round and square...</td>
<td>2</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Screw-wrench...</td>
<td>1</td>
<td>2.42</td>
<td></td>
</tr>
<tr>
<td>Hand screw-driver...</td>
<td>1</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Hand-vice...</td>
<td>1</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Smith’s calipers, pair...</td>
<td>1</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Taps... (Nos. 1, 2, 3, and 4)...</td>
<td>4</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Dies, pairs...</td>
<td>4</td>
<td>1.83</td>
<td></td>
</tr>
<tr>
<td>Wood screws, 1-in., No. 14... gross...</td>
<td>1</td>
<td>2.10</td>
<td></td>
</tr>
<tr>
<td>Quart-can of sperm-oil...</td>
<td>1</td>
<td>2.70</td>
<td></td>
</tr>
<tr>
<td>Fire-shovel...</td>
<td>1</td>
<td>3.05</td>
<td></td>
</tr>
<tr>
<td>Poker...</td>
<td>1</td>
<td>1.90</td>
<td></td>
</tr>
<tr>
<td>Split broom...</td>
<td>1</td>
<td>1.25</td>
<td></td>
</tr>
<tr>
<td>Hand-hammer...</td>
<td>1</td>
<td>8.50</td>
<td></td>
</tr>
<tr>
<td>Riveting-hammer...</td>
<td>1</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>Nailing-hammer...</td>
<td>1</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Sledge-hammer...</td>
<td>1</td>
<td>10.50</td>
<td></td>
</tr>
<tr>
<td>Chisels for hot iron...</td>
<td>2</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Chisels for cold iron...</td>
<td>2</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Smith’s tongs...</td>
<td>8</td>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>Fore-punch...</td>
<td>1</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Creaser...</td>
<td>1</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Fuller...</td>
<td>1</td>
<td>2.40</td>
<td></td>
</tr>
</tbody>
</table>

Total: 363.08
### Contents of limber-chest. (Smith’s tools and stores.)

<table>
<thead>
<tr>
<th>Item</th>
<th>No.</th>
<th>Weight (Lbs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brought forward</td>
<td>1</td>
<td>368.08</td>
</tr>
<tr>
<td>Nail-claw</td>
<td>1</td>
<td>5.00</td>
</tr>
<tr>
<td>Round-punch</td>
<td>1</td>
<td>2.10</td>
</tr>
<tr>
<td>Tap-wrench</td>
<td>1</td>
<td>3.75</td>
</tr>
<tr>
<td>Die-stock</td>
<td>1</td>
<td>6.25</td>
</tr>
<tr>
<td>Nave-bands, developed</td>
<td>4</td>
<td>11.75</td>
</tr>
<tr>
<td>Tire-bands, developed</td>
<td>2</td>
<td>2.75</td>
</tr>
<tr>
<td>Shoeing-hammer</td>
<td>1</td>
<td>0.62</td>
</tr>
<tr>
<td>Pincers, pair</td>
<td>1</td>
<td>2.00</td>
</tr>
<tr>
<td>Rasps (12 inches)</td>
<td>2</td>
<td>2.15</td>
</tr>
<tr>
<td>Shoeing-knife</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>Toe-knife</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>Pritchel</td>
<td>1</td>
<td>0.80</td>
</tr>
<tr>
<td>Nail-punch</td>
<td>1</td>
<td>1.00</td>
</tr>
<tr>
<td>Clinching-iron</td>
<td>1</td>
<td>1.50</td>
</tr>
<tr>
<td>Oil-stone</td>
<td>2</td>
<td>3.00</td>
</tr>
<tr>
<td>Leather aprons</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron square</td>
<td>1</td>
<td>2.00</td>
</tr>
<tr>
<td>Padlock</td>
<td>1</td>
<td>0.50</td>
</tr>
<tr>
<td>Tar-bucket</td>
<td>1</td>
<td>7.00</td>
</tr>
<tr>
<td>Boxes</td>
<td>6</td>
<td>58.45</td>
</tr>
<tr>
<td>Tow for packing</td>
<td></td>
<td>5.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>480.38</strong></td>
</tr>
</tbody>
</table>

- In box A 5, 80.05 lbs.
- In shoeing-box, 12.75 lbs.
- Fastened on inside of the chest-cover with two copper clamps.
- On the chest.
- On its hook.

One pound of horseshoe-nails, No. 3, contains 140 nails; one pound of horseshoe-nails, No. 2, contains 112 nails.

Box A 6, of the same dimensions as A 1, is carried in the iron-room. To put this box in, or take it out, loosen the thumb-nuts and raise the rear of the bellows an inch.
## Equipment of Carriages

<table>
<thead>
<tr>
<th>Contents of forge-body. (Tools and stores.)</th>
<th>No.</th>
<th>Weight.</th>
<th>Place.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water-bucket, wood.</td>
<td>1</td>
<td>10.00</td>
<td>On its hook.</td>
</tr>
<tr>
<td>Anvil</td>
<td>1</td>
<td>100.00</td>
<td>On the fireplace.</td>
</tr>
<tr>
<td>Vice</td>
<td>1</td>
<td>29.00</td>
<td>Fixed on stock of carriage.</td>
</tr>
<tr>
<td>Watering-bucket, leather</td>
<td>1</td>
<td>8.00</td>
<td>On the vice.</td>
</tr>
<tr>
<td>Bituminous coal</td>
<td></td>
<td>250.00</td>
<td>In coal-box.</td>
</tr>
<tr>
<td>Coal-shovel</td>
<td>1</td>
<td>4.75</td>
<td>On coal-box.</td>
</tr>
<tr>
<td>Padlock</td>
<td>1</td>
<td>0.50</td>
<td>Box A 6, in iron-room.</td>
</tr>
<tr>
<td>Horseshoes, Nos. 2 and 8</td>
<td>90</td>
<td>100.00</td>
<td>In the iron-room. The bars not more than 3 feet long; the square iron in 2 bundles.</td>
</tr>
<tr>
<td>Square iron, $\frac{1}{4}$ in. and $\frac{1}{2}$ in.</td>
<td></td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>Flat iron, $1\frac{1}{2}$ in. x $\frac{1}{4}$ in., 1 in. x $\frac{1}{4}$ in.</td>
<td></td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>Round iron, $\frac{1}{2}$ in.</td>
<td></td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Cast-steel, $\frac{1}{2}$ in. square.</td>
<td></td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>English blister-steel</td>
<td>1</td>
<td>8.25</td>
<td></td>
</tr>
<tr>
<td>Box</td>
<td></td>
<td>2.00</td>
<td></td>
</tr>
</tbody>
</table>

Total, exclusive of vice... 698.50

---

**Equipment of battery-wagon "C."

1114. The limber-chest is marked, "Battery-Wagon C"; the tools and stores it contains are in four boxes and in one oil-can.

The boxes are made of white pine, .75 inch thick, with leather handles inside, and loose covers, like those of the limber-chest of Forge A; the covers of Nos. 1 and 2 are .75 inch thick; those of Nos. 3 and 4 are .5 inch thick.

### Designation of boxes.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C No. 1.</td>
<td>17.8</td>
<td>18.25</td>
<td>7.5</td>
<td>8.25</td>
</tr>
<tr>
<td>C No. 2.</td>
<td>26.5</td>
<td>17.8</td>
<td>7.5</td>
<td>17.5</td>
</tr>
<tr>
<td>C No. 8.</td>
<td>39.8</td>
<td>9.8</td>
<td>6.25</td>
<td>12.5</td>
</tr>
<tr>
<td>C No. 4.</td>
<td>39.8</td>
<td>8</td>
<td>6.25</td>
<td>11</td>
</tr>
</tbody>
</table>
## Contents of limber-chest (tools and stores).

<table>
<thead>
<tr>
<th>Carriage-maker’s tools.</th>
<th>No.</th>
<th>Weight (Lbs.)</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handsaw</td>
<td>2</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Tenon-saw (14 in.)</td>
<td>1</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Jackplane</td>
<td>1</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td>Smoothing-plane</td>
<td>1</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>Brace, with 24 bits</td>
<td>1</td>
<td>4.35</td>
<td></td>
</tr>
<tr>
<td>Spokeshave</td>
<td>1</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Gauge</td>
<td>1</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Plane-irons</td>
<td>2</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>Saw-set</td>
<td>1</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Rule (2 feet)</td>
<td>1</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Gimlets</td>
<td>12</td>
<td>0.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compasses, pair</td>
<td>1</td>
<td>0.18</td>
<td></td>
</tr>
<tr>
<td>Chalk-line</td>
<td>1</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>Brad-awls</td>
<td>2</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>Scribe</td>
<td>1</td>
<td>0.15</td>
<td></td>
</tr>
<tr>
<td>Saw-files (4½ in.)</td>
<td>12</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>Wood-files (10 in.)</td>
<td>2</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>Wood-rasp (10 in.)</td>
<td>1</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Trying-square (8 in.)</td>
<td>1</td>
<td>0.60</td>
<td></td>
</tr>
<tr>
<td>Hand screw-driver</td>
<td>1</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Oil-stone</td>
<td>1</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Broad axe</td>
<td>1</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td>Hand-axe</td>
<td>1</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Claw-hatchet</td>
<td>1</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Claw-hammer</td>
<td>1</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>Pincers (small), pair</td>
<td>1</td>
<td>1.06</td>
<td></td>
</tr>
<tr>
<td>Table-vice</td>
<td>1</td>
<td>3.80</td>
<td></td>
</tr>
<tr>
<td>Framing-chisels (1 in. and 2 in.)</td>
<td>2</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Firmer-chisels (3/4 in. and 1 1/4 in.)</td>
<td>2</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Framing-gouges (1 in. and 1/2 in.)</td>
<td>2</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>Augers and handles (1/4 in., 1/2 in., and 3/4 in.)</td>
<td>3</td>
<td>2.35</td>
<td></td>
</tr>
<tr>
<td>Screw-wrench</td>
<td>1</td>
<td>2.42</td>
<td></td>
</tr>
<tr>
<td>Felling-axe. {</td>
<td>1</td>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td>} with handles</td>
<td>1</td>
<td>3.30</td>
<td></td>
</tr>
<tr>
<td>Adze</td>
<td>1</td>
<td>4.50</td>
<td></td>
</tr>
<tr>
<td>Frame-saw</td>
<td>1</td>
<td>2.70</td>
<td></td>
</tr>
</tbody>
</table>

### Saddler’s tools and stores.

<table>
<thead>
<tr>
<th>Item</th>
<th>No.</th>
<th>Weight (Lbs.)</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mallet</td>
<td>1</td>
<td>1.75</td>
<td></td>
</tr>
<tr>
<td>Clam</td>
<td>1</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Carried forward</td>
<td></td>
<td>78.18</td>
<td></td>
</tr>
</tbody>
</table>

\{ Fastened to the inside of chest-cover. \}

\{ In box C 1, 17.20 lbs. \}

\{ In box C 2, 32.23 lbs. \}

\{ In box C 3, 23.25 lbs. \}
### Contents of limber-chest (tools and stores).

<table>
<thead>
<tr>
<th>Item</th>
<th>No.</th>
<th>Weight (Lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saddler’s tools and stores.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brought forward</td>
<td></td>
<td>78.18</td>
</tr>
<tr>
<td>Hammer</td>
<td>1</td>
<td>0.65</td>
</tr>
<tr>
<td>Shoe-knife</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Half-round knife</td>
<td>1</td>
<td>0.28</td>
</tr>
<tr>
<td>Shears, pair</td>
<td>1</td>
<td>0.47</td>
</tr>
<tr>
<td>Sandstone</td>
<td>1</td>
<td>1.54</td>
</tr>
<tr>
<td>Rule (2 feet)</td>
<td>1</td>
<td>0.14</td>
</tr>
<tr>
<td>Needles</td>
<td>100</td>
<td>0.08</td>
</tr>
<tr>
<td>Awls and handles</td>
<td>12</td>
<td>0.75</td>
</tr>
<tr>
<td>Punches</td>
<td>2</td>
<td>0.22</td>
</tr>
<tr>
<td>Pincers, pair</td>
<td>1</td>
<td>0.75</td>
</tr>
<tr>
<td>Plyers, pair</td>
<td>1</td>
<td>0.22</td>
</tr>
<tr>
<td>Claw-tool</td>
<td>1</td>
<td>0.12</td>
</tr>
<tr>
<td>Creaser</td>
<td>1</td>
<td>0.15</td>
</tr>
<tr>
<td>Thimbles</td>
<td>4</td>
<td>0.06</td>
</tr>
<tr>
<td>Strap-awl</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>Beeswax, lbs.</td>
<td>2</td>
<td>2.00</td>
</tr>
<tr>
<td>Black wax, lbs.</td>
<td>3</td>
<td>3.00</td>
</tr>
<tr>
<td>Bristles, oz.</td>
<td>8</td>
<td>0.50</td>
</tr>
<tr>
<td>Shoe-thread, lbs.</td>
<td>5</td>
<td>5.00</td>
</tr>
<tr>
<td>Patent thread, lbs.</td>
<td>2</td>
<td>2.00</td>
</tr>
<tr>
<td>Buckles (assorted, .75 in. to 1.5 in.), doz.</td>
<td>3</td>
<td>1.00</td>
</tr>
<tr>
<td>Tacks, M</td>
<td>3</td>
<td>0.75</td>
</tr>
<tr>
<td>Gunner’s calipers</td>
<td>1</td>
<td>0.50</td>
</tr>
<tr>
<td>Shoe-knives</td>
<td>2</td>
<td>0.18</td>
</tr>
<tr>
<td>Scissors, pairs</td>
<td>2</td>
<td>0.20</td>
</tr>
<tr>
<td>Padlock</td>
<td>1</td>
<td>0.50</td>
</tr>
<tr>
<td>Tar-bucket</td>
<td>1</td>
<td>7.00</td>
</tr>
<tr>
<td>Boxes</td>
<td>4</td>
<td>49.25</td>
</tr>
<tr>
<td>Tow for packing</td>
<td></td>
<td>7.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>162.59</strong></td>
</tr>
</tbody>
</table>

In box C 4, 20.36 lbs.

On its hook.

No. 3 has a partition, at 5.25 inches from one end for the oil-can.

No. 4 has two partitions perpendicular to the sides, making three divisions 15.8 inches, 10 inches, and 11 inches long, respectively.

Nos. 1 and 2 are at the bottom of the chest; No. 1 against the left end.
Nos. 3 and 4 are placed on top of Nos. 1 and 2; No. 3 against the rear of the chest.

The oil-can is like that for the limber-chest of Forge A, and is marked, "C, Sperm-oil."

All the tools and stores are securely packed with tow.

**Interior arrangement of the battery-wagon-body C.**

1115. A till, 9 inches wide and 9.5 inches deep, is placed at the back or right side of the wagon-body.

An axe-rack extends along the whole length of the body, on the left side, 11 inches from the bottom; it is two inches deep and 1.5 inch wide, and has notches to hold three axes, a hatchet, and three billhooks.

*Four boxes, for stores, marked: "C, Nos. 5, 6, 7, and 8."
One box, marked: "C, Candles."

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>C Nos. 5 and 6.</td>
<td>23.0</td>
<td>18.50</td>
<td>11.25</td>
<td>17.50</td>
<td>No covers.</td>
</tr>
<tr>
<td>C No. 7........</td>
<td>23.5</td>
<td>20.25</td>
<td>14.00</td>
<td>28.00</td>
<td>Loose cover</td>
</tr>
<tr>
<td>C No. 8........</td>
<td>18.0</td>
<td>13.00</td>
<td>5.00</td>
<td>6.00</td>
<td>Div. into four parts.</td>
</tr>
<tr>
<td>Candle-box...</td>
<td>11.0</td>
<td>6.50</td>
<td>5.50</td>
<td>2.85</td>
<td></td>
</tr>
</tbody>
</table>

*Seven tin cans—two marked, "C, neat's-foot oil"; one marked, "C, linseed-oil"; one, "C, turpentine"; two, "C, olive-paint"; one, "C, black paint."

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>For neat's-foot oil.</td>
<td>2 gals.</td>
<td>8.00</td>
<td>11.50</td>
<td>2.20</td>
<td>Rounded tops and necks for corks.</td>
</tr>
<tr>
<td>For linseed-oil and turpentine</td>
<td>1 gal.</td>
<td>6.00</td>
<td>10.00</td>
<td>1.87</td>
<td>Flat tops; opening covered with a piece of tin soldered or</td>
</tr>
<tr>
<td>For olive-paint.......</td>
<td>25 lbs.</td>
<td>9.75</td>
<td>10.25</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>For black paint.......</td>
<td>5 lbs.</td>
<td>7.00</td>
<td>8.50</td>
<td>1.50</td>
<td></td>
</tr>
</tbody>
</table>
Two kegs, for grease; exterior dimensions—

- Diameter at the bilge: 10.5 inches.
- Diameter at the heads: 9.75 inches.
- Height: 12.5 inches.
- Weight: 5 lbs.

Box C, No. 5, is placed on the bottom of the wagon, next to the pile of harness which occupies the rear part of the body. Box No. 6 is on the top of No. 5; No. 7 on the bottom of the wagon, in front of No. 5; No. 8 on top of No. 7. The candle-box is No. 6.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Linseed-oil gal.</td>
<td>1</td>
<td>9.17</td>
<td>In 1 tin can</td>
</tr>
<tr>
<td>Spirits turpentine gal.</td>
<td>1</td>
<td>8.77</td>
<td>do.</td>
</tr>
<tr>
<td>Olive paint lbs.</td>
<td>50</td>
<td>56.</td>
<td>In 2 tin cans</td>
</tr>
<tr>
<td>Black paint lbs.</td>
<td>5</td>
<td>6.5</td>
<td>In 1 tin can</td>
</tr>
<tr>
<td>Paint-brushes</td>
<td>12</td>
<td>8.</td>
<td>In candle-box.</td>
</tr>
<tr>
<td>Sperm or wax candles lbs.</td>
<td>5</td>
<td>7.85</td>
<td>In box C 5, 80.44 lb.</td>
</tr>
<tr>
<td>Rammer-heads</td>
<td>4</td>
<td>2.90</td>
<td></td>
</tr>
<tr>
<td>Sponge-heads</td>
<td>4</td>
<td>8.20</td>
<td></td>
</tr>
<tr>
<td>Sponges</td>
<td>12</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>Priming-wires</td>
<td>3</td>
<td>0.24</td>
<td>In box C 6, 28.73 lbs.</td>
</tr>
<tr>
<td>Gunner's gimlets</td>
<td>3</td>
<td>0.24</td>
<td></td>
</tr>
<tr>
<td>Lanyards</td>
<td>4</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>Cannon-spikes</td>
<td>6</td>
<td>0.30</td>
<td></td>
</tr>
<tr>
<td>Dark lanterns</td>
<td>3</td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>Common lanterns</td>
<td>4</td>
<td>4.60</td>
<td></td>
</tr>
<tr>
<td>Neat's-foot oil gals.</td>
<td>4</td>
<td>32.80</td>
<td>In 2 tin cans</td>
</tr>
<tr>
<td>Grease lbs.</td>
<td>50</td>
<td>60.</td>
<td>In box C 7, 92.80 lbs.</td>
</tr>
<tr>
<td>Nails (4d, 6d, 8d, 10d). lbs.</td>
<td>20</td>
<td>20.</td>
<td>Box C 8.</td>
</tr>
<tr>
<td>Felling-axes</td>
<td>2</td>
<td>10.</td>
<td>In the axe-rack.</td>
</tr>
<tr>
<td>Claw-hatchet</td>
<td>1</td>
<td>1.</td>
<td>Under the till, against the side and rear of the wagon.</td>
</tr>
<tr>
<td>Billhooks</td>
<td>2</td>
<td>4.</td>
<td>On caisson-stock, against rear end.</td>
</tr>
<tr>
<td>Caisson-stock</td>
<td>1</td>
<td>19.5</td>
<td>On the bottom, piled lengthwise against the front end.</td>
</tr>
<tr>
<td>Sponge-and-rammers</td>
<td>3</td>
<td>10.5</td>
<td>On the spokes, crosswise.</td>
</tr>
<tr>
<td>Spokes</td>
<td>40</td>
<td>72.</td>
<td></td>
</tr>
<tr>
<td>Felloes</td>
<td>24</td>
<td>16.</td>
<td></td>
</tr>
<tr>
<td>Carried forward</td>
<td></td>
<td>520.47</td>
<td></td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Contents of battery-wagon body. (Tools and stores.)</th>
<th>No.</th>
<th>Weight, lbs.</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brought forward.</td>
<td></td>
<td>520.47</td>
<td></td>
</tr>
<tr>
<td>Grindstone, 14 x 4 inches.</td>
<td>1</td>
<td>50.</td>
<td></td>
</tr>
<tr>
<td>Arbor and crank for ditto.</td>
<td>1</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Screw-jacks</td>
<td>3</td>
<td>75.</td>
<td></td>
</tr>
<tr>
<td>Wheel-traces</td>
<td>10</td>
<td>47.5</td>
<td></td>
</tr>
<tr>
<td>Lead-traces</td>
<td>10</td>
<td>57.5</td>
<td></td>
</tr>
<tr>
<td>Collars</td>
<td>6</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Girths</td>
<td>16</td>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>Whips</td>
<td>16</td>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>Bridles</td>
<td>6</td>
<td>18.</td>
<td></td>
</tr>
<tr>
<td>Halter</td>
<td>6</td>
<td>21.</td>
<td></td>
</tr>
<tr>
<td>Hailer-chains</td>
<td>12</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>Hame-straps</td>
<td>25</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Spare nose-bags</td>
<td>12</td>
<td>13.5</td>
<td></td>
</tr>
<tr>
<td>Sash-cord</td>
<td>6</td>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>Slow-match</td>
<td>50</td>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>Elevating-screw</td>
<td>1</td>
<td>15.75</td>
<td></td>
</tr>
<tr>
<td>Pole-yoke</td>
<td>1</td>
<td>12.25</td>
<td></td>
</tr>
<tr>
<td>Harness-leather, side</td>
<td>1</td>
<td>25.</td>
<td></td>
</tr>
<tr>
<td>Bridle-leather, side</td>
<td>2</td>
<td>22.</td>
<td></td>
</tr>
<tr>
<td>Prolong</td>
<td>1</td>
<td>18.</td>
<td></td>
</tr>
<tr>
<td>Scythes</td>
<td>4</td>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>Scythe-stones</td>
<td>4</td>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>Spades</td>
<td>6</td>
<td>30.</td>
<td></td>
</tr>
<tr>
<td>Pickaxes and handles</td>
<td>2</td>
<td>13.</td>
<td></td>
</tr>
<tr>
<td>Corn-sacks</td>
<td>24</td>
<td>20.</td>
<td></td>
</tr>
<tr>
<td>Tarpaulins, 5 feet square</td>
<td>2</td>
<td>18.</td>
<td></td>
</tr>
<tr>
<td>Reaping-hooks</td>
<td>4</td>
<td>3.85</td>
<td></td>
</tr>
<tr>
<td>Scythe-snaths</td>
<td>4</td>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>Spare stock for bat'y-wagon</td>
<td>1</td>
<td>90.</td>
<td></td>
</tr>
<tr>
<td>Padlock</td>
<td>1</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Watering-bucket</td>
<td>1</td>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>Forage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boxes</td>
<td>4</td>
<td>69.</td>
<td></td>
</tr>
<tr>
<td>Tow</td>
<td></td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1,288.82</strong></td>
<td></td>
</tr>
</tbody>
</table>

Exclusive of forage.
1116. The places for the tools and stores, as given in the table, refer to the old form of battery-wagon.

