MOUNTED INSTRUCTION FOR FIELD ARTILLERY

Care of Horses and Equipment, Riding, Driving and Miscellaneous

CHRISTIAN

JOHN A. SEAVERNS

MOUNTED INSTRUCTION FOR FIELD ARTILLERY

CARE OF HORSES AND EQUIPMENT, RIDING, DRIVING AND MISCELLANEOUS

COMPILED BY

T. J. J. CHRISTIAN

MAJOR FIELD ARTILLERY

U. S. ARMY

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Courtesy of the Field Artillery Journal.

The Gallant Team of American Bays must get the shells to the Battery position in France