1117. Experience has shown that the number of spare spokes and felloes prescribed in the table should be greatly reduced, and the following indispensable articles carried in their stead—vent-punches (2); fuse-cutters (2); fuse-block (1); pendulum-hausse (1); hausse-pouch (1); and horse-medicines. The number of spare nose-bags may be also increased to advantage.

1118. Spare gun-carriage stocks, sinter-bars, axle-bodies, etc., form part of the equipment of battery-wagon D. When ordered on service beyond the reach of the ammunition and supply train for the artillery, these articles should accompany the battery, as well as other spare parts which may be needed and cannot be readily made from ordinary materials, such as hounds, forks, middle and side rails, and cross-bars for caissons, assembling-bars, spare lock-chains, etc.—(See Ordnance Manual.)

Paints.

1119. Paint is generally furnished to batteries mixed and ready for use.

Olive-paint is composed of olive-paste, 61.5 parts; boiled oil, 29.5 parts; spirits of turpentine, 5.5 parts; dryers, 3.5 parts; Japan-varnish, 2 parts.

Olive-paste consists of yellow-ochre 68 parts, lampblack 11 parts, boiled oil 37 parts, spirits of turpentine 0.4 parts. To prepare it, make a thick paste with the ochre and oil, in a paint-pot, and with the lampblack and oil in another; grind them together in small portions, and keep the mixture in a tin vessel.

Black paint is composed of lampblack 28 parts, litharge 1 part, boiled oil 72 parts, Japan-varnish 1 part, spirits of
turpentine 1 part; the varnish and turpentine are added last.

The proportions are given for 100 parts by weight of prepared colors, etc., when not otherwise designated.

1120. Quantity of paint required for light artillery carriages.

<table>
<thead>
<tr>
<th>Kind of carriage</th>
<th>Lead-color</th>
<th>Olive</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gun-carriage and limber, with implements</td>
<td>6</td>
<td>10</td>
<td>0.75</td>
</tr>
<tr>
<td>Caisson, with limber and implements, etc.</td>
<td>8</td>
<td>15</td>
<td>0.8</td>
</tr>
<tr>
<td>Forge, with limber</td>
<td>6</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Battery-wagon, with limber</td>
<td>7</td>
<td>13</td>
<td>0.9</td>
</tr>
</tbody>
</table>
HARNES AND HORSE EQUIPMENTS.

Harness.

1121. Artillery-harness consists of the head-gear to guide and hold the horse; the saddle for the transportation of the driver; the draught-harness by which the horse moves the carriage forward, and the breeching by which he holds the carriage back, stops it, or moves it to the rear.

1122. The collar prevents the horse's shoulders from being hurt by the two curved pieces of iron called the hames; to each hame is fastened a short leather tug ending in an iron ring, to which the front trace-chain is attached. The load is pulled by strong leather straps called traces, to the ends of which chains are fastened; the front trace-chain plays back and forth in the tug-ring, and makes the wheel-horse independent of the horses in front; the rear trace-chain can be lengthened or shortened at will so as to adapt the harness to different horses. The pole-yoke is supported by a chain attached to the hame-clasp and to a ring which slides along the yoke; the branches of the pole-yoke are jointed to a collar near the end of the pole in such a way that they can only play in a plane passing through the axis of the pole; this device enables the horse to keep the pole steady without constraining his motion.

1123. The breeching forms a part of the wheel-harness only; it completely encircles the horse, and is held up in rear by a strap passing over his hips.
1124. The traces of the wheel-horses are usually hitched to the splinter-bar; the traces of the lead and swing horses are hitched to those of the horses in rear, giving a continuous line of traction from horses to carriage.

1125. When the wheel-horses are hitched to a splinter-bar trace, there is always an equal bearing on both sides of the collar; this saves their necks from a great deal of chafing, particularly in changing direction.

1126. As the limber has no sweep-bar, the weight of the pole comes on the necks of the wheel-horses; this defect is somewhat lessened when the limber-chest is loaded, its position over the axle being such as to decrease the weight at the end of the pole.

Nomenclature of the harness.

1127. (Plates 1 and 2.) Halter, composed of headstall and hitching-strap (1); the head-stall includes, crown-piece (2), cheek-strap (3), brow-band (4), nose-band (5), chin-strap (6), throat-strap (7), and throat-lash (or throat-band) (8). Bridle, composed of head-stall, curb-bit, and reins; the head-stall includes, crown-piece, cheek-strap, brow-band, and throat-lash; the curb-bit is of iron and brass-plated; it includes mouth-piece, branches, cross-bar, curb-chain (or curb-strap), and curb-chain hook. Near saddle (9), including saddle-tree, seat, saddle-skirts, stirrups, and girth (10); the saddle-tree consists of pommel, canile, and side-bars; the girth consists of two straps of unequal length. Collar (11), including rim, belly, pad, collar-straos, and billets. Hames (12), including branches, double-joint loops for trace-tugs, links for breast-straos, hame-rings, hame-clasp, chain and toggle (13), safes (14), trace-tugs (15), trussing-straos (16), hame-straos (17), and collar-straos (18). Traces (19); front-trace-chaos (20); rear-trace-
chains (21); trace-loops; trace-toggles (22); belly-band; loin-strap (23). Crupper, including back-strap (24), body (25), and dock (26). Breeching, including breech-strap (27), hip-strap (28), breast-strap (29), and sliding-loops (30) for pole-straps. Off-saddle (31), including hook for reins, and valise-strap (32). Valise (33). Coupling-rein. Whip, including stock, and lash. Leg-guard, including body, under-strap, leg-straps, and plate. Nose-bag.
Care of harness.

1128. Harness, after being used, must be carefully wiped and cleaned; if possible, this is done before taking it off the horse; otherwise, it is put in good order at the earliest practicable moment and covered with the sack.

Straps and leather parts generally are kept soft and supple; trace-chains and iron parts, free from rust.
Collars and saddles will be aired, and the stuffing beaten with a rope or small mallet to keep it soft.

1129. Harness must be oiled two or three times a year, oftener in warm than in cold weather.

The best oil for this use is neat’s-foot oil, the unctuous property of which is particularly suitable for preserving the suppleness of the leather; this oil contains no siccative part, and may be used unpurified. Four pints and a half will oil the harness of a team of three pairs.

Before using the oil, every part of the leather must be perfectly cleaned and washed, without letting the water soak deeply into the leather; while still damp, blacken those places with dye which have become red; when the leather begins to dry, oil it, spreading the oil on with a sponge, or thick, soft brush. When neat’s-foot oil cannot be had, pure fish-oil may be used, but it must be carefully ascertained that it does not contain any siccative matter, which would make it injurious.

Other oils may be usefully employed, as whale-oil, when they can be gotten pure; this is not easily done, it being hard to detect the frauds.

Vegetable oils are very hurtful.

As good oil cannot always be had, a mixture of three-quarters of melted lard and one-quarter of whale-oil may be used in emergencies; it should be spread over the leather with a piece of woolen cloth, and well rubbed in.

Dye for blacking.

1130. Extract of logwood, two pounds; broken nutgalls, half a pound; iron pyrolignite, half a pint; soft water, one gallon.

Boil the logwood and nutgalls in the water until the logwood is dissolved; when cold, add the iron; stir it well
and let it settle; when clear, decant it free from sediment, and keep it well corked.

The iron pyrolignite is made by dissolving iron filings in pyroligneous acid, as much as the acid will take up.

A solution of copperas may replace the iron, but it is not so good. The addition of the logwood is not essential.

1131. **Harness required for each horse.**

<table>
<thead>
<tr>
<th></th>
<th>Wheel-horse</th>
<th>Lead and swing horse</th>
<th>Weight, Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Halter</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Bridle</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Coupling-reins</strong></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Near saddle</strong></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Off saddle</strong></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Valise</strong></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Collar and collar-straps.</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Hames, hame-straps, and trussing-straps.</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Pair of traces</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Wheel.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lead.</strong></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Trace-loops and belly-band.</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Loin-strap and trace-loops.</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Wheel.</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lead.</strong></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Crupper</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Breeching and hip-strap.</strong></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Breast-strap.</strong></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Leg-guard</strong></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Whip</strong></td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Nose-bag</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>For each horse</strong></td>
<td>59.82</td>
<td>54.00</td>
<td>51.60</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>118.82</td>
<td></td>
<td>89.87</td>
</tr>
</tbody>
</table>

**Horse-equipments.**

1132. The number of sets of horse-equipments corresponds to the number of mounted men in the battery exclusive of drivers.
1133. Each set consists of one bridle, one watering-bridle, one halter, one saddle, one pair of saddle-bags, one saddle-blanket, one surcingle, one pair of spurs, one brush-and-comb pouch, one horse-brush, one curry-comb, one picket-pin, and one lariat, or side-line; one link, and one nose-bag are added when specially required.

1134. Curb-bits are made of steel; they are of two degrees of severity, and of two widths of mouth-pieces, and are designated as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Inches between branches</th>
<th>1 inch height of arch</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>4.75</td>
</tr>
<tr>
<td>2</td>
<td>4.75</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>0.5</td>
</tr>
<tr>
<td>4</td>
<td>4.75</td>
<td>0.5</td>
</tr>
</tbody>
</table>

1135. Watering-bits consist of two mouth-piece sides, united by a loop-hinge.

**Nomenclature of the curb-bit and bridle.**

1136. Curb-bit.—Branches; mouth-piece; cross-bar; curb-chain hook; curb-chain, or curb-strap.

Bridle.—Crown-piece; cheek-straps; brow-band; throat-lash, or throat-band; reins.

**Nomenclature of the saddle.**

1137. (Pl. 8.) Saddle-tree, including pommel (1), seat (2), and cantle (3); stirrups (4); stirrup-leathers (5); girth (6); girth-strap (7); surcingle.
### Weight of a set of horse-equipments.

<table>
<thead>
<tr>
<th>Item</th>
<th>Weight (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridle</td>
<td>2.81</td>
</tr>
<tr>
<td>Watering-bridle</td>
<td>1.09</td>
</tr>
<tr>
<td>Halter</td>
<td>2.06</td>
</tr>
<tr>
<td>Saddle</td>
<td>14.84</td>
</tr>
<tr>
<td>Saddle-bags</td>
<td>2.12</td>
</tr>
<tr>
<td>Saddle-blanket</td>
<td>8.48</td>
</tr>
<tr>
<td>Surcingle</td>
<td>0.71</td>
</tr>
<tr>
<td>Spurs</td>
<td>0.57</td>
</tr>
<tr>
<td>Brush-and-comb pouch</td>
<td>1.00</td>
</tr>
<tr>
<td>Horse-brush and curry-comb</td>
<td>1.32</td>
</tr>
<tr>
<td>Lariat, or side-line, and picket-pin</td>
<td>8.09</td>
</tr>
<tr>
<td>Nose-bag</td>
<td>1.12</td>
</tr>
</tbody>
</table>

Total weight: 34.16 pounds
HORSES.

General rules.

1139. The captain is held responsible that his officers have a thorough knowledge of the structure and powers of endurance of horses. He requires every officer to be familiar with the rules for their management under all circumstances, to understand in detail the method of shoeing them, and to be able to treat all ordinary cases of injury or disease. To this end, he prescribes such recitations and practical instruction as may be necessary.

In the field, or on the march, an ignorant or careless commander will always have many broken-down and unserviceable animals, while the animals of other commands, performing the same duties, but judiciously handled, remain in good condition.

Horses are branded on the near hip with the number of the regiment and the letter of the battery.

Each captain makes permanent assignments of horses to men. After a horse has been assigned, his rider or driver will not exchange him, nor allow him to be used by any other person, without the permission of the captain.

The captain will keep a descriptive book of the animals under his charge, showing the name, sex, age, size, color, marks, brands, and special peculiarities of each; how and when acquired; how long each has been in the service, and his fitness therefor; the particular use to which he is applied, and the name of his rider or driver. The date and
cause of the death or transfer of every animal will also be recorded.

A work-horse can draw sixteen hundred pounds twenty-three miles a day, weight of carriage included. Artillery-horses will not be required to draw more than from six hundred and fifty to seven hundred pounds each, including the weight of the carriage, but not counting that of the cannoneers; the horses move the load more by the weight thrown into the collar than by muscular exertion.

Purchase of horses.

1140. The captain of the battery for which the horses are intended, should inspect them before purchase, if practicable.

Before accepting a horse, the inspector carefully examines him, and satisfies himself that he is sound, free from vice, and conforms, as nearly as possible, to the following description, viz.—In fair condition, of a hardy color, not less than fourteen hands three inches, nor more than sixteen hands high; weight not less than nine hundred, nor more than twelve hundred pounds; age not less than five, nor more than eight years; forehead wide; shoulders broad enough to support the collar, but not too heavy; forelegs short, straight, and well under the horse; chest broad and deep, barrel large, and increasing from girth to flank; withers elevated, back short and straight, loins and haunches broad and muscular; hind-legs short, hocks well bent and under the horse; feet rather large. Special care is taken that the withers are not too sharp, and that the horse is neither away-backed nor roach-backed. In time of war, horses should not be accepted under six nor over ten years of age; young animals, as a rule, are not able to stand the exposure of a campaign.

Each horse must be well broken to harness; he will be
ridden before he is accepted, to see that he has an easy and free action at the walk, trot, and gallop.

In each battery, horses of the minimum size and weight should never exceed one-third of the whole number.

The inspector selects as soon as possible a suitable horse, and keeps him as a model during subsequent inspections.

The near shoulder of every horse must be branded with the letters U. S., in the presence of the inspector, and on the day that the horse is received.

A complete descriptive list will be made of each horse at the time of purchase, which will accompany him wherever he may be sent.

Training horses.

1141. Horses are trained by the best horsemen, under the supervision of an officer or non-commissioned officer.

Extreme gentleness and patience must be used, and loud talking and shouting are prohibited. By careful treatment at first, most horses soon become perfectly gentle and tractable. Mere force, without skill or coolness, only serves to confirm bad habits.

Approach the horse on the near side, speak to him gently, place the right hand on his haunch; and step into the stall beside him. Take hold of the halter-strap; pat the horse and speak to him gently until he permits his legs to be rubbed and his feet to be lifted.

As soon as the horse becomes quiet in handling, he is bridled with the watering-bridle, great care being taken not to frighten or hurt him. The blanket is then folded and placed on the horse; if the horse show any fear of the blanket, lay it over the left arm, go into the stall, show the blanket to the horse and let him smell it, patting him on the neck until he is quiet and allows the blanket to
be placed on his back; then place the surcingle gently over the blanket and buckle it.

The horse is now led out of the stable, and is patted and coaxed until he becomes perfectly quiet and stands still while the man goes up to him on both sides, rubs him, takes up his feet, etc., and at length permits the man to get on his back. After mounting, the man pats the horse for a few moments, without attempting to make him move, and then dismounts. This is repeated several times, until the horse submits without fear. The horse is then led into the stable.

*To make the horse tractable and steady in mounting.*

1142. Go up to the horse, pat him on the neck, and speak to him; then take the reins from the horse's neck, and hold them at a few inches from the rings of the bit with the left hand; take such position as to offer as much resistance as possible to the horse, should he attempt to break away; hold the whip in the right hand, with the point down; raise the whip quietly and tap the horse on the breast; the horse naturally tries to move back to avoid the whip; follow the horse, pulling at the same time against him, and continuing the use of the whip; be careful to show no sign of anger nor any symptom of yielding. The horse, tired of trying ineffectually to avoid the whip, soon ceases to pull, and moves forward; then drop the point of the whip and make much of him. This repeated once or twice, usually proves sufficient; the horse having found how to avoid the punishment, no longer waits for the application of the whip, but anticipates it, by moving up at the slightest gesture; this is of great assistance in the bending-lessons, as also in mounting and dismounting, and accelerates the training of the horse.
To bend the horse’s neck and to rein in, dismounted.

1143. The balance of the horse’s body, and his lightness in hand, depend on the proper carriage of his head and neck.

A young horse usually tries to resist the bit, either by bending his neck to one side, by setting his jaw against the bit, or by carrying his nose too high or too low.

The bending-lessons serve to make a horse manageable by teaching him to conform to the movements of the reins and to yield to the pressure of the bit. During the lessons the horse must never be hurried.

1144. To bend the horse’s neck to the right. Take a position on the near side of the horse, in front of his shoulder and facing toward his neck; take the off rein close up to the bit with the right hand, the near rein in the same way with the left hand, the thumbs toward each other, the little fingers outward, bring the right hand toward the body, and at the same time extend the left arm so as to turn the horse’s head to the right.

The force employed must be gradual, and proportioned to the resistance met with, and care must be taken not to bring the horse’s nose too close to his chest. If the horse back, continue the pressure until, finding it impossible to avoid the restraint imposed by the bit, he stands still and yields to it.

When the bend is complete, the horse holds his head there without any restraint, and champs the bit; then make much of him, and let him resume his natural position by degrees, without throwing his head round hurriedly. A horse, as a rule, champs the bit when he ceases to resist.

The horse’s neck is bent to the left in a similar manner, the man standing on the off side.
1145. To rein in. Cross the reins behind the horse's jaw, taking the near rein in the right hand, and the off rein in the left, at about six inches from the rings; draw them across each other till the horse gives way to the pressure and brings his nose in. Prevent the horse from raising his head by lowering the hands. When the horse gives way to the cross-pressure of the reins, ease the hand, and make much of him.

To bend the horse's neck and to rein in, mounted.

1146. The horse is now equipped with the curb-bridle.

To bend the horse's neck to the right. Adjust the reins in the left hand; seize the right rein with the right hand well down; draw it quietly toward you until the horse's head is brought completely around to the right, in the same position as in the bend dismounted. When the horse champs the bit, make much of him, and allow him to resume his natural position.

The horse's neck is bent to the left in a similar manner.

1147. To rein in. Lower the bridle-hand as much as possible, turning the back uppermost; with the right hand, nails down, take hold of the curb-reins above and close to the left hand and shorten them by degrees, drawing them through the left hand, which closes on the reins each time they are shortened.

When the horse resists much, and holds his nose up, keep the reins steady; do not shorten or lengthen them; close the legs to prevent the horse from backing; after remaining perhaps a minute or more with his nose up, and his jaw set against the bit, he will yield, bring his nose in, and champ the bit; make much of him, loosen the reins, and, after a few seconds, rein in again.

This exercise gives the horse confidence, and teaches
him to arch his neck, and bring his head in proper position whenever he feels the bit.

Most young horses are afraid of the bit, and they must never be frightened by sudden jerks on the reins, lest they should afterward refuse to stand the requisite pressure of the bit. A certain amount of bearing is necessary to induce the horse to work boldly and well, as well as to apprise the rider of what the horse is going to do.

In reining in, some horses rest the lower jaw against the breast; to counteract this, press both legs equally and force the horse forward to the bit.

Some horses will not work up to the hand, that is, will not bear on the bit at all. Such horses are unfit for the service.

To teach the horse to obey the pressure of the leg.

1148. To turn to the right on the fore-feet. Apply the right leg well behind the girth, very quietly, and without touching the horse's side with the spur; press against him till he makes a step to the left with his hind-legs; then cease the pressure of the leg and make much of him; then repeat the same until the horse takes another step, and so on until he has turned about, always pausing when he takes a step in turning. The horse should not be reined back; his fore-legs remain in place, and his hind-quarters move around in a circle. Both legs are kept close to the horse, the pressure of either leg being increased as the occasion requires.

Turning to the left on the fore-feet is executed in a similar manner.

1149. The horses are now exercised in the riding-hall, the lessons for young horses not exceeding three-quarters of an hour. The curb should not be used much the first few days, but the horses should be brought by degrees to ear slightly on it.
Ride the horses on the track, take the slow trot; walk and trot again; walk; bend the horses to the hand toward which they are marching, and halt. The horse's head and neck must always be bent the way he is to go, thus preparing the animal for all turns, wheels, etc. Finish the exercise by the bending-lessons, mounted and dismounted.

1150. Whenever, without an apparent cause, a horse resists, or is restive, the saddle and equipment should be carefully examined to see if any part hurts or irritates him.

Rearing.

1151. Should the horse rear, the rider must yield the hand when the horse is up, and urge him vigorously forward when he is coming down; if the horse be punished while up, he may spring and fall backward.

Kicking.

1152. This can be prevented by holding the horse's head well up, and closing the legs; if necessary, they are closed so much as to force the horse forward.

Shying.

1153. This sometimes results from defect of sight, and sometimes from fear. If from fear, the horse must be taken up to the object with great patience and gentleness, and be allowed to touch the object with his nose. In no case should a horse be punished for timidity. The dread of chastisement will increase his restiveness.

To accustom horses to firing.

1154. Station a few men at a little distance from, and on both sides of, the stable-door, and cause them to fire pistols as the horses are led into the stable to be fed; for
the same object, a gun may be fired during the hour of feeding.

To teach horses to jump.

1155. Horses are first taught to leap the ditch and then the bar. They are equipped with the watering-bridle, and follow a steady horse who is accustomed to jumping.

The horses are taken in the open field and practised at jumping shallow ditches, fallen logs, very low fences, etc. Great discretion must be used in applying the whip, and the horses will not be required to leap repeatedly over the same thing or at the same place.

Swimming horses.

1156. The men are occasionally required to swim their horses mounted; this exercise is important for young horses, as it gives them confidence.

The horses at first are equipped with the watering-bridle, and are without saddles.

Gaits of horses.

1157. The gaits are the walk, the trot, and the gallop.

The walk is at the rate of about three and three-quarter miles an hour; the trot at the rate of seven to eight miles an hour; the gallop at the rate of nine to eleven miles an hour.

The gallop very soon breaks down horses, and is the exceptional gait at drill and in campaign; on all other occasions it is strictly prohibited.

Treatment and care of horses.

1158. Horses require gentle treatment. Docile but bold horses are apt to retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals.
A horse must never be kicked in the belly, or struck about the head with the hand, reins, or any instrument whatever.

At least two hours' exercise daily is necessary to the health and good condition of horses; they should be marched a few miles when cold weather, muddy ground, etc., prevents drill.

Horses' legs will be often hand-rubbed, particularly after severe exercise, as this removes enlargements and relieves or prevents stiffness.

Horses' feet will be frequently stopped with clay, or cow-manure; if the animals stand on boards, this must be done as often as once a week.

In mild weather, the sheath will be washed out once a month with warm water and castile soap, and then greased; during the cold season, longer intervals between the washings are sufficient.

Sore backs and galled shoulders are generally occasioned by neglect. The greatest pains will be taken in the fitting of the saddles and collars; the men must never be allowed to lounge or sit unevenly in their saddles; every driver should keep a pair of soft leather pads, stuffed with hair, about six inches by four; the moment any tenderness is noticed in a horse's shoulders, the pressure is removed by placing these pads under the collar above and below the tender part.

1159. To prevent foundering, or otherwise injuring horses, observe the following instructions:

(a.) Water must never be given to a horse warm from exercise, unless he is to move off the instant he has done drinking, and be kept at work without intermission.

(b.) A horse which has been exercised until sweated, must not be kept standing in the cold, or be exposed to wind or draughts; and, as soon as the saddle is taken
off, his back and loins must be thoroughly dried by rubbing.

(c.) Cold water must not be thrown over horses coming in hot; not even over their legs or feet.

(d.) Overheated animals are to be wisped (in some sheltered place) until dry. Otherwise they must be gently exercised so as to cool gradually.

(e.) Hay will not hurt a horse, no matter how warm; but grain must not be fed until the horse is cool.

(f.) Horses used freely in snow or slush cannot with impunity be placed in a hot stable with littered stalls.

Sick horses.

1160. The horses on sick report are in charge of the stable-sergeant, who reports daily to the captain for instructions as to their treatment.

In garrison, the battery-officer of the day inspects the sick horses daily, and records in his guard report-book the names of the horses on sick-report, and the treatment they receive.

In treating sick horses, it is to be observed that very little medicine is ordinarily required, and that unnecessary doses do a great deal of harm.

If a horse sustain an injury, neglect his feed, refuse his water, or give any evidence of sickness, it will be at once reported.

No horse on sick-report will be taken from the stable or picket-line for exercise or work, without permission from proper authority.

If there be at any time a suspicious discharge from one or both nostrils of an animal, it must be immediately reported.

To prevent contagion to man or beast, an animal who shows any decided symptom of glanders is to be isolated
HORSES.

at once, and confined, or tied up in some locality where no other animal can approach him.

1161. A glandered horse should be killed as soon as possible. The stall in which he has stood is closed, and must remain empty until the rack, manger, and every part of the iron and wood work, as also the vessels used in watering and feeding, have received at least two or three thorough washings with a strong solution of carbolic acid. As all equipments used with him are liable to be infected, saddles and bits are carefully sponged with carbolic-acid solution; halters, bridles, horse-cloths, saddle-cloths, blankets, curry-combs, and brushes, should be destroyed.

Directions for shoeing horses.

1162. Horses should be shod at least once a month. The length of the hoof indicates when a horse needs re-shoeing, rather than the wear of the shoe.

In removing shoes, raise the clinches first, lest the crust be torn and stubs left in the horn. Pare the sole until it yields under the pressure of the thumb; cut the walls down until they are but very little higher than the contiguous sole, taking care to shorten the toe if necessary, it being frequently left too long; cut away the bars so as to make a gradual slope from the walls to the bottom of the commissures, which must be deepened; lower and open the heels, and take the bearing off them for at least an inch on each side of the frog, so that the walls at those parts will not be in immediate contact with the shoe when first put on. Pay special attention to the removal of the pegs (the hard, horny substance which grows down at the heel, on each side of the frog and contiguous to it); these pegs are apt to contract the foot or make it thrushy by pinching and narrowing the frog. The frog may be pared
to stimulate its growth, and the cleft opened; otherwise it is left untouched.

If a horse be flat-footed, pare the base or forward part of the hoof very little, if at all, and shorten the toe as much as possible.

For the shoe to fit the foot; do not let it project beyond the heels; make its lower face perfectly flat. Avoid nailing too far back, particularly on the inside quarter; this is to be specially attended to in the fore-foot. Use as few nails as possible; six are enough for an ordinary fore-foot, and seven for a hind-foot; horses with small feet should be shod forward with but five nails. In driving, take care to give the nails an outward direction, so that the points be brought out low down in the crust. Turn the clinches down so as to be broad and firm; in rasp ing them never rasp the whole surface of the hoof. When calks are used, there should be three; one at the toe, the others at the heel.
STABLES.

Construction of stables.

1163. Foul air is the cause of many diseases of the horse; hence the importance and economy of spacious, clean, and well-ventilated stables. Ceilings should be twelve or fifteen feet high, with large ventilators through the roof, and a window or side-aperture in each stall. If possible, the building should have no upper story or loft.

In stables with a loft, ventilation from the top is always insufficient, and there must be side openings well above the horses, so that the draught will pass over their heads. These openings must never be closed except on the windward side, to keep out rain or snow.

1164. A picket-line is established in the immediate vicinity of the battery-stable, the horses being tied on each side of a timber framed on posts, or to a rope passed through the posts. There should be shallow trenches behind the horses to carry off rain, the ground on which they stand having just slope enough to let water run into the trenches. Constant attention must be paid to maintaining the ground about the picket-line in good order.

Stable management.

1165. A non-commissioned officer, usually a sergeant, is detailed as stable-sergeant. He takes immediate charge of the police and sanitary condition of the stable, picket-
line, etc., and is the custodian of the forage and stable property generally.

The stable is to be kept thoroughly policed, free from smells, and well whitewashed. There must be no accumulation of manure or foul litter inside, or near the doors or windows without. The feed-boxes are washed out from time to time, and kept clean. The ground about the picket-line is swept daily, and all dung, etc., carried to the manure-heap.

Except at night, when the horses are bedded down, no manure or urine is to remain in the stalls; the stable-police remove it as fast as it accumulates.

If practicable, all wood-work within reach of the horses and not protected by sheet-iron or other metal, is painted every four months with thin gas-tar, to prevent its being gnawed. The same precaution must be followed with regard to troughs, picket-posts, and picket-line.

Smoking in stables, or in their immediate vicinity, is prohibited.

One or more lamps will be hung in each stable, to burn during the night.

Pegs for harness, saddles, and bridles, are arranged in the walls of the harness-room and in the heel-posts of the stalls; the harness-pegs are placed as explained in the School of the Driver.

Battery-stables have preferably double stalls, nine feet wide, the horses of each pair standing together; stalls, if single, are six feet wide.

The horses are stalled according to their positions in the battery, the teams nearest the door being led out first; their places at the picket-line will be in accordance with the same rule.

The name of each horse, and that of his rider or driver, are placed over his stall.
Horses should always stand on earth. Clay is the best for this purpose, as it packs well. Gravel, or sandy earth, is not suitable. Each man is held responsible for the renewal of the earth, and the leveling of the floor of his stall.

The sloping of the floor of stalls, from the manger to the heel-post, is injurious and uncomfortable to the animal, who stands in an unnatural position, with the fore-legs higher than the hind ones. When earthen floors are not level, they give more trouble, as the horse will paw a hollow for his fore-feet unless he can elevate his hind-legs by backing out of the stall.

Whenever the horses go out of the stable, the windows of their stalls are to be kept open, unless necessary to exclude rain or snow, or when cold draughts affect the animals in contiguous or opposite stalls.

Stable-doors are never closed in the daytime, except to keep out wet or to exclude cold winds which blow on the horses. If the doors be in a single piece, bars are put across the door-way; if divided in half, it will be usually sufficient to open the upper part. At night, except in very hot weather, they should be closed and locked, communication with the stable being kept up by a man-hole.

Except in very cold, windy weather, or in very hot weather where there is no shade, horses should stand most of the day at the picket-line, as they have better air and are less confined, while the stables become drier and more healthful.

In ordinary climates, military stables must be kept as cool as possible. If the horses do not stand directly in the draught, the colder the stable the less will they suffer if called suddenly to take the field. For the same reason, horses should never be blanketed in the stable, except in the excessively cold weather of a high latitude.
Stable and park guard.

1166. The pieces, caissons, etc., with their ammunition and stores, as well as the horses, harness, and forage, are in charge of a stable and park guard, consisting of two non-commissioned officers and as many privates as may be necessary.

A lieutenant of the battery is detailed daily as battery officer of the day, or orderly officer; the stable and park guard is under his immediate orders and those of the captain.

It is the duty of this guard to enforce the special regulations in regard to the stables, horses, and park.

The sentinels of the stable and park guard will be posted and relieved like those of other guards. They are forbidden to strike or otherwise punish horses; and wear the sabre-belt only when on post at the stable or picket-line.

The sentinels over the horses, or in charge of prisoners, receive orders from the stable-sergeant so far as the exercise of his duties is concerned.

The employment of guards for police and fatigue duty at the stables is strictly forbidden; but this will not prohibit men not on post from being called upon to groom their own horses, or to assist in feeding grain before reveille.

This method of guard duty is the only one practicable in campaign, or on the march; its observance in garrison keeps a battery in constant readiness for service, and increases its efficiency; when ordered to move, the battery has not to make a complete change of system in the manner of protecting public property and in all the interior details of duty.

Stable-duty.

1167. The captain is responsible for the proper performance of stable-duty in his battery.
Morning stable-duty does not take place until after the men have breakfasted; in hot weather, when battery drill is directly after sunrise, morning stable-duty is after drill. Evening stable-duty will be an hour and a half before retreat.

At morning stable-call, the cannoneers, assisted by the prisoners, clean out the stalls and police the stable under the direction of the stable-sergeant. The bedding is taken up, that which is much soiled being separated for the manure-heap, and the remainder put out on racks or spread upon the ground to dry. If necessary, the drivers assist after they have done grooming.

At evening stable-call, the stable is policed as in the morning; the bedding is laid down and fresh straw spread on top of it; the bed must be soft and even, with the thickest part toward the manger.

Horses are groomed twice daily, at morning and at evening stable-calls, under the supervision of the first-sergeant and battery officer of the day.

The grooming is always at the picket-line, except in stormy weather; the rolls having been called, the men are marched to the horses, and get to work as soon as the first-sergeant commands: COMMENCE GROOMING.

Each driver, whether on guard or not, grooms his own horses, under the superintendence of his chief of section. Supernumerary horses are groomed by a detail of cannoneers under the direction of a corporal who is permanently assigned to this duty. In each platoon, the horses of the chiefs of section are groomed by a cannoneer who is permanently detailed, both horses being attached for grooming purposes to the section to which the cannoneer belongs. The trumpeters groom their own horses under the direction of the first-sergeant.

At evening stable-call, each man examines and cleans
out his horses' feet, and sees that the shoes are in good order. Horses requiring shoeing are reported to the proper non-commissioned officer, who notifies the stable-sergeant.

Each chief of section having ascertained by a minute personal inspection that his horses are properly groomed, notifies the first-sergeant, who directs the chief to have his drivers cease grooming and stand to horse; the first-sergeant then reports to the battery officer of the day: (Such) section horses in order, Sir! The battery officer of the day inspects the horses; if properly cleaned, he directs the chief of section to march off his drivers and dismiss them, without waiting for those of the other sections. If the horses are to return to the stable, each chief of section leads in before marching off his drivers.

In garrison, when there are no available prisoners, two or more men, called the stable-police, are usually kept at work between morning and evening stable-calls, in removing manure, policing generally, feeding, etc.

1168. In horse-batteries, stable-duty is conducted on the same principles, with such modifications as the nature of the service demands.

Grooming.

1169. Take the curry-comb in right hand, fingers over back of comb; begin on the near side at the upper part of the neck, thence proceed to the chest, arm, shoulders, back, belly, flank, loins, and rump. Then go to the off side, taking comb in left hand, and proceed as before. The curry-comb is not applied to the head or very tender parts, and must not be used on the legs from the knees or hocks downward, except to carefully loosen matted dirt. In cold weather, or when the hair is long, the curry-comb is freely used; at other times but little, particularly when the horse
is changing his coat. It must always be applied very gently to horses with tender skins and short coats.

Next take the brush in left hand, and change curry-comb to right; begin at the neck on the near side, and proceed in the same order as in currying, brushing also the parts not touched by the comb; on the off side take brush in right hand, curry-comb in left. In places difficult to clean, apply the brush backward and forward, finishing by leaving the coat smooth. After every few strokes, clean the brush from dust with the curry-comb.

Having done with the brush, rub or dust off the horse with the grooming-cloth, and wipe about the eyes and nostrils, and clean the dock. The skin under the flank and between the hind-quarters must be soft, clean, and free from dust.

Curry-combs, cards, or common combs, must never be applied to the mane or tail; but the brush, fingers, and cloth, are freely used on both.

A wisp is used for wet places; it is rubbed against the hair until the places become dry.

Both horses of a pair are curried before using the brush, the near horse first.

Feeding.

1170. In garrison, it is recommended that grain be fed at first call for reveille by the stable-sergeant, assisted by one or two members of the stable-guard, or men detailed for the purpose. The grain, in a box on wheels, is rolled in front of each stall, whence it is transferred to the feed-boxes by allowance-measures. Grain is fed again at evening stable-duty as in the morning, but not until after the hay has been fed and the stable swept up.

In camp, or on the march, grain is fed at morning and evening stable-duty. The men are marched to the forage
wagon, or other grain depository, where the non-commissioned officer in charge, with an allowance-measure, issues to each in turn.

The first-sergeant then marches them back to the horses and commands: Feed. The men are to remain near their horses until they have done eating.

Hay, in garrison, is fed thrice daily; immediately after morning stable-duty, in the middle of the day, and at evening stable-duty; at the evening feed each animal should have at least one-half of his daily allowance. The dust must be well shaken out of the hay before it is put in the mangers. During the short days of winter, the feeding at noon may be omitted without injury to the animals.

Hay, in camp, is fed at the picket-rope, morning, noon, and evening; on the march, in the evening only.

The occasional use of bran is important for stabled horses. In spring, or early summer, they should have grass for at least a week or ten days, during which time they ought not to be much worked. Salt should be given once a week.

When forage cannot be obtained, grazing should be allowed at every spare moment, especially early in the morning, when the dew is on the grass.

The daily allowance of oats, barley, or corn, is twelve pounds to each horse; that of hay fourteen pounds; the allowance of straw for bedding is one hundred pounds a month to each animal.

Good oats weigh about forty pounds to the bushel; barley about forty-eight pounds; corn about fifty-six pounds. Pressed hay weighs eleven pounds per cubic foot. The average weight of a bale of hay is from three hundred to three hundred and twenty-five pounds.

The standard bushel in the United States contains 2150.4 cubic inches. A cubic yard contains 21.69 bushels. A box
16 x 16.8 x 8 inches holds one bushel; a box 12 x 11.2 x 8 inches holds half a bushel; a box 8 x 8.4 x 8 inches holds one peck.

Watering.

1171. Horses must be watered quietly and without confusion; the manner in which this duty is performed is a good test of the discipline of a mounted command.

Horses are to be led or ridden, at a walk, to and from water, depending upon its distance from the stable. At the drinking-place, no horse should be hurried, or have his head jerked up from the water, until he has done drinking.

In the field, or on the march, the watering is from the most convenient running water; in garrison, it is usually from troughs. In warm weather, water drawn from a cold well or spring, before being used, should stand long enough for the chill to pass off.

The horses are watered under the immediate direction of the first-sergeant, but, if they are liable to meet those of other commands at the watering-place, a commissioned officer should replace him.

During the hot months, horses are watered thrice daily; in the morning, at noon, and just before grooming in the afternoon. At other times, two waterings are enough; after morning and at evening stable-duty. In very cold weather, once a day, at noon, is sufficient. It is to be always remembered that a horse will rarely drink enough very early in the morning.

The daily allowance of water for a horse is four gallons.

On the march, horses are watered with buckets carried on the carriages; the oftener this is done the better, as it
is not usually known when another watering-place will be reached.

When horses have to make a day's march without water, they will be watered after they are fed, just before leaving camp in the morning.

If a mounted command have to march a long distance without water, so that it will be necessary to encamp en route, the animals are well fed but denied water until just before starting, when they are permitted to drink freely. The command marches in the afternoon, and does not encamp until it has accomplished at least half of the distance, and moves early the next morning to reach water.
MARCHES.

1172. In the properly conducted march of a battery, more care and labor is required on the part of all the officers, than in that of troops of other arms.

The average march for artillery, on good roads, is from fifteen to twenty miles per day. With rare exceptions, the walk is the invariable gait.

Long marches or expeditions should be begun moderately, particularly with horses new to the service. Ten or twelve miles a day is enough for the first marches, which over good roads may be increased to twenty or twenty-five miles when necessary, after the horses are inured to their work.

The care of horses on the march is one of the most important duties of an artillery officer; by constant attention on the part of the captain, chiefs of platoon, and chiefs of section, many horses may be kept in serviceable condition, which would otherwise be disabled for months.

Reveille, ordinarily, should not be sounded on the march before daylight, as horses rest better from midnight until dawn than at other times.

A halt of from five to ten minutes is made at the end of every hour, for the purpose of adjusting harness, tightening girths, etc. When troops march for the greater part of the day, a halt of from twenty to forty-five minutes is usually made about noon.

The march is usually in column of sections; when practicable, it will be in column of platoons at closed intervals;
but the front of the column must not be frequently diminished or increased, as this unavoidably adds to the fatigue of the horses, particularly of those in rear.

An intelligent non-commissioned officer, usually the first-sergeant, may be sent forward to reconnoitre the road or ground the battery is to pass over; the chief of caissons is sometimes charged with this duty.

The distance of two yards between carriages is always maintained except in very bad or difficult ground, when it may be necessary to increase it to four or more yards.

The carriages in rear must keep closed to their proper distances; this can only be done by the leading guide maintaining a slow and steady walk, and by the strictest attention on the part of the chiefs of platoon and of section.

When distances are lost in column, they must never be regained by taking the trot; no practice is more fatiguing to horses and more injurious to their shoulders, than the alternate trotting and walking so often seen at the rear of artillery columns. The walk will be quickened as much as possible by such carriages as have lost distance, and it is the duty of the captain to have the gait of the leading guide slackened, or the column halted, so that they can close up.

Chiefs of platoon must never be permitted to leave their platoons to march at the head of the column; they will halt frequently to see that their carriages are well up and marching properly.

Chiefs of platoon and of section, without waiting for express instructions, give such orders as may be necessary for helping horses out of difficulty, for the passage of obstacles, etc.; the cannoneers assist at the piece or caisson as may be required.

A small bunch of bale-wire, in lengths of from one to
two feet, if carried by each chief of section in his saddle-
pouch, is very useful for temporary repairs of harness.

If the ruts be very deep, the carriages quarter the road, 
unless it be very narrow and sunken; in this case, the horses 
will be left to themselves and not hurried; a skillful driver 
can help his horses greatly, particularly if they be the 
wheelers.

When water-call is sounded, the chiefs of section, under 
the supervision of the chiefs of platoon or of the first-
sergeant, have the watering-buckets taken off the carriages 
and their horses watered without confusion. When water 
is very scarce, the nostrils may be sponged, which gives 
great relief, particularly in hot weather, when it is not 
possible to let the horses drink.

Toward the close of the march, an officer or non-commis-
sioned officer may be sent forward to select a camp-ground.

Upon the arrival of the battery in camp, damages must 
be repaired without delay, horses shod, wheels greased, etc. 
On the march, artificers must always ride, or be mounted 
on the chests; if fatigued with marching, they cannot be 
expected to work efficiently after getting into camp.

The march of larger bodies of artillery is conducted on 
the same principles.

When near the enemy, the artillery always marches with 
the bulk of the troops, its place being near the centre or rear 
of the infantry or cavalry, never at the head of the column. 
In campaign, if a battery does not march with troops of the 
other arms, a sufficient escort must always be provided.

Accidents to carriages.

1173. When an accident happens to a carriage, it is 
pulled out of the column, if possible, so as not to interrupt 
the march; otherwise, the carriages in rear pass it by the 
most convenient flank and close to proper distance. The
disabled carriage resumes its place as soon as the damage is repaired; if the road be narrow, it must fall into the first interval it finds, and regain its proper place as soon as the ground permits.

The caisson of a disabled piece remains with it; a piece, however, does not remain with its disabled caisson, the caisson corporal, and men to assist him, if necessary, being left behind.

1174. When a piece and its carriage are overturned, it is better to disengage the piece by letting the breech rest on the ground, or on a block of wood, and by then raising the muzzle with a handspike, while the cap-squares are taken off; the carriage is then righted and the piece mounted.

To right the carriage without disengaging the piece, detach the limber, secure the cap-squares, and lash the knob of the cascabel to the stock; place the middle of a rope over the nave of one wheel, pass the ends of it downward between the lower spokes of that wheel, then under the carriage, through the corresponding spokes of the other wheel, and then upward over the wheel and across the top of the carriage to the side where it was first attached; the ends of the rope and the wheel to be raised are then manned, and the carriage pulled over, two men being required to steady the trail. If necessary, the ends of the rope may be fastened to the limber, and horses used to assist in righting the carriage.

A piece and its carriage may be also righted without disengaging the piece as follows: detach the limber; fasten two prolonges, or the middle of a picket-rope, to the trail; chock the wheels; and dig an oblong hole under the muzzle about two and a half feet deep; pass one of the prolonges, or one end of the picket-rope, over the carriage to the tent; man the ends of the prolonges, or picket-rope; then e the trail and pass it over the axle to the opposite side.
Light carriages may be righted by hand without using a rope.

Ascents.

1175. After pulling up a short steep hill, the horses should be halted to recover their wind; when this cannot be done, they will move very slowly.

In going up a difficult hill, the carriages may be halted to rest the horses, by bringing them across the declivity and locking the limbers or chocking the wheels; for this purpose, it may be expedient to start the sections, or platoons, from the bottom in succession, leaving a distance of twenty or thirty yards between the different portions of the column.

If the draught be so difficult that the teams are liable to stall, some of the carriages in rear are halted and their leaders hitched to the teams in front; on completing the ascent, these leaders are sent back to the carriages which have halted, with as many additional pairs as may be required. As it is very hard to make the horses pull together, not more than five pairs can be hitched with effect to a single carriage.

Descents.

1176. The drivers never dismount in going down-hill; the wheel-driver holds his near horse well in hand, and his off horse very short; the other drivers barely stretch their traces. If the hill be steep, the wheels may be locked; if very steep, the prolonge may be used by the cannoneers to hold back; in this case the wheel-horses only remain hitched to the carriage, the others being led in rear.

In mounted batteries, the cannoneers usually attend to the locking; in horse batteries, the swing-driver, or with a team of but two pairs, the lead-driver, dismounts for this
purpose; should there be a ditch or other dangerous place on the road-side, the wheel toward that side is locked in preference to the other.

**Moving along declivities.**

1177. If a carriage have to move along a declivity so steep that a slight jolt may overturn it, a prolonge is fastened to the lower side of the carriage, and held by two or three cannoneers who march on the upper side of the slope; the rope passes over the carriage.

**Ditches.**

1178. If the ditch be wide and deep, the prolonge is fixed and the handspike taken out; the team is halted on the edge, and the piece run by hand close to the limber, which then moves slowly until the piece reaches the bottom of the ditch, when it moves quickly until the piece is out. If the ditch be deep and narrow, it may be necessary to cut down the edges, and hold back with prolonges; should the trail sink into the ground in passing over, it is disengaged with a handspike, or by fastening a prolonge to it.

In passing shallow ditches, drains, or deep furrows, the carriages must cross them obliquely.

**Moving over marshy ground.**

1179. Each carriage moves at a distance of ten or twelve yards from the one preceding it, to avoid having to halt; officers, or non-commissioned officers, are posted at the worst places to instruct the drivers how to conduct their teams. The horses must pull freely and quicken the gait; if the ground be very miry, it may be necessary to assist with prolonges, or even to use them alone, the teams singing separately.
Crossing fords.

1180. If the ford be not well known, it must be examined, and the dangerous places marked, before the carriages attempt to cross.

If the water be deep and the current strong, great care is necessary. The men are instructed to keep their eyes fixed on some object on the opposite bank which marks the place of exit; they must not look at the stream, and move rather against the current, so as to better resist its power.

If the ford have a bad bottom, and the banks be difficult, the teams are strengthened by adding pairs; an officer, or non-commissioned officer, is posted at the entrance to regulate the distance between carriages, and to instruct the drivers how to proceed; a second officer, or non-commissioned officer, is posted at the exit to direct the drivers how to leave the ford.

The management of the team is the same as in crossing marshy ground; the horses must not be allowed to halt, or trot, either in passing the ford or in leaving it, unless the stream be neither deep nor very rapid; in this case, the carriages may be halted to let the horses drink, or at least to give them a mouthful of water.

Upon reaching the opposite bank, the leading carriages are halted after they have moved far enough forward to leave room for the carriages in rear.

If the chests be not water-tight, and are at the usual height of two feet ten inches above the ground, a ford deeper than two feet four inches cannot be crossed without danger of wetting the ammunition.

If the chests be water-tight, or means have been taken to raise them high enough, a depth of three and one-third feet may be safely attempted.
When the ford is deeper than this, the cannoneers must carry over the cartridges, fuses, and primers, in the pouches which they hold above the water. The chests are sometimes removed and taken over in boats.

Crossing deep streams without bridges.

1181. In crossing rivers which cannot be forded, when there are no bridges, the horses are swum, and the carriages and harness crossed on rafts, etc.; if the rivers be broad and swift, it is too hazardous for horses to be ridden; in this case, a horse known to be a good swimmer is ridden without saddle as a leader, the other horses following without riders; the horses are led or driven to the bank, and can generally be made to take the water without much trouble. The bridle-reins must be secured to prevent the horses from getting their legs entangled. A horse swims easily and safely with a man floating and holding to the mane or tail.

Passage of military bridges.

1182. At the entrance of the bridge, the lead and swing drivers dismount and lead their pairs. A distance of twelve yards is taken between the carriages, and the gait is free and decided; the drivers keep the carriages as near the middle of the flooring as possible, and must not halt; if the bridge crack under a carriage, it must increase its gait and get over as fast as possible. If the flooring be wet, battens should be nailed across it to keep the horses from falling. If the bridge begins to rock, the passage of the column is suspended.

In passing over a flying bridge, all the drivers dismount and hold their horses; it may be occasionally advisable to take the horses out; and in boisterous weather, or at night, the wheels may be locked.
Passage on ice.

1183. Ice two inches thick will bear infantry.
Ice four inches thick will bear light guns or cavalry.
Ice six inches thick will bear heavy field-guns.

Facing a battery to the rear on a narrow road.

1184. All the carriages are moved close to one side of
the road, and the pieces and caissons unlimbered and
brought about; the limbers then take their places in front
of their carriages by an about, and the carriages are lim-
bered up; if there be not room for the limbers to execute
an about, the horses are taken out.

If the road be so narrow that the limbers cannot pass
the carriages, the trails of the pieces and the stocks of the
caissons are carried round until perpendicular to the road,
and are then placed against the bank, the wheels being run
close to it; on an embankment, or a road with ditches on
each side, the carriages are run as close to the edge as pos-
sible, the wheels chocked or locked, and the trails and
stocks held up while the limbers pass.
BATTERIES ON TRANSPORTS.

1185. TRANSPORTS for horses should be specially prepared for the purpose; as a rule, the larger the vessel the better is she adapted for the conveyance of horses. Ventilation is of primary importance, the safety and condition of the horses mainly depending upon their having plenty of fresh air; large air-ports or scuttles are indispensable; and wind-sails down every hatch to each deck should be insisted upon. If time permits, fixed air-shafts should be provided for each deck; the ventilation of steamers may be assisted by using the donkey-engines for this purpose.

1186. The stalls are preferably between-decks; never, if it can be avoided, in the hold; should horses be put on the spar-deck, nothing will be stowed on the stall-sheds. Stalls should be about six and a half feet long, twenty-eight inches wide; tail-boards fastened to the rear posts, and padded as low as the hock; breast-boards and side-boards fitted in grooves about four feet from the floor, the first padded on the inner side and upper edge, the latter on both sides; the floors of the stalls set on blocks that the water may pass under them; four slats across each floor, to give the horses foothold. Troughs should be made to hang with hooks, so as to be easily removed.

Before the embarkation the side-boards are removed, and replaced as each horse is put in his stall.

Embarkation of horses.

1187. If made from a wharf, the horses are slung; or,
if the height of the vessel’s side permit, they are led by ramps to the deck and then lowered. If the transport cannot lie at a wharf, the horses are brought alongside in lighters and transferred by slings.

In hoisting horses on board, the slings are made fast to a hook at the end of the fall, or the knot is tied by an expert seaman so that it may be well secured and easily loosed; each horse is run up quickly to prevent him from plunging; his ascent and descent are regulated by two guys attached to the halter, one being held on the wharf or lighter, and the other on the transport. A portable stall may be also employed, into which a horse may be led; the stall is then hoisted by a donkey-engine.

Horses will not be put on board after severe exercise, nor unless perfectly cool.

Care of horses during the voyage.

1188. The horses must not be overfed, and bran should form part of their diet. At the usual hours for stable-duty, the eyes and nostrils of each horse are wiped with a wet rag; occasionally, the nostrils should be sponged with vinegar and water, and the troughs washed out.

Should any contagious disease appear, the horse or horses attacked will be promptly thrown overboard, and the precautions taken as prescribed under the head of sick horses.

Embarkation of matériel.

1189. The pieces and caissons are brought to the wharf or shore and unlimbered, and the chests and wheels taken off; each set of implements is strapped together, the washers and linch-pins being put in a box; the harness is tied and labeled in sets; if the voyage is to be short, the harness for each horse may be tied up in its blanket. The forge
and battery-wagon are unlimbered, and the limber-chests taken off, as well as the spare parts outside of the wagon. All the chests are distinctly marked, so that it can immediately be seen where they belong.

The pieces are first lowered to their places between decks, the place for dismounting them depending upon the manner of embarking; then the carriages, limbers, implements, and wheels; the harness is placed (regard being had to its preservation) where it may be of easy access.

The box of washers and linch-pins is in the special charge of a non-commissioned officer.

The forge and battery-wagon, with their limbers and limber-chests, are stowed away from the battery, but where they will be accessible.

Disembarkation of batteries.

1190. When the transport is at a wharf, no especial directions are necessary; generally, the debarkation is in the inverse order of the embarkation.

At a distance from the shore, lighters are employed, upon whose decks the horses are lowered; when these have approached as near the shore as possible, the horses are backed over their sides, and swim ashore.

The battery may be landed in surf-boats or flats, according to the nature of the shore.
RAILWAY TRANSPORTATION.

1191. Batteries should be loaded, if possible, at the places intended for loading cattle.

The horses are carried in cattle-cars, those of the same teams being as far as possible put together; the horses being unharnessed, a quiet horse is first led into the car and the others generally follow without difficulty; a very restive horse has sometimes to be backed in. As many horses are packed in each car as possible, experience having shown that they are then less likely to fall down or be injured during the journey. A liberal allowance of hay is put in front of the animals.

The harness and horse equipments are carried in baggage-cars; the harness for each horse is tied up in its blanket, which should be marked or labeled. In loading the harness, that of each team and section is placed in regular order.

The matériel is carried on trucks; the carriages are unlimbered, the trails and stocks resting on the floor of the truck; the limbers are lashed to the carriages, and all the wheels are chocked by pieces of wood nailed to the floor of the truck.

If the battery is to leave the train at some other point than a regular station or siding, skids, planks, etc., for unloading, are taken along.

43
CAMPING.

1192. (Pl. 1.) The pieces and caissons are parked at fourteen yards interval.

The harness of the team of each carriage is on a rack on the right, and close to the carriage, so that the paulin can cover the harness. Horse equipments are kept on the racks or in the tents.

The picket-line is fifteen yards in rear of the caissons; it is stretched between posts about six feet high, the ends being firmly secured; the horses are tied to the picket-line by the halter at intervals of a yard.

The men's tents are pitched in line, about thirty yards in rear of the picket-line; the first-sergeant's tent covers the carriages of the right section; the left guard-tent covers the carriages of the left section; the tents of each section are in the order of their pieces in park, and are closed on the centre, or to the right, so as to have a vacant space between the guard-tents and the tents of the left section. The men's kitchens are in line ten yards in rear of the guard-tents, which may be faced to the right so that No. 1 can overlook the kitchen.

The officers' tents are in line thirty yards in rear of the battery tents; the captain's tent is on the right, covering that of the first-sergeant. The officer's kitchens are ten yards in rear of their tents.

The battery-wagon, baggage-wagons, and forge, are in line thirty yards in rear of the officers' tents; the battery-wagon covers the captain's tent; the forge covers the left yard-tent.
CAMPING.

Plate 1.

Guard

Kitchen

Officers

Sink

Sink
The sinks are fifty yards in rear of the wagons; the officers' sink on the right, the men's sinks on the left.

The location of a camp should be susceptible of good drainage, and be near fuel, water, and the road.

When time permits, the rows of tents are ditched, and a shallow ditch is made round each tent.

When straw or leaves are at hand, the men are required to raise their beds above the ground; attention to this rule, to cleanliness, and to the proper cooking of food, will greatly lessen the number and frequency of camp-diseases.

On arriving in camp, sinks should be dug at once, unless the march is to be resumed on the following morning.

The sinks are concealed by bushes, when practicable, and must be covered daily with fresh earth.

1193. (Pl. 2.) The preceding order may be modified as circumstances require; the battery-wagon and baggage-wagons may be in line with the pieces, the interval between the battery-wagon and nearest piece being fourteen yards, that between the battery-wagon and left baggage-wagon about thirty yards; the guard-tents, half-way between the battery-wagon and baggage-wagons, facing to the rear; the forage-pile, between the guard-tents and the baggage-wagons; the forge, in line with the caissons and covering the right baggage-wagon; the men's kitchens in line with the caissons, and covering the left baggage-wagon; the officers' tents on a line perpendicular to the men's tents, facing them, and on the prolongation of one of the baggage-wagons; the officers' kitchen in rear of the officers' tents, and on the prolongation of the forge.

1194. In a horse battery, if but one picket-line be used, it may be turned equally to the front around the flanks of the park; the battery-wagon, forge, and baggage-wagons, may be divided equally and placed on the flanks of the men's tents, facing inward, and so as to be on the prolon-
gage-wagons should be equally divided upon lines to the rear of its extremities. The horses are sometimes picketed in two lines, in which case the second line is fourteen yards in rear of the first, and the wagons are in line thirty yards in rear of the men’s tents.

**Bivouacs.**

1195. In a single platoon of a mounted battery, the pieces and caissons are parked at eight yards interval; the horses are tied to the prolonges (twenty-four feet long) stretched between the hind-wheels of the pieces, the distance between the pieces and caissons being increased; the harness, etc., is placed on the carriages, and any implements which could be injured by the horses are removed. If there be no forage on the caissons, the prolonges may be stretched between the hind-wheels of these carriages, the spare wheels being taken off. The men bivouac at a convenient distance in rear of the caissons; the guard is on the flank; the cook-fire is near the guard-tent.

1196. In a single platoon of a horse battery, the carriages are parked in one line with ten yards interval; the prolonges are lengthened by lariats doubled or trebled. If platoons are liable to be often detached, a rope should be provided for the cannoneers’ horses.

1197. A battery bivouacs in a similar manner; the battery-wagon and forge are in line with the pieces; the picket-rope is ordinarily used instead of the prolonges.

1198. When practicable, the picket-rope, or prolonges, should be stretched between trees, etc., so as not to run the risk of having the carriages gnawed by the horses.
POINTING AND RANGES.

1199. The axis of the piece is the axis of the bore. The line of fire is the axis of the bore prolonged. The plane of fire is a vertical plane, through the line of fire. The line of sight is the right line from the eye to the object to be hit, passing through the front and rear sights. The angle of sight is the angle which the line of sight makes with the axis of the piece. The natural line of sight is the right line passing through the highest point of the base of the breech, and the top of the front sight. The disparat of a piece is the difference between the largest exterior radius of the base of the breech and the exterior radius of the muzzle, or of the largest exterior radius of the swell of the muzzle. The height of the front sight of every light gun is equal to the disparat of the piece; the natural line of sight is consequently parallel to the axis of the piece.

Theory of pointing.

1200. When a projectile is fired, it is acted upon by the force of gravity as soon as it leaves the gun, and begins to fall below the line of fire at the rate of sixteen and one-half feet during the first second, sixty-four and one-third feet during the second, one hundred and forty-four and three-fourths during the third, and so on in proportion to the time of flight; the projectile consequently describes a curve, called the trajectory.
When the natural line of sight is horizontal, the point where the projectile first strikes the horizontal plane on

Plate 1.

\[ \text{AB Axis of the piece. BC Line of fire. DE Natural line of sight. ab Dispar. H Point blank. GH point-blank range.} \]

which the gun stands is the \textit{point blank}, and the distance to the point blank is the \textit{point-blank range}.

The distance of the point blank increases with the velocity, the diameter, and the density of the ball, but the effect is so slight as to be disregarded in practice.

To hit an object at or within the point blank, aim directly at the object along the natural line of sight.

To hit an object beyond the point blank, the muzzle

Plate 2.

\[ \text{must be elevated; this is done by erecting artificial sights upon the breech, by which new lines of sight are obtained. To point the piece accurately, these lines of elevation must be accurately measured; for this purpose a hausse, or rear-sight, is used.} \]

\textit{Pendulum-hausse.}

1201. (\textit{Pl. 3.}) The pendulum-hausse consists of a scale
and slider. The scale is made of sheet-brass; at the lower end is a brass bulb filled with lead. The slider is of thin brass, and is retained in any desired position on the scale by means of a brass set screw with a milled head. The scale is passed through a slit in a piece of steel, with which it is connected by a brass screw, forming a pivot on which the scale can vibrate laterally; this slit is made long enough to allow the scale to take a vertical position in any ordinary inequality of the ground on which the wheels of the carriage stand; the ends of this piece of steel form two journals, by means of which the scale is supported on the seat attached to the piece, and is at liberty to vibrate in the direction of the axis of the piece.

The seat for suspending the pendulum-hausse upon the piece is screwed to the base of the breech in such a manner that the centres of the two journal-notches shall be at a distance from the axis equal to the greatest exterior radius of the base of the breech.

The height of the front-sight being equal to the dispar of the piece, a line from the top of the muzzle-sight to the zero, which is the pivot of the scale, is parallel to the axis of the piece; hence the vertical plane of sight passing through the centre line of the scale and the top of the muzzle-sight, will be parallel to the axis in any position of the piece; the scale will therefore always indicate correctly the angle which the line of sight makes with the axis. The hausse, the seat, and the muzzle-sight, vary, in their construction and arrangement, with the piece for which they are intended. The graduations on the scale are the tangents of each quarter-degree to a radius equal to the distance between the muzzle-sight and the centre of th
journal-notches, which are in all cases one inch in rear of the highest point of the base of the breech.

Estimating distances.

1202. As accuracy of fire depends largely upon a correct knowledge of distance, officers and men will be frequently practised in pacing and estimating distances, the appearance of men at different distances being carefully impressed upon them.

With ordinary eyesight, masses of troops are distinguishable at sixteen hundred yards; infantry from cavalry at twelve hundred yards; single figure, one thousand yards; movements of arms and legs at eight hundred yards; upper part of body at six hundred yards; head at five hundred yards; faces and principal parts of uniform at three hundred yards; buttons at one hundred and fifty yards; eyes at eighty yards; white of the eyes at thirty yards.

The first graze of two or three shots fired successively should, however, be principally relied upon to correct any previous estimate of distance. In all cases it is better to under-estimate than over-estimate distance, as the error can then be more easily seen and corrected.

A portable measuring instrument, called a range-finder, may be employed whenever it can be done to advantage.

Different kinds of fire.

1203. Artillery-fire is either direct or ricochet. It is direct when the projectiles hit the object without touching any intermediate point; this fire is necessarily employed for case-shot, for all elongated projectiles, which, from their form, are very easily deflected, and generally in all cases where great percussive and penetrative effect is required. When the object aimed at is below the level of
the piece, direct fire becomes *plunging*; it is principally effective against the decks of vessels, or upon ice.

Fire is *ricochet* when the projectiles are thrown so as to rebound; it can only be used on tolerably hard, level, and unobstructed ground, or over water; with rifled guns it is unreliable and should not be attempted. Ricochet fire becomes *rolling*, when the axis of the piece is parallel, or nearly so, with the ground.

*Deviation of projectiles.*

1204. If the wheels of a carriage do not rest upon the same horizontal plane, the projectile will deviate toward the lower side of the carriage. This deviation is corrected by pointing to the side of the higher wheel and at a distance from the object proportional to the range; at short ranges, the use of the pendulum-hausse renders correction unnecessary.

If the wind blow across the line of fire, the projectile will deviate to the side opposite the wind; the deviation varies with the strength of the wind, the angle its direction makes with the line of fire, and the velocity of the projectile. Deviation from wind, which is greater with light than with heavy guns, can only be corrected by the experience and judgment of the gunner.

1205. Rifle-projectiles have a deviation peculiar to themselves called *drift*, which is a constantly-increasing divergence from the plane of fire, in the direction of the twist of the grooves. If the bore be grooved with a right-handed twist, so that the projectile rotates from left to right, the drift is to the right; if the twist be left-handed, the drift is to the left. The twist being right-handed in all rifled guns in our service, the deviation due to drift is corrected by pointing more or less to the left depending upon the range.

1206. If the centre of gravity of a spherical projectile be not coincident with the centre of figure, the projectile will
deviate toward the heavier side; that is, in the direction that the centre of gravity of the projectile, while resting in the piece, lies with respect to the centre of figure; therefore a shot, if placed in the piece so that its centre of gravity is to the right of the centre of the ball, will deviate toward the right, and *vice versa*. If the centre of gravity be above the centre of figure, the range will be increased; if below, it will be diminished. In field-service, this deviation is neglected, as its correction is beyond the control of the gunner.

**Ranges.**

1207. *Range* is the distance in yards from the piece to the point where a projectile fired with any given elevation first strikes the horizontal plane drawn through the centre of the muzzle.

*Extreme range* is the distance to the point where the projectile finally rests.

1208. The tables of ranges for the three-inch rifle and twelve-pounder were constructed by Brevet Brigadier-General J. A. Haskin, Lieutenant-Colonel 1st Artillery, by means of Didion's formula; they agree remarkably well with the ranges obtained in practice.

The range of a case-shot is the distance at which the shot bursts near the ground in the time given, thus showing the elevation and the length of fuse required for certain distances.

The time of flight may be approximately found by allowing one second for every three hundred yards. This rule is only applicable for distances less than two thousand yards.

It has been found that greater ranges than those given in the table may safely be obtained from the twelve-pounder by shortening or sinking the trail, thus admitting of elevations that cannot be given with the present construction of the carriage.
### 440 yards is

| 880 | ... | ... | ... | ... | 1/3 mile. |
| 1,320 | ... | ... | ... | ... | 2/3 " |
| 1,760 | ... | ... | ... | ... | 1 “ |
| 2,640 | ... | ... | ... | ... | 1 1/2 “ |
| 3,520 | ... | ... | ... | ... | 2 “ |
| 4,400 | ... | ... | ... | ... | 2 1/2 “ |

#### Three-inch rifle.

### DYER SHELL.

Charge 1 lb.; weight 9 lbs.; initial velocity 1,282.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30 min.</td>
<td>258</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td>1 min.</td>
<td>489</td>
<td>1.29</td>
<td></td>
</tr>
<tr>
<td>2 min.</td>
<td>700</td>
<td>1.91</td>
<td></td>
</tr>
<tr>
<td>3 min.</td>
<td>892</td>
<td>2.53</td>
<td></td>
</tr>
<tr>
<td>4 min.</td>
<td>1,070</td>
<td>3.12</td>
<td></td>
</tr>
<tr>
<td>5 min.</td>
<td>1,234</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>6 min.</td>
<td>1,386</td>
<td>4.25</td>
<td></td>
</tr>
<tr>
<td>7 min.</td>
<td>1,530</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>8 min.</td>
<td>1,794</td>
<td>5.87</td>
<td></td>
</tr>
<tr>
<td>9 min.</td>
<td>2,031</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>10 min.</td>
<td>2,244</td>
<td>7.87</td>
<td></td>
</tr>
<tr>
<td>12 min.</td>
<td>2,441</td>
<td>8.83</td>
<td></td>
</tr>
<tr>
<td>20 min.</td>
<td>2,621</td>
<td>9.75</td>
<td></td>
</tr>
<tr>
<td>10 min.</td>
<td>2,788</td>
<td>10.67</td>
<td></td>
</tr>
<tr>
<td>12 min.</td>
<td>3,114</td>
<td>12.45</td>
<td></td>
</tr>
<tr>
<td>20 min.</td>
<td>3,972</td>
<td>17.88</td>
<td></td>
</tr>
</tbody>
</table>

The ranges of other varieties of the 3-inch projectiles do not vary greatly from those here given.
The following tables of ranges for mitrailleurs were obtained from experimental firing at Fort Monroe, Va., in 1866:

**Half-inch mitrailleur.**

<table>
<thead>
<tr>
<th>Projectile</th>
<th>Elevation</th>
<th>Range, yards</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>degrees</td>
<td>minutes</td>
</tr>
<tr>
<td>.</td>
<td>51'</td>
<td>100</td>
</tr>
<tr>
<td>.</td>
<td>54\frac{1}{3}'</td>
<td>200</td>
</tr>
<tr>
<td>1°</td>
<td>05'</td>
<td>300</td>
</tr>
<tr>
<td>1°</td>
<td>26'</td>
<td>500</td>
</tr>
<tr>
<td>1°</td>
<td>52'</td>
<td>700</td>
</tr>
<tr>
<td>2°</td>
<td>25'</td>
<td>900</td>
</tr>
</tbody>
</table>

**One-inch mitrailleur.**

<table>
<thead>
<tr>
<th>Projectile</th>
<th>Elevation</th>
<th>Range, yards</th>
<th>No. of fires</th>
<th>No. of bits</th>
<th>Time of firing</th>
<th>Size of target</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>deg.</td>
<td>min.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CANISTER</td>
<td>.</td>
<td>30'</td>
<td>100</td>
<td>29</td>
<td>291</td>
<td>22'</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>50'</td>
<td>150</td>
<td>101</td>
<td>691</td>
<td>1'30''</td>
</tr>
<tr>
<td>charge, ½ oz.</td>
<td>.</td>
<td>55'</td>
<td>200</td>
<td>74</td>
<td>322</td>
<td>&quot;</td>
</tr>
<tr>
<td>SHOT</td>
<td>2°</td>
<td>35'</td>
<td>800</td>
<td>110</td>
<td>49</td>
<td>1'23'</td>
</tr>
<tr>
<td>charge, ½ oz.</td>
<td>3°</td>
<td>20'</td>
<td>1,000</td>
<td>92</td>
<td>50</td>
<td>1'</td>
</tr>
<tr>
<td></td>
<td>4°</td>
<td>30'</td>
<td>1,200</td>
<td>87</td>
<td>22</td>
<td>12 × 12 &quot;</td>
</tr>
</tbody>
</table>

Before a board of Naval officers, ten shots were fired at an elevation of 10° 40', giving by the plane table an average distance of 2,800 yards.
Twelve-pounder smooth-bore.

<table>
<thead>
<tr>
<th>Elevation (deg. min.)</th>
<th>Range (yards)</th>
<th>Elevat’n (deg. min.)</th>
<th>Range (yards)</th>
<th>Time (sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 00</td>
<td>181</td>
<td>30 00</td>
<td>324</td>
<td>.77</td>
</tr>
<tr>
<td>30 00</td>
<td>320</td>
<td>30 00</td>
<td>324</td>
<td>.77</td>
</tr>
<tr>
<td>45 00</td>
<td>452</td>
<td>1 00</td>
<td>554</td>
<td>1.45</td>
</tr>
<tr>
<td>1 00</td>
<td>562</td>
<td>1 15</td>
<td>662</td>
<td></td>
</tr>
<tr>
<td>1 30</td>
<td>750</td>
<td>1 30</td>
<td>733</td>
<td>2.09</td>
</tr>
<tr>
<td>1 45</td>
<td>832</td>
<td>2 00</td>
<td>906</td>
<td></td>
</tr>
<tr>
<td>2 00</td>
<td>906</td>
<td>2 30</td>
<td>1,040</td>
<td></td>
</tr>
<tr>
<td>2 30</td>
<td>1,040</td>
<td>3 00</td>
<td>1,158</td>
<td></td>
</tr>
<tr>
<td>3 00</td>
<td>1,261</td>
<td>3 30</td>
<td>1,218</td>
<td>4.3</td>
</tr>
<tr>
<td>3 30</td>
<td>1,261</td>
<td>4 00</td>
<td>1,355</td>
<td></td>
</tr>
<tr>
<td>4 00</td>
<td>1,521</td>
<td>5 00</td>
<td>1,663</td>
<td></td>
</tr>
<tr>
<td>5 00</td>
<td>1,788</td>
<td>6 00</td>
<td>1,899</td>
<td></td>
</tr>
<tr>
<td>6 00</td>
<td>1,999</td>
<td>7 00</td>
<td>2,090</td>
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<table>
<thead>
<tr>
<th>Elevat’n (deg. min.)</th>
<th>Range (yards)</th>
<th>Time (sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 00</td>
<td>324</td>
<td>.77</td>
</tr>
<tr>
<td>1 00</td>
<td>554</td>
<td>1.45</td>
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<tr>
<td>1 30</td>
<td>733</td>
<td>2.09</td>
</tr>
<tr>
<td>1 45</td>
<td>906</td>
<td></td>
</tr>
<tr>
<td>2 00</td>
<td>1,040</td>
<td></td>
</tr>
<tr>
<td>2 30</td>
<td>1,158</td>
<td></td>
</tr>
<tr>
<td>3 00</td>
<td>1,261</td>
<td></td>
</tr>
<tr>
<td>3 30</td>
<td>1,355</td>
<td></td>
</tr>
<tr>
<td>4 00</td>
<td>1,521</td>
<td></td>
</tr>
<tr>
<td>5 00</td>
<td>1,788</td>
<td></td>
</tr>
<tr>
<td>6 00</td>
<td>1,999</td>
<td></td>
</tr>
<tr>
<td>7 00</td>
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<td>8 00</td>
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<td>9.64</td>
</tr>
<tr>
<td>9 00</td>
<td>1,919</td>
<td>10.34</td>
</tr>
<tr>
<td>10 00</td>
<td>1,979</td>
<td>11.98</td>
</tr>
</tbody>
</table>
FIELD SERVICE AND BATTLES.

Artillery in the field.

1209. The use of artillery in the field depends upon the character and organization of the troops on both sides, and the nature of their operations. The consideration of these conditions and of the various questions as to the proportion which the reserve artillery should bear to the corps artillery, the proper organization of reserve artillery, etc., properly belongs to grand tactics.

Light artillery is used to attack and defend temporary fortifications; to destroy material obstacles and means of cover, and thus assist the other arms; to break an enemy's line or prevent his forming; to crush his batteries; to follow and support in pursuit; and to cover and protect in retreat.

Choice of position.

1210. The commander of the artillery brigade, or battalion, precedes the batteries and selects the exact ground each is to occupy; otherwise this duty is performed by the captains.

The proper choice of position is of vital importance; the safety of the pieces, and, to a great degree, the efficacy of the fire, depends upon the advantage that is taken of the accidents of the ground.

The best position for batteries, so far as the profile of the ground is concerned, is just behind the brow of a gentle
eminence, sloping very gradually toward the enemy, and more suddenly to the rear so as to give cover.

If the ground do not fall away in rear, the pieces, whenever practicable, must be sunk by digging the earth away where they are to stand and banking it in front and on the sides; the cut slopes gently downward and to the front.

By taking advantage of any little accident of the ground, such as a low bank, or a slight depression, shelter may often be had or labor saved in creating it artificially. The recent improvements in small-arms have made cover more necessary than ever for the protection of batteries.

If the ground slope so abruptly to the rear that the recoil would run the pieces down the slope, a small platform must be cut in the side-hill.

If the position be too high, the battery is often unable to command ground in its immediate front, besides making itself a target for the enemy's guns; the advantages of a flat trajectory are lost; and the effect of the projectiles is seriously impaired, as they strike with great velocity, and either bury themselves in the ground or ricochet high in the air.

On the other hand, if the position be too low, no view can be had of the field of battle, or of the enemy's movements, and an effective fire is impossible.

So far as the nature of the ground itself is concerned, obstructions that splinter freely and rocky places are to be avoided, lest men and horses be struck by splinters or fragments of stone; wooden buildings, hay-stacks, and other combustible objects are even more objectionable; marshy ground in which it is hard to move the pieces by hand is also unfavorable. If there be woods, or other cover for the enemy's skirmishers within musket range of the position, it must not be chosen unless the cover be occupied by
our own troops; otherwise the battery will be disabled by the loss of its men and horses.

If there be a railway cutting, canal, or sunken road parallel to the front of the battery, the pieces should be put into position close to the edge, as all projectiles falling a little short are caught by the slope in front. Batteries may be posted with advantage behind a pond, swamp, or stream; a position of this kind is secure from a sudden advance of the enemy as well as unfavorable to his artillery-fire.

Facility of movement in every direction is always desirable; the communications on all sides must be carefully examined, and whenever fences, walls, or ditches interfere, openings or crossings will be made.

1211. In supporting a battery, infantry or cavalry is posted on the flanks of the position, and never in its rear.

**Time to open fire.**

1212. If the ground and the state of the atmosphere be favorable, rifle-guns may open fire at twenty-five hundred yards, or, in exceptional cases, at three thousand yards; but the object aimed at must be well defined, the range carefully determined, and the firing calm and very deliberate.

The increased range and effect of infantry fire, by impairing the utility of guns at short distances, have added to the importance of their fire at long ranges.

**Choice of object.**

1213. The object upon which the fire is directed changes constantly during an engagement. As a general rule, when acting offensively, the enemy's artillery should receive most attention, so as to distract its fire from our advancing troops; on the defensive, his guns should be
neglected, no matter how annoying, and the fire be directed upon his advancing infantry or cavalry.

It must always be remembered that artillery-fire is effective in proportion to its concentration. As far as possible the object will be so chosen that all the batteries of a brigade or battalion can be brought to bear upon it simultaneously.

It is a mere waste of ammunition to fire at a wood, because it is known, or supposed, to be held by the enemy; it is, ordinarily, equally futile to fire upon a small or detached group of men.

In firing at troops, lines or columns are enfiladed, if possible; if not, the centre of the formation is aimed at.

**Projectiles to be used.**

1214. The projectile to be used depends upon the character of the object fired at.

1215. *Percussion-shell*, or shell with the percussion fuse, is employed against troops in line or column, and against artillery; in opening fire, it is always used to get the range, the puff of smoke, from the explosion of the projectile, showing the exact striking-point.

For general purposes the percussion-shell is by far the most useful projectile; in very soft ground many of its fragments are buried, and its explosion is occasionally retarded, or even prevented, when the direction of impact diverges considerably from the direction of its axis; but the accuracy with which its range and effectiveness can be determined more than atones for these disadvantages.

1216. *Time-shell*, or shell with the time-fuse, is used against earthworks, buildings, block-houses, shipping, and combustible materials; the fuse is cut long.

1217. *Case-shot* is chiefly used against troops; it is intended to explode at from fifty to one hundred yards
in front of the object and from fifteen to twenty feet above it.

It should not be used at a less distance than five hundred yards except in cases of emergency, when, if the fuse be cut very short, it acts as canister.

The objections to case-shot are twofold: in the first place, the fuses are uncertain, the density of the composition, and hence its rate of burning, depending upon the hygrometric condition of the atmosphere at the time it is driven; secondly, it is impossible to find out, particularly at long ranges, whether the projectile explodes at the proper distance in front of the object, and consequently whether the fire is effective.

1218. Canister from rifled guns is effective up to about three hundred and fifty yards; within two hundred yards two canister projectiles with a single cartridge do most execution. The nature of the surface has a great influence on the utility of canister which is largely diminished in rough or soft ground, especially if covered with bushes or standing crops.

Batteries can no longer move up to short range of troops and open fire with canister; its use offensively is entirely ended. On the defensive, it will oftenest come into play in repelling assaults on earthworks or fortified positions.

1219. Solid shot is employed for percussion and penetration; with rifled guns it is usually dispensed with, case-shot without fuses, or with fuses uncut, being used in its stead.

1220. When necessary to fire over other troops, solid shot, or shell (preferably percussion), will be used; case or canister never.

Rapidity of fire.

1221. Wild and ineffective fire not only weakens us by
the loss of the projectiles, but gives confidence to the enemy; an officer who uselessly throws away his ammunition at the beginning of an engagement is in danger of finding himself helpless when his guns are most needed. In firing, care and accuracy in pointing, and close observance of effect, are of first importance; as both require time, the fire must be slow and deliberate. A heavy fire is produced by concentrating a number of guns on a single point, not by increasing the rapidity of fire of a small number. As a general rule, one shot per gun every four or six minutes is amply sufficient at distances from three thousand to fifteen hundred yards; as the range decreases, the fire may be quickened; in firing canister, the utmost rapidity is necessary, consistent with proper care in aiming.

1222. Ammunition will never be piled on the ground near the pieces, nor will fuses be cut more rapidly than the demand requires.

Changes of position in action.

1223. A battery is ordinarily moved forward if the enemy retire farther than twenty-five hundred yards from its position, as the fire is apt to become inefficient at greater distances.

When a position is not to be held, a battery should fall back as soon as the enemy’s infantry arrives at about nine hundred yards from the pieces; the fire is just as effective at greater ranges, while the chances are, particularly where there is no cover, that by remaining longer the battery will be disabled by losing its horses.

When a battery has once taken a position it should keep it as long as possible; every change of position requires a new determination of ranges, on the accurate knowledge of which the effect of the fire depends. As the range of rifled guns so greatly exceeds that of small-arms, it is ofte
possible for them to retain a single position, and yet render
effective service throughout a whole engagement; in any
event, rifled guns cannot be required to conform to the
minor movements of the infantry line, without an almost
total loss of efficiency.

A battery which has to change its position in action
is non-combatant as long as its pieces are limbered, hence
as little time as possible should be consumed in making the
movement; batteries in which all the cannoneers can be
carried on the off-horses, cannoneer-seats, and limber-
chests, have the advantage of being able to move at the
quickest gait that the nature of the ground permits; when
it is impracticable to move at a faster gait than the walk,
the cannoneers are not mounted.

Use of mitrailleurs.

1224. Although guns and mitrailleurs are sometimes
used for similar purposes, each has its special duty to per-
form, the rôle of mitrailleurs being most prominent at
short ranges, when that of rifled guns decreases in impor-
tance. Mitrailleur fire thus makes up for the very restricted
use of canister to which rifled guns are now reduced,
and mitrailleur batteries should support and protect guns
in positions which are to be held at any cost.

Mitrailleurs are best suited for defensive operations; in
action, they are posted, as a rule, to defend important por-
tions of the line; offensively, in attacks of intrenched
works, etc., when they can fire over the assaulting columns,
they may be used to silence the enemy’s guns at the mo-
ment of attack, and to cover the retreat of the assailants,
if driven back. If practicable, mitrailleur batteries are al-
ways posted under cover.

Mitrailleurs are peculiarly fitted for the defense of in-
trenched positions, villages, roads, defiles, and bridges; for
covering the embarkation or debarkation of troops, or the crossing of streams.

Mitrailleurs should be employed for ordinary street-fighting; for breaking down barricades guns are required.

Supply of ammunition in battle.

1225. The caissons, in charge of their chief, are posted some distance in rear, and, if possible, under cover from fire; their movements must conform to those of the pieces, so that the ammunition will be always available.

As the ammunition of the limbers of the pieces becomes exhausted, the caisson-limbers are brought up to take their places; the piece-limbers then move at once to the position of the caissons, and are limbered to the caisson-bodies.

As soon as the exchange of limbers is completed, the caisson corporals, assisted by the drivers if necessary, fill the empty limber-chests from the middle, or rear, chests; the limbers are then ready for another exchange.

The chief of caissons must not leave his caissons except by special order of the captain.

Replacing killed and wounded horses in battle.

1226. The spare horses accompany the caissons, and are under the direction of the chief of caissons; a few pairs may be advantageously equipped with spare harness, so as to be in constant readiness.

If there be no spare horses in harness, a disabled horse of a piece-team is usually replaced by the corresponding horse of the caisson-team, the caisson refitting with a spare horse and the harness of the disabled animal. When the supply of spare horses is exhausted, the caisson-horses must be taken in succession so that they may be gradually and regularly reduced.


Removing disabled pieces and carriages in battle.

1227. If a gun-carriage be disabled, the team is unhitched and the piece slung. A limber, besides carrying the piece, can take off a disabled carriage, if taken apart and lashed upon it; but, as the weight is very great, the disabled carriage must be transferred to the caisson as soon as possible.

If a limber be disabled, the trail of the carriage or caisson is attached to the rear of another carriage.

If a hind-wheel of either piece or caisson be disabled and cannot be replaced by another, the rear axle may be kept in position without a wheel by a pole ten or twelve feet long placed under the rear axle-body; one end of the pole rests on the ground, the other end is lashed over the front axle-body. The part of the carriage thus supported is relieved of as much weight as possible.

If a wheel be injured so that it cannot turn, a shoe of wood may be made and placed under it; a piece of round wood about three feet long and nine inches in diameter, with a groove on one side to receive the felloe, will answer for this purpose; the end in front is beveled, and the lock-chain fastened to it. The carriage is relieved of as much weight as possible.

Refitting after a battle.

1228. After an engagement, the captain at once replaces disabled horses, supplies the chests with ammunition, makes all the repairs possible, and reassigns officers and men.

After each day's action, a field return, if practicable, is made by the captain of each battery to the next superior artillery commander, showing the effective strength in officers and men, as well as in pieces, caissons, and horses, and stating the amount of ammunition expended and on hand; the return must give the names of officers killed, wounded, and captured. Chiefs
consolidate these returns, noting their action thereon with respect to refitting, and forward them promptly to the chief of artillery of the army.

To disable or destroy matériel.

1229. If necessary to abandon matériel, it must be disabled, or destroyed, so as to be useless to the enemy.

Guns are permanently disabled by bursting, bending the chase, breaking off the trunnions, or by scoring the surface of the bore; they are temporarily disabled by spiking, breaking off the sights and the seat for the hausse, or in breech-loaders by carrying off or destroying the breech-blocks, etc.

To burst a cast-iron gun, load with a heavy charge, fill the bore with sand or shot, and fire at a high elevation. To bend the chase of a bronze gun, fire a shotted piece against another, muzzle to muzzle, or muzzle to chase; or, kindle a fire under the chase and strike on it with a sledgehammer. To break off a trunnion of a cast-iron cannon, strike on it with a heavy hammer, or fire a shotted gun against it. To score the surface of the bore and injure the rifling, cause shells to burst in the gun, or fire broken shot from it with high charges.

To spike a gun, drive into the vent a jagged and hardened steel spike with a soft point, break it off flush with the vent-field, and clinch it in the bore with the rammer; a nail without a head, a piece of ramrod, or even a plug of hard wood, may be used in the absence of a spike. To prevent the spike from being blown out, make a projectile fast in the bottom of the bore by wrapping it with cloth or felt, or by means of iron wedges driven in with a rammer or with an iron bar; if the wedges were of wood, they could be easily burnt out by a charcoal-fire lighted with a pair of bellows.
When it is expected to retake a gun, use a spring spike with a shoulder to prevent its coming out too readily.

Mitrailleurs are permanently disabled by bending the barrels, etc.; they are made temporarily useless by removing the crank-handles, locks, etc.

Carriages are destroyed by piling them up and burning them; to prevent them from moving, the spokes and poles may be cut or sawed off. Ammunition-chests are blown up, or water is poured over their contents. Implements are carried off, or destroyed.

To render serviceable a temporarily-disabled gun.

1230. To unspike a gun, try to drive the spike into the bore with a punch; if there be a shot wedged in the bore, expel it by powder inserted through the vent. When it is impossible to drive down the spike, if the bore be unobstructed, insert a charge of one-third the weight of the projectile, and ram down junk wads with a handspike, first placing on the bottom of the bore a strip of wood with a groove on the lower side containing a strand of quick-match, by which the charge is ignited; this plan will not answer when the spike is screwed or riveted into the vent. In a bronze gun, remove some of the metal at the upper orifice of the vent, and pour sulphuric acid into the cavity before firing. Should the preceding methods fail, after several trials, drill out the spike, or drill a new vent, if the gun be iron; if it be bronze, unscrew the vent-piece.

To drive out a shot wedged in the bore, unscrew the vent-piece, if there be one, and drive in wedges so as to start the shot forward, then ram it back again, and with a hook withdraw the wedges that may have held it; or, pour in powder and fire it, after replacing the vent-piece. As a last resort, bore a hole in the bottom of the breech, drive out the shot, and stop the hole with a screw.
SQUARE KNOT.  BOW KNOT.  LOOPS.

SINGLE KNOT.  WEAVER'S KNOT.  FIGURE-EIGHT KNOT.  2 HALF HITCHES OR ARTIFICER'S KNOT.

MOORING KNOTS.

HITCHES.  CAPSTAN OR PROLONGE KNOT.
TRUMPET-SIGNALS.

1231. The assembly of trumpeters is the signal for the trumpeters to assemble; it precedes reveille, retreat, and tattoo, by such interval as may be prescribed by the commanding officer; it is also the first signal for all ceremonies dismounted.

When there is to be dress parade, or dress guard-mounting, dismounted, the signal for dress parade or dress guard-mounting is sounded immediately after the assembly of trumpeters.

Drill-call is the first signal for drill dismounted.

Boots and saddles is the first signal for mounted drill, and for all other formations mounted; it is also the signal for the trumpeters to assemble.

The assembly is the signal for forming the battery in ranks, and calling the roll; it is usually sounded five minutes after the termination of reveille, stable-call, boots and saddles, drill-call, and tattoo. It is also sounded after the signal for such other duties as require battery roll-call.

In large camps or garrisons, marches are played in the streets, or in front of the quarters between the assembly of trumpeters and the reveille and tattoo. When marches are played before the reveille and tattoo, the assembly may be sounded immediately after the reveille and tattoo.

The assembly precedes the retreat, the interval between them being only that required for formation and roll-call, except when there is dress parade.
When the drivers are near their horses, and the men are known to be present, the assembly may be omitted after boots and saddles, at the discretion of the commanding officer, in which case the drivers immediately proceed to their horses, and harness without further command; the cannoneers proceed to their guns.

Assembly of guard details is the signal for the details to form in ranks on their battery parade-grounds.

Adjutant’s call is the signal for batteries and guard details to assemble on the camp or garrison parade-ground.

The general is the signal for packing up effects, striking tents, and loading wagons, preparatory to marching.

To arms is the signal for preparing the battery for action, or for the march, with the least practicable delay.

Assembly, reveille, retreat, tattoo, adjutant’s call, the flourishes, and the marches, are sounded by all the trumpeters united; the other camp or garrison calls, as a general rule, are sounded by the trumpeter of the guard or orderly trumpeter.

The morning gun is fired at the first note of the reveille, or, if marches be played before the reveille, it is fired at the commencement of the first march.

The evening gun is fired at the last note of the retreat.

The signals for drill-movements include both the preparatory commands and the commands of execution.

The drill-signals are taught in succession, a few at a time, until all the officers and men are thoroughly familiar with them, some drills being specially devoted to this purpose.

When a command is given by the trumpet, the chiefs of subdivision give the proper commands orally. In the evolutions of large bodies of troops the subordinate commanders cause their trumpeters to repeat the signals of the chief trumpeter, who accompanies the commanding officer.
TRUMPET-SIGNALS.

The memorizing of these signals will be facilitated by observing that all movements to the right are on the ascending chord, that the corresponding movements to the left are corresponding signals on the descending chord; and that the changes of gait are all upon the same note.
TRUMPET SIGNALS.

To economize space, the music is written an octave higher than the trumpet scale, and is adjusted to the scale of the bugle.

1. Assembly of Trumpeters.

Quick.

Moderate.

2. Assembly.
13. Recall.

15. Watering.

Quick.

16. Boots and Saddles.

Quick.

17. Assembly of Guard Details.

Quick.

18. Dress Parade or Dress Guard Mounting.

Quick.
19. Adjutant's Call.

20. Officer's Call.

21. First Sergeant's Call.

23. To Arms.

Quick.

Repeat at will.
24. Fire Alarm.

Repeat at will.

25. Rogues' March.

Repeat at will.
TRUMPET SIGNALS.

26. Funeral March.

Very Slow.

\[\text{Musical notation}\]

Repeat at will.
TRUMPET SIGNS.

29. Flourish for Review.

Quick.

30. To the Color.

Quick time.

End.

D. C.
TRUMPET SIGNS.

32. Quickstep. No. 2.

33. Quickstep, No. 3.
34. Quickstep, No. 4.

F Trumpet.

C Crook.
TRUMPET SIGNALS.

Second time. End.

Da Capo.
36. **Attention.**

**Slow.**

37. **Drivers Mount.**

**Quick.**

38. **Drivers Dismount.**

**Quick.**

39. **Cannoneers Mount.**

**Quick.**

40. **Cannoneers Dismount.**

**Quick.**

41. **Forward.**

**Slow.**
42. Halt.

\[ \text{\textcopyright} \]

43. Walk.

\[ \text{\textadjustfont{\textcopyright}} \]

44. Trot.

\[ \text{\textcopyright} \]

45. Gallop.

\[ \text{\textcopyright} \]

46. Guide Right.

\[ \text{\textcopyright} \]

47. Guide Left.

\[ \text{\textcopyright} \]
Slow.

49. Reverse.  
Moderate.

50. Countermarch.

51. Column Right.  
Slow.

52. Column Left.  
Slow.

53. By the Right Flank.  
Moderate.
54. By the Left Flank.
Moderate.

55. Platoons Right Wheel.
Moderate.

56. Platoons Left Wheel.
Moderate.

57. Right Oblique.
Slow.

58. Left Oblique.
Slow.

59. Right Front into Line.
Moderate.
60. Left Front into Line.

Moderate.

61. Face to the Rear.

Slow.

62. On Right into Line.

Moderate.

63. On Left into Line.

Moderate.

64. Battery Right Wheel.

Quick.
TRUMPET SIGNALS.

65. Battery Left Wheel.

66. In Battery.

Moderate.

67. Commence Firing.

Quick.

68. Cease Firing.

Quick.
### Table of Contents

**ARTILLERY TACTICS**

<table>
<thead>
<tr>
<th>Command</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SCHOOL OF THE SOLDIER DISMOUNTED</strong></td>
<td></td>
</tr>
<tr>
<td>Position of the soldier (No. 12)</td>
<td>6</td>
</tr>
<tr>
<td>Remarks on the position of the soldier (No. 12)</td>
<td>7</td>
</tr>
<tr>
<td>To rest and dismiss the squad (No. 18)</td>
<td>8</td>
</tr>
<tr>
<td>Setting up (No. 17)</td>
<td>9</td>
</tr>
<tr>
<td>Eyes right or left (No. 18)</td>
<td>10</td>
</tr>
<tr>
<td>Salutes (No. 19)</td>
<td>10</td>
</tr>
<tr>
<td>Facings (No. 20)</td>
<td>11</td>
</tr>
<tr>
<td>Parade rest (No. 22)</td>
<td>11</td>
</tr>
<tr>
<td>Direct step (No. 23)</td>
<td>12</td>
</tr>
<tr>
<td>To march in the direct step (No. 26)</td>
<td>13</td>
</tr>
<tr>
<td>Short step (No. 30)</td>
<td>14</td>
</tr>
<tr>
<td>To mark time (No. 31)</td>
<td>14</td>
</tr>
<tr>
<td>To change step (No. 32)</td>
<td>15</td>
</tr>
<tr>
<td>Side step (No. 33)</td>
<td>15</td>
</tr>
<tr>
<td>Back step (No. 34)</td>
<td>15</td>
</tr>
<tr>
<td>To march to the rear (No. 35)</td>
<td>16</td>
</tr>
<tr>
<td>The double step (No. 36)</td>
<td>16</td>
</tr>
<tr>
<td>Alignments (No. 39)</td>
<td>17</td>
</tr>
<tr>
<td>To march in line (No. 41)</td>
<td>18</td>
</tr>
<tr>
<td>To march by the flank (No. 42)</td>
<td>19</td>
</tr>
<tr>
<td>To change direction in column of files (No. 46)</td>
<td>20</td>
</tr>
<tr>
<td>To oblique (No. 47)</td>
<td>20</td>
</tr>
<tr>
<td>To march backward (No. 50)</td>
<td>21</td>
</tr>
<tr>
<td>To march to the rear (No. 51)</td>
<td>21</td>
</tr>
<tr>
<td>To march in double time (No. 52)</td>
<td>21</td>
</tr>
<tr>
<td>To pass from quick time to double time, and the reverse (No. 53)</td>
<td>22</td>
</tr>
<tr>
<td>Wheelings (No. 54)</td>
<td>2</td>
</tr>
<tr>
<td>Wheeling on a fixed pivot (No. 57)</td>
<td>2</td>
</tr>
</tbody>
</table>
### TABLE OF CONTENTS

**Wheeling on a movable pivot (No. 60)** ............................................................... 24  
**Double rank (No. 63)** ......................................................................................... 25

#### Manual of the Sabre.

- **To open and close files (No. 75)** ............................................................... 26  
- **Draw sabre (No. 78)** ..................................................................................... 27  
- **Present sabre (No. 79)** ................................................................................ 28  
- **Inspection sabre (No. 80)** ........................................................................... 28  
- **Return sabre (No. 81)** ................................................................................ 28  
- **To rest, and to dismiss the squad (No. 82)** ................................................. 29

#### Sabre Exercise.

- **Position of guard (No. 86)** ......................................................................... 30  
- **The moulinets (No. 89)** ............................................................................... 32  
- **The points (No. 94)** ...................................................................................... 34  
- **The cuts (No. 102)** ....................................................................................... 36  
- **The parries (No. 111)** .................................................................................. 39

#### Manual of the Pistol.

- **Draw pistol (No. 119)** .................................................................................. 43  
- **Load (No. 121)** ............................................................................................ 43  
- **Ready (No. 122)** ......................................................................................... 44  
- **Aim (No. 123)** ............................................................................................. 44  
- **Fire (No. 124)** ............................................................................................. 44  
- **Return pistol (No. 125)** ............................................................................... 44

#### Inspection of Arms, dismounted (No. 127) .................................................... 45

#### Manual of the Piece.

- **Posts of cannoneers, piece unlimbered (No. 138)** ...................................... 46  
- **To take, and to replace equipments (No. 186)** ......................................... 48  
- **To load and fire (No. 188)** ......................................................................... 48  
- **Duties of the gunner—Commanding and pointing (No. 145)** ................. 50  
- **Duties of No. 1—Sponging and ramming (No. 146)** .................................. 51  
- **Remarks on the duties of No. 1 (No. 147)** ................................................. 54  
- **Duties of No. 2—Inserting the charge (No. 148)** ....................................... 55  
- **Duties of No. 3—Serving the vent (No. 149)** .............................................. 56  
- **Duties of No. 4—Firing (No. 150)** ............................................................... 57  
- **Duties of Nos. 5, 6, and 7—Serving and preparing ammunition (No. 153)** ... 58  
- **Summary of duties of cannoneers executed in detail (No. 158)** ............... 59  
- **To draw a load (No. 154)** ......................................................................... 60  
- **To change posts of cannoneers, piece unlimbered (No. 155)** .................... 60
TABLE OF CONTENTS.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To move the piece by hand, piece unlimbered</td>
<td>61</td>
</tr>
<tr>
<td>To the front (No. 156)</td>
<td>61</td>
</tr>
<tr>
<td>To the rear (No. 157)</td>
<td>61</td>
</tr>
<tr>
<td>To limber</td>
<td>62</td>
</tr>
<tr>
<td>To the front (No. 158)</td>
<td>62</td>
</tr>
<tr>
<td>To the right (No. 160)</td>
<td>63</td>
</tr>
<tr>
<td>To the left (No. 161)</td>
<td>64</td>
</tr>
<tr>
<td>To the rear (No. 162)</td>
<td>64</td>
</tr>
<tr>
<td>Posts of cannoneers, piece limbered (No. 163)</td>
<td>64</td>
</tr>
<tr>
<td>Posts of the gun-detachment at the piece limbered</td>
<td>65</td>
</tr>
<tr>
<td>In front (No. 165)</td>
<td>65</td>
</tr>
<tr>
<td>In rear (No. 165)</td>
<td>65</td>
</tr>
<tr>
<td>To form the gun-detachment at the piece limbered</td>
<td>65</td>
</tr>
<tr>
<td>To the front (No. 166)</td>
<td>65</td>
</tr>
<tr>
<td>To the rear (No. 168)</td>
<td>65</td>
</tr>
<tr>
<td>To change the post of the gun-detachment at the piece limbered</td>
<td>66</td>
</tr>
<tr>
<td>From front to rear (No. 169)</td>
<td>66</td>
</tr>
<tr>
<td>From rear to front (No. 170)</td>
<td>66</td>
</tr>
<tr>
<td>To post the cannoneers at the piece limbered</td>
<td>67</td>
</tr>
<tr>
<td>In front (No. 172)</td>
<td>67</td>
</tr>
<tr>
<td>In rear (No. 173)</td>
<td>67</td>
</tr>
<tr>
<td>To change posts of cannoneers, piece limbered (No. 174)</td>
<td>67</td>
</tr>
<tr>
<td>To move the piece by hand, piece limbered</td>
<td>68</td>
</tr>
<tr>
<td>To the front (No. 175)</td>
<td>68</td>
</tr>
<tr>
<td>To the rear (No. 176)</td>
<td>68</td>
</tr>
<tr>
<td>To unlimber and prepare for firing</td>
<td>68</td>
</tr>
<tr>
<td>To the front (No. 177)</td>
<td>68</td>
</tr>
<tr>
<td>To the right (No. 178)</td>
<td>69</td>
</tr>
<tr>
<td>To the left (No. 179)</td>
<td>69</td>
</tr>
<tr>
<td>To the rear (No. 180)</td>
<td>70</td>
</tr>
<tr>
<td>To fix prolonge (No. 181)</td>
<td>70</td>
</tr>
<tr>
<td>To coil prolonge (No. 182)</td>
<td>70</td>
</tr>
<tr>
<td>To mount the cannoneers (No. 185)</td>
<td>71</td>
</tr>
<tr>
<td>To dismount the cannoneers (No. 190)</td>
<td>73</td>
</tr>
<tr>
<td>Service of the piece with diminished numbers (No. 193)</td>
<td>73</td>
</tr>
<tr>
<td>Service of the Mitrailleur</td>
<td></td>
</tr>
<tr>
<td>To load and fire (No. 196)</td>
<td>74</td>
</tr>
<tr>
<td>Duties of the gunner (No. 198)</td>
<td>75</td>
</tr>
<tr>
<td>Duties of No. 1 (No. 200)</td>
<td>76</td>
</tr>
<tr>
<td>Duties of No. 2 (No. 201)</td>
<td>76</td>
</tr>
<tr>
<td>Duties of No. 3 (No. 202)</td>
<td>77</td>
</tr>
<tr>
<td>Duties of No. 4 (No. 203)</td>
<td>77</td>
</tr>
<tr>
<td>Duties of No. 5 (No. 204)</td>
<td>78</td>
</tr>
<tr>
<td>Remark (No. 205)</td>
<td>78</td>
</tr>
<tr>
<td>Service of the mitrailleur with diminished numbers (No. 208)</td>
<td>78</td>
</tr>
</tbody>
</table>
### TABLE OF CONTENTS.

#### Mechanical Manoeuvres.

<table>
<thead>
<tr>
<th>Maneuver</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To change wheels (No. 203)</td>
<td>80</td>
</tr>
<tr>
<td>To dismount a piece (No. 209)</td>
<td>82</td>
</tr>
<tr>
<td>To mount a piece (No. 211)</td>
<td>83</td>
</tr>
<tr>
<td>To carry a piece (No. 212)</td>
<td>84</td>
</tr>
<tr>
<td>To dismount a gun-carriage (No. 213)</td>
<td>85</td>
</tr>
<tr>
<td>To dismount a limber (No. 214)</td>
<td>85</td>
</tr>
<tr>
<td>To mount gun-carriages and limbers (No. 215)</td>
<td>85</td>
</tr>
<tr>
<td>To mount and to dismount a mitrailleur (No. 216)</td>
<td>85</td>
</tr>
</tbody>
</table>

#### SCHOOL OF THE BATTERY DISMOUNTED.

<table>
<thead>
<tr>
<th>Action</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation of the battery dismounted (No. 225)</td>
<td>87</td>
</tr>
<tr>
<td>Posts of officers, non-commissioned officers, etc. (No. 227)</td>
<td>67</td>
</tr>
<tr>
<td>To form the battery dismounted (No. 234)</td>
<td>91</td>
</tr>
<tr>
<td>To open ranks (No. 238)</td>
<td>93</td>
</tr>
<tr>
<td>To close ranks (No. 239)</td>
<td>94</td>
</tr>
<tr>
<td>Alignments (No. 240)</td>
<td>94</td>
</tr>
<tr>
<td>Manual of the sabre and sabre exercise (No. 241)</td>
<td>95</td>
</tr>
<tr>
<td>To rest (No. 242)</td>
<td>95</td>
</tr>
<tr>
<td>To dismiss the battery (No. 243)</td>
<td>96</td>
</tr>
<tr>
<td>To march in line (No. 244)</td>
<td>96</td>
</tr>
<tr>
<td>To halt the battery and to align it (No. 245)</td>
<td>96</td>
</tr>
<tr>
<td>To march in the short step; to mark time; to change step; to side step; to march backward; to oblique in line; to pass from quick time to double time, and the reverse (No. 246)</td>
<td>96</td>
</tr>
<tr>
<td>To wheel the battery (No. 249)</td>
<td>97</td>
</tr>
<tr>
<td>To march by the flank (No. 253)</td>
<td>97</td>
</tr>
<tr>
<td>To oblique, and to change direction in column of files (No. 256)</td>
<td>99</td>
</tr>
<tr>
<td>To form column of subdivisions to the right or left (No. 257)</td>
<td>99</td>
</tr>
<tr>
<td>To put the column of subdivisions in march, and to halt the column (No. 259)</td>
<td>100</td>
</tr>
<tr>
<td>To oblique in column of subdivisions (No. 260)</td>
<td>100</td>
</tr>
<tr>
<td>To change direction in column of subdivisions (No. 261)</td>
<td>101</td>
</tr>
<tr>
<td>To face the column of subdivisions to the rear, and to march it to the rear (No. 265)</td>
<td>102</td>
</tr>
<tr>
<td>To march the column of subdivisions by the flank (No. 266)</td>
<td>103</td>
</tr>
<tr>
<td>To form column of files from column of subdivisions (No. 269)</td>
<td>103</td>
</tr>
<tr>
<td>To form column of subdivisions from column of files (No. 270)</td>
<td>104</td>
</tr>
<tr>
<td>Route step (No. 272)</td>
<td>105</td>
</tr>
<tr>
<td>To form line to the right or left from column of subdivisions (No. 275)</td>
<td>105</td>
</tr>
<tr>
<td>To form line on the right or left from column of subdivisions (No. 277)</td>
<td>107</td>
</tr>
<tr>
<td>To form line to the front from column of subdivisions (No. 278)</td>
<td>108</td>
</tr>
<tr>
<td>To face the line to the rear, and to march it to the rear (No. 279)</td>
<td>110</td>
</tr>
<tr>
<td>Manoeuvres of two or more gun-detachments dismounted (No. 280)</td>
<td>119</td>
</tr>
<tr>
<td>To march the gun-detachments to the park (No. 285)</td>
<td>119</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

| To post the gun-detachments with their pieces (No. 286) | 112 |
| To serve the pieces (No. 287) | 113 |
| Firings (No. 288) | 112 |
| To leave the park (No. 289) | 114 |

## SCHOOL OF THE SOLDIER MOUNTED

### Equipment of the Horse

| To fold the saddle-blanket (No. 301) | 115 |
| To put on the blanket and surcingle (No. 302) | 116 |
| To put on the watering-bridle (No. 303) | 117 |
| To saddle (No. 304) | 117 |
| To unsaddle (No. 306) | 118 |
| To put on the curb-bridle (No. 307) | 118 |
| To unbridle (No. 308) | 119 |

### Order of instruction

| Position of stand to horse (No. 309) | 120 |
| To lead out (No. 310) | 120 |
| To mount in line with intervals (horse unsaddled) (No. 312) | 120 |
| Position of the soldier mounted (horse unsaddled) (No. 314) | 121 |
| Remarks on the position of the soldier mounted (No. 314) | 122 |
| To lengthen the rein (No. 315) | 123 |
| To shorten the rein (No. 316) | 123 |
| To dismount in line with intervals (horse unsaddled) (No. 317) | 123 |
| To rest (No. 318) | 124 |
| To file off (No. 320) | 124 |
| To dismiss the squad (No. 321) | 124 |
| Use of the reins and legs (No. 322) | 124 |
| To march (No. 323) | 125 |
| To halt (No. 324) | 126 |
| To march by the flank from line with intervals (No. 325) | 127 |
| To march to the rear (No. 328) | 127 |
| To oblique (No. 329) | 128 |
| To change direction marching in column of files (No. 331) | 128 |
| To rein back (No. 332) | 129 |
| Alignment (No. 333) | 129 |
| Remark (No. 334) | 130 |
| To mount in line (horse unsaddled) (No. 335) | 130 |
| To march by the flank from line (No. 336) | 130 |
| To form line from the right or left, from column of files (No. 337) | 130 |
| To dismount in line (horse unsaddled) (No. 338) | 131 |
| The riding-school (No. 339) | 131 |
| To enter the riding school (No. 340) | 131 |
| To change hands (No. 341) | 132 |
Manual of the Sabre, mounted.

Draw sabre (No. 881) .................................................. 148
Return sabre (No. 888) .................................................. 148

Sabre Exercise, mounted.

To open and close files (No. 887) ..................................... 149
Remarks on the use of the sabre (No. 891) .......................... 150

Manual of the pistol, mounted (No. 892) ............................ 151

Inspection of arms, mounted (No. 898) .............................. 151

HORSE ARTILLERY.

The gun-detachment mounted (No. 896) ............................ 152
To lead out (No. 897) ..................................................... 152
To mount (No. 898) ....................................................... 153
To dismount (No. 400) .................................................... 158
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS.</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alignments (No. 402)</td>
<td>153</td>
</tr>
<tr>
<td>To open ranks (No. 407)</td>
<td>155</td>
</tr>
<tr>
<td>To close ranks (No. 409)</td>
<td>156</td>
</tr>
<tr>
<td>To rest (No. 410)</td>
<td>156</td>
</tr>
<tr>
<td>To file off (No. 411)</td>
<td>156</td>
</tr>
<tr>
<td>To dismiss the detachment (No. 412)</td>
<td>156</td>
</tr>
<tr>
<td>To march in line (No. 413)</td>
<td>156</td>
</tr>
<tr>
<td>To halt the detachment, and to align it (No. 414)</td>
<td>157</td>
</tr>
<tr>
<td>To oblique in line (No. 415)</td>
<td>157</td>
</tr>
<tr>
<td>To rein back the detachment (No. 416)</td>
<td>158</td>
</tr>
<tr>
<td>To wheel the detachment (No. 417)</td>
<td>159</td>
</tr>
<tr>
<td>To make a half-wheel (No. 418)</td>
<td>159</td>
</tr>
<tr>
<td>To execute the about by detachment (No. 420)</td>
<td>160</td>
</tr>
<tr>
<td>To march by the flank from line (No. 421)</td>
<td>160</td>
</tr>
<tr>
<td>To form line to the right or left, from column of files (No. 423)</td>
<td>161</td>
</tr>
<tr>
<td>To form line to the front from column of files (No. 425)</td>
<td>161</td>
</tr>
<tr>
<td>To oblique in column of files (No. 426)</td>
<td>162</td>
</tr>
<tr>
<td>To change direction in column of files (No. 427)</td>
<td>163</td>
</tr>
<tr>
<td>Posts of the mounted gun-detachment, at the piece limbered</td>
<td></td>
</tr>
<tr>
<td>In rear (No. 428)</td>
<td>163</td>
</tr>
<tr>
<td>In front (No. 428)</td>
<td>163</td>
</tr>
<tr>
<td>To change the post of the mounted detachment at the piece limbered</td>
<td>163</td>
</tr>
<tr>
<td>From rear to front (No. 429)</td>
<td>163</td>
</tr>
<tr>
<td>From front to rear (No. 430)</td>
<td>164</td>
</tr>
<tr>
<td>Manoeuvres of two or more gun-detachments mounted (No. 431)</td>
<td>164</td>
</tr>
<tr>
<td>To lead out (No. 434)</td>
<td>164</td>
</tr>
<tr>
<td>To mount; to dismount; the alignments; to open, and to close ranks; to rest; to file off; to dismiss the detachments; to march in line; to oblique in line; and to rein back (No. 435)</td>
<td>165</td>
</tr>
<tr>
<td>To face the line to the rear, and to march it to the rear (No. 436)</td>
<td>165</td>
</tr>
<tr>
<td>To march by the flank from line (No. 437)</td>
<td>165</td>
</tr>
<tr>
<td>To form line to the right or left from column of files (No. 438)</td>
<td>165</td>
</tr>
<tr>
<td>To oblique and to change direction in column of files (No. 439)</td>
<td>166</td>
</tr>
<tr>
<td>To form column of detachments to the right or left (No. 440)</td>
<td>166</td>
</tr>
<tr>
<td>To oblique in column of detachments (No. 441)</td>
<td>166</td>
</tr>
<tr>
<td>To change direction in column of detachments (No. 442)</td>
<td>166</td>
</tr>
<tr>
<td>To halt the column of detachments, and to put it in march (No. 444)</td>
<td>167</td>
</tr>
<tr>
<td>To march the column of detachments to the rear (No. 445)</td>
<td>167</td>
</tr>
<tr>
<td>To form column of detachments from column of files (No. 446)</td>
<td>167</td>
</tr>
<tr>
<td>To form column of files from column of detachments (No. 447)</td>
<td>167</td>
</tr>
<tr>
<td>To form line to the right or left from column of detachments (No. 448)</td>
<td>168</td>
</tr>
<tr>
<td>To form line on the right or left from column of detachments (No. 449)</td>
<td>168</td>
</tr>
<tr>
<td>To form line to the front from column of detachments (No. 450)</td>
<td>169</td>
</tr>
<tr>
<td>To march the mounted gun-detachments to the park (No. 451)</td>
<td>169</td>
</tr>
<tr>
<td>To post the mounted gun-detachments with their pieces (No. 452)</td>
<td>169</td>
</tr>
<tr>
<td>Detachments opposite your pieces (No. 452)</td>
<td>169</td>
</tr>
<tr>
<td>To leave the park (No. 453)</td>
<td>170</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS.

SCHOOL OF THE DRIVER.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harness-peg (No. 455)</td>
<td>171</td>
</tr>
<tr>
<td>Arrangement of harness on its pegs (No. 456)</td>
<td>171</td>
</tr>
<tr>
<td>To harness (No. 459)</td>
<td>172</td>
</tr>
<tr>
<td>Position of stand to horse (No. 460)</td>
<td>173</td>
</tr>
<tr>
<td>To unharness (No. 461)</td>
<td>178</td>
</tr>
<tr>
<td>To lead out (No. 462)</td>
<td>174</td>
</tr>
<tr>
<td>To couple (No. 464)</td>
<td>174</td>
</tr>
<tr>
<td>To uncouple (No. 466)</td>
<td>175</td>
</tr>
<tr>
<td>To mount (No. 467)</td>
<td>175</td>
</tr>
<tr>
<td>To dismount (No. 469)</td>
<td>176</td>
</tr>
<tr>
<td>To rest (No. 471)</td>
<td>176</td>
</tr>
<tr>
<td>To file off (No. 472)</td>
<td>176</td>
</tr>
<tr>
<td>To dismiss the drivers (No. 473)</td>
<td>177</td>
</tr>
<tr>
<td>Use of the coupling-rein and whip (No. 474)</td>
<td>177</td>
</tr>
<tr>
<td>To march (No. 475)</td>
<td>178</td>
</tr>
<tr>
<td>To halt (No. 477)</td>
<td>179</td>
</tr>
<tr>
<td>To march by the flank, from line with intervals (No. 478)</td>
<td>179</td>
</tr>
<tr>
<td>To halt the column of pairs and to resume the march (No. 430)</td>
<td>180</td>
</tr>
<tr>
<td>To march to the rear (No. 481)</td>
<td>180</td>
</tr>
<tr>
<td>To oblique (No. 483)</td>
<td>180</td>
</tr>
<tr>
<td>To change direction in column of pairs (No. 485)</td>
<td>181</td>
</tr>
<tr>
<td>To rein back (No. 486)</td>
<td>182</td>
</tr>
<tr>
<td>Changes of gait (No. 487)</td>
<td>182</td>
</tr>
<tr>
<td>The riding-school (No. 492)</td>
<td>183</td>
</tr>
</tbody>
</table>

The Team.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To align the drivers (No. 494)</td>
<td>188</td>
</tr>
<tr>
<td>To form the team in column of pairs from line</td>
<td>184</td>
</tr>
<tr>
<td>To the right (No. 495)</td>
<td>184</td>
</tr>
<tr>
<td>To the front (No. 496)</td>
<td>184</td>
</tr>
<tr>
<td>To wheel by team (No. 497)</td>
<td>185</td>
</tr>
<tr>
<td>To execute an about by team (No. 498)</td>
<td>185</td>
</tr>
<tr>
<td>To oblique the team (No. 499)</td>
<td>185</td>
</tr>
<tr>
<td>To form the team in line from column of pairs</td>
<td>186</td>
</tr>
<tr>
<td>To the left (No. 500)</td>
<td>186</td>
</tr>
<tr>
<td>On the right (No. 501)</td>
<td>186</td>
</tr>
<tr>
<td>To the front (No. 502)</td>
<td>186</td>
</tr>
<tr>
<td>Instruction of two or more teams (No. 503)</td>
<td>187</td>
</tr>
<tr>
<td>To lead out (No. 505)</td>
<td>188</td>
</tr>
<tr>
<td>To form column of teams</td>
<td>188</td>
</tr>
<tr>
<td>To the right (No. 506)</td>
<td>188</td>
</tr>
<tr>
<td>To the front (No. 507)</td>
<td>188</td>
</tr>
<tr>
<td>To change direction in column of teams (No. 510)</td>
<td>191</td>
</tr>
<tr>
<td>To oblique in column of teams (No. 511)</td>
<td>191</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To halt the column of teams, and to put it in march (No. 512)</td>
<td>191</td>
</tr>
<tr>
<td>To march the column of teams to the rear (No. 513)</td>
<td>191</td>
</tr>
<tr>
<td>To form line from column of teams (No. 514)</td>
<td>192</td>
</tr>
<tr>
<td>To dismiss the teams (No. 515)</td>
<td>192</td>
</tr>
<tr>
<td>General remark (No. 516)</td>
<td>193</td>
</tr>
<tr>
<td>To post teams with their carriages (No. 517)</td>
<td>198</td>
</tr>
<tr>
<td>To hitch (No. 519)</td>
<td>194</td>
</tr>
<tr>
<td>To unhitch (No. 520)</td>
<td>195</td>
</tr>
<tr>
<td>To leave the park (No. 522)</td>
<td>196</td>
</tr>
</tbody>
</table>

## The Team hitched.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To march (No. 528)</td>
<td>197</td>
</tr>
<tr>
<td>To halt (No. 526)</td>
<td>197</td>
</tr>
<tr>
<td>To rest (No. 528)</td>
<td>198</td>
</tr>
<tr>
<td>Changes of gait (No. 530)</td>
<td>198</td>
</tr>
<tr>
<td>To wheel (No. 584)</td>
<td>199</td>
</tr>
<tr>
<td>To execute the about (No. 533)</td>
<td>199</td>
</tr>
<tr>
<td>To oblique (No. 537)</td>
<td>200</td>
</tr>
<tr>
<td>To reverse (No. 533)</td>
<td>200</td>
</tr>
<tr>
<td>To back the carriage</td>
<td>202</td>
</tr>
<tr>
<td>To the rear (No. 542)</td>
<td>202</td>
</tr>
<tr>
<td>To the right or left (No. 548)</td>
<td>202</td>
</tr>
</tbody>
</table>

## Exercise of a Section.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To march; to halt; and the changes of gait (No. 545)</td>
<td>203</td>
</tr>
<tr>
<td>To change direction in column (No. 546)</td>
<td>203</td>
</tr>
<tr>
<td>To oblique (No. 547)</td>
<td>203</td>
</tr>
<tr>
<td>Passage of carriages (No. 548)</td>
<td>204</td>
</tr>
<tr>
<td>To execute the about (No. 549)</td>
<td>205</td>
</tr>
<tr>
<td>To reverse (No. 550)</td>
<td>205</td>
</tr>
<tr>
<td>To countermarch (No. 551)</td>
<td>205</td>
</tr>
</tbody>
</table>

## SCHOOL OF THE BATTERY.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition of the battery of manoeuvre (No. 563)</td>
<td>208</td>
</tr>
<tr>
<td>Formations of the battery (No. 569)</td>
<td>210</td>
</tr>
<tr>
<td>Posts of officers, non-commissioned officers, etc., in the order in column (No. 575)</td>
<td>212</td>
</tr>
<tr>
<td>Posts of officers and non-commissioned officers, etc., in the order in line (No. 576)</td>
<td>215</td>
</tr>
<tr>
<td>Posts of officers and non-commissioned officers in the order in battery (No. 577)</td>
<td>218</td>
</tr>
<tr>
<td>Measures of the elements composing the battery of manoeuvre and of its formations (No. 578)</td>
<td>220</td>
</tr>
<tr>
<td>Instruction (No. 579)</td>
<td>222</td>
</tr>
</tbody>
</table>
The park (No. 580) ........................................... 228
To form the battery (No. 581) ................................ 228
To align the battery (No. 582) ................................ 226
To unpark (No. 584) ......................................... 227
Route marches (No. 587) ..................................... 228
To park .......................................................... 229
  To the right or left (No. 590) .................. 229
  On the right or left (No. 592) .............. 230
  To the front (No. 593) ....................... 230
To rest the battery (No. 595) ....................... 231
To dismiss the battery (No. 596) .................... 232
To change direction in column of sections (No. 597) 233
To form column of platoons from column of sections (No. 601) 234
To form column of sections from column of platoons (No. 604) 236
To halt the column and to put it in march (No. 605) ........ 237
Changes of gait in column (No. 608) ............... 238
Passage of carriages in column (No. 609) ............ 239
About, reverse, and countermarch in column.
  About (No. 613) ......................................... 239
  Reverse (No. 616) ...................................... 240
  Countermarch (No. 619) ................................. 240
To change direction in column of platoons (No. 626) .... 241
To oblique in column (No. 632) ...................... 244
To close and extend intervals in column of platoons (No. 636) 247
To march by the flank (No. 637) ...................... 248
Being in column of sections, to form the caissons on the flank (No. 640) 251
The caissons being on the flank, to form column of sections (No. 642) 252
To form line to the right or left from column of platoons (No. 644) .. 255
To form line on the right or left from column of platoons (No. 645) .. 256
To form front into line from column of platoons (No. 646) ........ 258
To form front into line, faced to the rear, from column of platoons (No. 649) 259
To form line from column of sections.
  To the right or left (No. 652) .................... 259
  On the right or left (No. 653) .................. 261
  To the front (No. 654) ......................... 261
To form column of platoons to the right or left (No. 655) .... 263
To form column of platoons to the front (No. 656) ........ 263
To break into column of platoons from one flank to march toward the
  other (No. 657) ........................................ 265
To form double column (No. 659) ...................... 267
To form line from double column
  To the front (No. 662) ............................... 270
  To and on the right or left (No. 663) ..... 270
To march in line (No. 665) ............................. 272
To halt the battery and to align it (No. 666) .......... 273
Changes of gait in line; passage of carriages in line; about, reverse, and
  countermarch in line; and to march by the flank from line (No. 667) 273
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS.</th>
</tr>
</thead>
</table>

| To oblique in line (No. 668) | 273 |
| To wheel the battery (No. 669) | 275 |
| To make a half-wheel to the right or left (No. 671) | 277 |
| To close and to extend intervals in line (No. 672) | 277 |
| To countermarch with diminished intervals (No. 673) | 279 |
| Reverse with diminished intervals (No. 674) | 280 |
| To pass obstacles (No. 675) | 280 |
| To form in battery to the front from line, by moving the pieces forward | 280 |
| Pieces in front (No. 677) | 281 |
| Caissons in front (No. 682) | 283 |
| To form in battery to the front from line, by moving the caissons to the rear (No. 684) | 284 |
| Pieces in front (No. 687) | 286 |
| Caissons in front (No. 689) | 286 |
| To form line to the front from battery | 290 |
| Pieces in front (No. 692) | 290 |
| Caissons in front (No. 695) | 291 |
| To form line to the rear from battery | 292 |
| Pieces in front (No. 696) | 292 |
| Caissons in front (No. 698) | 292 |
| To form in battery to the right or left, from column of platoons, gaining ground to the right or left. | 293 |
| Pieces in front (No. 699) | 293 |
| Caissons in front (No. 700) | 294 |
| To form in battery to the right or left, from column of platoons, gaining ground to the left or right. | 294 |
| Pieces in front (No. 701) | 294 |
| Caissons in front (No. 702) | 296 |
| To form in battery on the right or left from column of platoons | 296 |
| Pieces in front (No. 703) | 296 |
| Caissons in front (No. 704) | 296 |
| To form in battery to the front from column of platoons. | 297 |
| Pieces in front (No. 705) | 297 |
| Caissons in front (No. 706) | 298 |
| To form in battery to the rear from column of platoons | 300 |
| Pieces in front (No. 709) | 300 |
| Caissons in front (No. 711) | 301 |
| To form in battery from double column | 301 |
| To the front (No. 713) | 301 |
| To the rear (No. 714) | 301 |
| To the right or left (No. 715) | 302 |
| To march by the flank from battery, and to form again in battery (No. 716) | 302 |
| To form in battery to the right or left, from column with caissons on the flank (No. 720) | 304 |
| To form in battery to the rear from battery (No. 722) | 305 |
| Firings (No. 726) | 307 |
TABLE OF CONTENTS.

To fire retiring with prolonge fixed (No. 727) .................................. 807
Change of front (No. 728) ............................................................. 809

SCHOOL OF THE BATTALION.

Formation of the battalion (No. 738) ........................................... 810
Posts of major, adjutant, sergeant-major, and trumpeter (No. 738) ... 811
To form the battalion (No. 740) ..................................................... 812
To rest the battalion (No. 741) .................................................... 814
To dismiss the battalion (No. 743) .............................................. 815
To march in line (No. 744) .......................................................... 815
To halt the battalion and to align it (No. 745) .............................. 816
Changes of gait (No. 746) ............................................................ 816
Passage of carriages (No. 747) ..................................................... 816
Reverse, countermarch, and about in line (No. 749) .................... 817
To oblique (No. 749) ................................................................. 817
To march by the flank (No. 750) .................................................. 817
To form column of platoons to the right or left (No. 751) ............ 818
To break into column of platoons from the right or left, to march to the left or right (No. 752) .................................................. 818
To march in column of platoons (No. 753) ..................................... 818
To halt the column of platoons (No. 754) ..................................... 819
To close and extend intervals in column of platoons (No. 755) ...... 819
Reverse, countermarch, and about in column of platoons (No. 756) . 819
To change direction in column of platoons (No. 757) .................. 819
To march by the flank, from column of platoons (No. 760) .......... 820
Route marches (No. 761) ............................................................ 820
To form the column of platoons to the right or left into line (No. 762) 821
General rules for successive formations (No. 763) ....................... 821
To form the column of platoons on the right or left into line (No. 764) 828
To form column of platoons front into line (No. 765) ................... 824
To form front into line, faced to the rear (No. 767) ....................... 825
To form front into line on the head of an interior battery (No. 768) . 826
Formation of column of platoons into line by two movements (No. 770) 828
To form column of batteries to the right or left (No. 771) ............ 831
To change direction in column at full distance (No. 771) ............. 832
To march in column at full distance; to halt the column; to execute the about, reverse, and countermarch; to march by the flank, and to march again in column (No. 779) ...................... 832
Column at full distance to the right or left into line (No. 780) .... 832
To form column at full distance, on the right or left into line (No. 781) 833
Column at full distance front into line (No. 782) ......................... 833
To form front into line, faced to the rear (No. 783) ...................... 834
To advance in line of platoon columns (No. 784) ......................... 834
To form line from line of platoon columns (No. 788) ................. 835
Being in line of platoon columns to form column of batteries (No. 789) ... 835
<table>
<thead>
<tr>
<th>Table of Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being in column of batteries at full distance to form line of platoon columns</td>
<td>386</td>
</tr>
<tr>
<td>(No. 790)</td>
<td></td>
</tr>
<tr>
<td>Marching in line of platoon columns to march in column of platoons</td>
<td>386</td>
</tr>
<tr>
<td>(No. 791)</td>
<td></td>
</tr>
<tr>
<td>To form column of platoons from column of batteries (No. 792)</td>
<td>385</td>
</tr>
<tr>
<td>To advance in line of double columns (No. 793)</td>
<td>387</td>
</tr>
<tr>
<td>To form line from line of double columns (No. 794)</td>
<td>387</td>
</tr>
<tr>
<td>To deploy the battalion into close column (No. 795)</td>
<td>387</td>
</tr>
<tr>
<td>To form column of platoons from close column (No. 800)</td>
<td>340</td>
</tr>
<tr>
<td>To form close column from column of platoons (No. 802)</td>
<td>341</td>
</tr>
<tr>
<td>To march in close column, to change direction, and to halt; to march in line of</td>
<td>342</td>
</tr>
<tr>
<td>platoon columns, to march by the flank, and to resume the march in column; to</td>
<td></td>
</tr>
<tr>
<td>face to the rear; to march to the rear (No. 803)</td>
<td></td>
</tr>
<tr>
<td>To change direction in close column by the flank (No. 804)</td>
<td>342</td>
</tr>
<tr>
<td>To form line to the right or left from close column (No. 805)</td>
<td>344</td>
</tr>
<tr>
<td>To deploy the close column (No. 806)</td>
<td>344</td>
</tr>
<tr>
<td>To close the column in mass (No. 813)</td>
<td>347</td>
</tr>
<tr>
<td>Being in close column, to take distance (No. 816)</td>
<td>348</td>
</tr>
<tr>
<td>To change front (No. 817)</td>
<td>348</td>
</tr>
<tr>
<td>Order in echelon (No. 819)</td>
<td>349</td>
</tr>
<tr>
<td>To execute an oblique change of front in echelon (No. 824)</td>
<td>350</td>
</tr>
<tr>
<td>To form line from echelon (No. 825)</td>
<td>350</td>
</tr>
<tr>
<td>Formations in battery (No. 826)</td>
<td>351</td>
</tr>
<tr>
<td>To form in battery to the front from line (No. 827)</td>
<td>351</td>
</tr>
<tr>
<td>Pieces in front (No. 828)</td>
<td></td>
</tr>
<tr>
<td>Caissons in front (No. 829)</td>
<td></td>
</tr>
<tr>
<td>To form in battery to the front by moving the caissons to the rear (No. 830)</td>
<td>351</td>
</tr>
<tr>
<td>To form in battery to the rear from line (No. 832)</td>
<td>352</td>
</tr>
<tr>
<td>Pieces in front (No. 833)</td>
<td>352</td>
</tr>
<tr>
<td>Caissons in front (No. 834)</td>
<td>352</td>
</tr>
<tr>
<td>To form line from battery (No. 835)</td>
<td>352</td>
</tr>
<tr>
<td>To form in battery to the right, or left, from column of platoons, gaining</td>
<td></td>
</tr>
<tr>
<td>ground to the right, or left (No. 836)</td>
<td>352</td>
</tr>
<tr>
<td>To form in battery to the right, or left, from column of platoons, gaining</td>
<td></td>
</tr>
<tr>
<td>ground to the left, or right (No. 837)</td>
<td>353</td>
</tr>
<tr>
<td>To form the column of platoons on right or left into battery (No. 838)</td>
<td>353</td>
</tr>
<tr>
<td>To form the column of platoons front into battery (No. 840)</td>
<td>353</td>
</tr>
<tr>
<td>To form front into battery on the head of an interior battery (No. 842)</td>
<td>354</td>
</tr>
<tr>
<td>Formation of column of platoons into battery by two movements (No. 844)</td>
<td>354</td>
</tr>
<tr>
<td>To form in battery from column at full distance.</td>
<td>355</td>
</tr>
<tr>
<td>To the right or left (No. 846)</td>
<td>355</td>
</tr>
<tr>
<td>On the right or left (No. 847)</td>
<td>355</td>
</tr>
<tr>
<td>To the front (No. 848)</td>
<td>355</td>
</tr>
<tr>
<td>To form in battery from line of platoon columns</td>
<td>356</td>
</tr>
<tr>
<td>To the front (No. 850)</td>
<td>356</td>
</tr>
<tr>
<td>To the rear (No. 851)</td>
<td>356</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>To form in battery from line of double columns (No. 852)</td>
<td>356</td>
</tr>
<tr>
<td>To form in battery from close column (No. 853)</td>
<td>356</td>
</tr>
<tr>
<td>Front into battery, faced to the rear, on first battery (No. 854)</td>
<td>357</td>
</tr>
<tr>
<td>Front into battery, faced to the rear, on fourth battery (No. 856)</td>
<td>357</td>
</tr>
<tr>
<td>Front into battery, faced to the rear, on an interior battery (No. 858)</td>
<td>357</td>
</tr>
<tr>
<td>To form in battery from echelon (No. 860)</td>
<td>358</td>
</tr>
<tr>
<td>Firings (No. 861)</td>
<td>358</td>
</tr>
<tr>
<td>To march by the flank from battery, and to form again in battery (No. 862)</td>
<td>358</td>
</tr>
<tr>
<td>To form in battery to the right or left from column, with the caissons on</td>
<td>358</td>
</tr>
<tr>
<td>the flank (No. 863)</td>
<td></td>
</tr>
<tr>
<td>To form in battery to the rear from battery (No. 864)</td>
<td>359</td>
</tr>
<tr>
<td>To fire advancing (No. 865)</td>
<td>359</td>
</tr>
<tr>
<td>To fire retiring (No. 866)</td>
<td>359</td>
</tr>
<tr>
<td>To change front in battery (No. 867)</td>
<td>359</td>
</tr>
</tbody>
</table>

EVOLUTIONS OF A BRIGADE.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posts of the brigadier-general and staff (No. 875)</td>
<td>360</td>
</tr>
<tr>
<td>To advance in line (No. 876)</td>
<td>361</td>
</tr>
<tr>
<td>To form in column (No. 877)</td>
<td>361</td>
</tr>
<tr>
<td>To form line from column of platoons or batteries</td>
<td>361</td>
</tr>
<tr>
<td>To the right or left (No. 878)</td>
<td>361</td>
</tr>
<tr>
<td>On the right or left (No. 879)</td>
<td>361</td>
</tr>
<tr>
<td>To the front (No. 880)</td>
<td>362</td>
</tr>
<tr>
<td>Formations in battery</td>
<td>362</td>
</tr>
<tr>
<td>To the front (No. 881)</td>
<td>362</td>
</tr>
<tr>
<td>To the rear (No. 882)</td>
<td>362</td>
</tr>
<tr>
<td>To the right or left (No. 883)</td>
<td>362</td>
</tr>
<tr>
<td>On right or left (No. 884)</td>
<td>362</td>
</tr>
</tbody>
</table>

Special instructions for officers and non-commissioned staff-officers (No. 885) | 363  |
Salute with the hand for officers (No. 895)                                    | 364  |
About face for officers dismounted (No. 896)                                   | 365  |
Salute of the guidon (No. 898)                                                 | 365  |
Honors to be paid by troops (No. 900)                                          | 365  |
Salutes with cannon (No. 988)                                                  | 369  |

CEREMONIES.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Review of a battery (No. 962)</td>
<td>872</td>
</tr>
<tr>
<td>Parade of a battery, dismounted (No. 968)</td>
<td>878</td>
</tr>
<tr>
<td>Undress parade of a battery, dismounted (No. 969)</td>
<td>878</td>
</tr>
<tr>
<td>Inspection of a battery (No. 971)</td>
<td>879</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>Page</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
</tr>
<tr>
<td>Inspection of a battery, dismounted (No. 973)</td>
<td>382</td>
</tr>
<tr>
<td>Muster of a battery (No. 974)</td>
<td>383</td>
</tr>
<tr>
<td>Guard-mounting of a battery (No. 976)</td>
<td>383</td>
</tr>
<tr>
<td>Undress guard-mounting (No. 977)</td>
<td>388</td>
</tr>
<tr>
<td>Funeral honors (No. 978)</td>
<td>388</td>
</tr>
<tr>
<td>General rules for review of a battalion and larger bodies of artillery (No. 982)</td>
<td>391</td>
</tr>
<tr>
<td>Review of a battalion (No. 983)</td>
<td>393</td>
</tr>
<tr>
<td>Review of a battalion with diminished intervals (No. 985)</td>
<td>395</td>
</tr>
<tr>
<td>Review of a brigade (No. 986)</td>
<td>396</td>
</tr>
<tr>
<td>Dress parade of a battalion dismounted (No. 989)</td>
<td>398</td>
</tr>
<tr>
<td>Undress parade of a battalion, dismounted (No. 991)</td>
<td>403</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORGANIZATION OF ARTILLERY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition of light batteries (No. 1002)</td>
<td>406</td>
</tr>
<tr>
<td>Organization of light batteries (No. 1006)</td>
<td>407</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIECES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description and nomenclature of light guns (No. 1021)</td>
<td>410</td>
</tr>
<tr>
<td>Description and nomenclature of mitrailleurs (1023)</td>
<td>412</td>
</tr>
<tr>
<td>To take the one-inch mitrailleur apart (No. 1025)</td>
<td>413</td>
</tr>
<tr>
<td>To put the one-inch mitrailleur together (No. 1026)</td>
<td>414</td>
</tr>
<tr>
<td>Care of pieces (No. 1027)</td>
<td>414</td>
</tr>
<tr>
<td>Principal dimensions and weight of pieces (No. 1029)</td>
<td>415</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CARRIAGES</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gun-carriages (No. 1032)</td>
<td>416</td>
</tr>
<tr>
<td>Nomenclature of the gun-carriage (No. 1034)</td>
<td>416</td>
</tr>
<tr>
<td>Nomenclature of gun-carriage for mitrailleurs (No. 1036)</td>
<td>420</td>
</tr>
<tr>
<td>Limbers (No. 1037)</td>
<td>420</td>
</tr>
<tr>
<td>Nomenclature of the limber (No. 1038)</td>
<td>420</td>
</tr>
<tr>
<td>Caissons (No. 1040)</td>
<td>422</td>
</tr>
<tr>
<td>Nomenclature of the caisson-body (No. 1041)</td>
<td>423</td>
</tr>
<tr>
<td>Traveling-forges and battery-wagons (No. 1042)</td>
<td>424</td>
</tr>
<tr>
<td>Nomenclature of the traveling-forge body (No. 1043)</td>
<td>425</td>
</tr>
<tr>
<td>To put the bellows in its place (No. 1044)</td>
<td>425</td>
</tr>
<tr>
<td>Nomenclature of the battery-wagon body (No. 1045)</td>
<td>426</td>
</tr>
<tr>
<td>Care of carriages (No. 1046)</td>
<td>427</td>
</tr>
<tr>
<td>Weight of pieces and caissons equipped for service (No. 1047)</td>
<td>428</td>
</tr>
<tr>
<td>Weights of forges and battery-wagons equipped for service (No. 1048)</td>
<td>429</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS.

## AMMUNITION.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gunpowder (No. 1049)</td>
<td>480</td>
</tr>
<tr>
<td>Proof of gunpowder (No. 1051).</td>
<td>480</td>
</tr>
<tr>
<td>Charges of gunpowder (No. 1052)</td>
<td>481</td>
</tr>
<tr>
<td>Projectiles (No. 1054)</td>
<td>481</td>
</tr>
<tr>
<td>Charges for projectiles (No. 1062)</td>
<td>483</td>
</tr>
<tr>
<td>Principal kinds of rifle projectiles (No. 1063)</td>
<td>483</td>
</tr>
<tr>
<td>Fuses (No. 1068)</td>
<td>484</td>
</tr>
<tr>
<td>Friction-primers (No. 1074)</td>
<td>487</td>
</tr>
<tr>
<td>Weights of projectiles and rounds of ammunition (No. 1075)</td>
<td>487</td>
</tr>
<tr>
<td>Packing-boxes for ammunition (No. 1076)</td>
<td>488</td>
</tr>
<tr>
<td>Capacity and weight of packing-boxes (No. 1076)</td>
<td>488</td>
</tr>
<tr>
<td>Chests for ammunition (No. 1079)</td>
<td>441</td>
</tr>
<tr>
<td>Ammunition carried in each chest (No. 1088)</td>
<td>443</td>
</tr>
<tr>
<td>To pack ammunition in the chests (No. 1098)</td>
<td>444</td>
</tr>
<tr>
<td>Care of ammunition in chests (No. 1098)</td>
<td>444</td>
</tr>
</tbody>
</table>

## EQUIPMENT OF CARRIAGES.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implements and equipments for three-inch rifle and twelve-pounder guns (No. 1100)</td>
<td>445</td>
</tr>
<tr>
<td>Implements and equipments for three-Inch rifle and twelve-pounder caissons (No. 1110)</td>
<td>447</td>
</tr>
<tr>
<td>Implements and equipments for mitrailleurs (No. 1111)</td>
<td>448</td>
</tr>
<tr>
<td>Implements and equipments for mitrailleur caissons (No. 1112)</td>
<td>450</td>
</tr>
<tr>
<td>Equipment of traveling-forge, “A”, (No. 1113)</td>
<td>451</td>
</tr>
<tr>
<td>Equipment of battery-wagon, “C” (No. 1114)</td>
<td>454</td>
</tr>
<tr>
<td>Interior arrangement of the battery-wagon body, “C” (No. 1115)</td>
<td>457</td>
</tr>
<tr>
<td>Paints (No. 1119)</td>
<td>460</td>
</tr>
<tr>
<td>Quantity of paint required for light-artillery carriages (No. 1120)</td>
<td>461</td>
</tr>
</tbody>
</table>

## HARNESS AND HORSE EQUIPMENTS.

<table>
<thead>
<tr>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harness (No. 1121)</td>
<td>462</td>
</tr>
<tr>
<td>Nomenclature of the harness (No. 1127)</td>
<td>468</td>
</tr>
<tr>
<td>Care of harness (No. 1125)</td>
<td>465</td>
</tr>
<tr>
<td>Dye for blacking (No. 1130)</td>
<td>466</td>
</tr>
<tr>
<td>Harness required for each horse (No. 1181)</td>
<td>467</td>
</tr>
<tr>
<td>Horse-equipments (No. 1182)</td>
<td>467</td>
</tr>
<tr>
<td>Nomenclature of the curb-bit and bridle (No. 1186)</td>
<td>468</td>
</tr>
<tr>
<td>Nomenclature of the saddle (No. 1187)</td>
<td>468</td>
</tr>
<tr>
<td>Weight of a set of horse-equipments (No. 1188)</td>
<td>469</td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS.

HORSES.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General rules (No. 1189)</td>
<td>470</td>
</tr>
<tr>
<td>Purchase of horses (No. 1140)</td>
<td>471</td>
</tr>
<tr>
<td>Training horses (No. 1141)</td>
<td>472</td>
</tr>
<tr>
<td>To make the horse tractable and steady in mounting (No. 1142)</td>
<td>473</td>
</tr>
<tr>
<td>To bend the horse's neck and to rein in, dismounted (No. 1143)</td>
<td>474</td>
</tr>
<tr>
<td>To bend the horse’s neck and to rein in, mounted (No. 1146)</td>
<td>475</td>
</tr>
<tr>
<td>To teach the horse to obey the pressure of the leg (No. 1148)</td>
<td>476</td>
</tr>
<tr>
<td>Rearing (No. 1151)</td>
<td>477</td>
</tr>
<tr>
<td>Kicking (No. 1152)</td>
<td>477</td>
</tr>
<tr>
<td>Shying (No. 1158)</td>
<td>477</td>
</tr>
<tr>
<td>To accustom horses to firing (No. 1154)</td>
<td>477</td>
</tr>
<tr>
<td>To teach horses to jump (No. 1155)</td>
<td>478</td>
</tr>
<tr>
<td>Swimming horses (No. 1156)</td>
<td>478</td>
</tr>
<tr>
<td>Gaits of horses (No. 1157)</td>
<td>478</td>
</tr>
<tr>
<td>Treatment and care of horses (No. 1158)</td>
<td>478</td>
</tr>
<tr>
<td>Sick horses (No. 1160)</td>
<td>480</td>
</tr>
<tr>
<td>Directions for shoeing horses (No. 1162)</td>
<td>481</td>
</tr>
</tbody>
</table>

STABLES.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of stables (No. 1163)</td>
<td>483</td>
</tr>
<tr>
<td>Stable management (No. 1165)</td>
<td>488</td>
</tr>
<tr>
<td>Stable and park guard (No. 1166)</td>
<td>486</td>
</tr>
<tr>
<td>Stable-duty (No. 1167)</td>
<td>486</td>
</tr>
<tr>
<td>Grooming (No. 1169)</td>
<td>488</td>
</tr>
<tr>
<td>Feeding (No. 1170)</td>
<td>489</td>
</tr>
<tr>
<td>Watering (No. 1171)</td>
<td>491</td>
</tr>
</tbody>
</table>

MARCHES.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidents to carriages (No. 1172)</td>
<td>495</td>
</tr>
<tr>
<td>Ascents (No. 1175)</td>
<td>497</td>
</tr>
<tr>
<td>Descents (No. 1176)</td>
<td>497</td>
</tr>
<tr>
<td>Moving along declivities (No. 1177)</td>
<td>498</td>
</tr>
<tr>
<td>Ditches (No. 1178)</td>
<td>498</td>
</tr>
<tr>
<td>Moving over marshy ground (No. 1179)</td>
<td>498</td>
</tr>
<tr>
<td>Crossing fords (No. 1180)</td>
<td>499</td>
</tr>
<tr>
<td>Crossing deep streams without bridges (No. 1181)</td>
<td>500</td>
</tr>
<tr>
<td>Passage of military bridges (No. 1182)</td>
<td>500</td>
</tr>
<tr>
<td>Passage on ice (No. 1183)</td>
<td>501</td>
</tr>
<tr>
<td>Facing a battery to the rear on a narrow road (No. 1184)</td>
<td>501</td>
</tr>
</tbody>
</table>
# Table of Contents

## Batteries on Transports

- Embarkation of horses (No. 1187) .................................................. 502
- Care of horses during the voyage (No. 1188) .................................. 508
- Embarkation of matériel (No. 1189) ................................................. 503
- Disembarkation of batteries (No. 1190) ......................................... 504
- Railway transportation (No. 1191) .................................................. 505

## Camping

- Bivouacs (No. 1195) ................................................................. 510

## Pointing and Ranges

- Theory of pointing (No. 1200) ....................................................... 511
- Pendulum-hausse (No. 1201) ......................................................... 512
- Estimating distances (No. 1202) .................................................... 514
- Different kinds of fire (No. 1203) ............................................... 514
- Deviation of projectiles (No. 1204) .............................................. 515
- Ranges (No. 1207) ................................................................. 516

## Field Service and Battles

- Artillery in the field (No. 1209) ..................................................... 520
- Choice of position (No. 1210) ....................................................... 520
- Time to open fire (No. 1212) ......................................................... 522
- Choice of object (No. 1213) .......................................................... 522
- Projectiles to be used (No. 1214) ................................................ 523
- Rapidity of fire (No. 1221) ............................................................. 524
- Changes of position in action (No. 1228) ..................................... 525
- Use of mitrailleurs (No. 1224) ....................................................... 526
- Supply of ammunition in battle (No. 1225) ................................... 527
- Replacing killed and wounded horses in battle (No. 1226) ............ 527
- Removing disabled pieces and carriages in battle (No. 1227) ...... 528
- Refitting after a battle (No. 1228) ............................................... 528
- To disable or destroy matériel (No. 1229) ................................... 529
- To render serviceable a temporarily-disabled gun (No. 1230) ...... 530

## Knots and Hitches

- Knots and hitches ................................................................. 581

## Knots and Splices

- Knots and splices ............................................................... 582

## Trumpet-Signals

- Trumpet-signals (No. 1196) ....................................................... 583
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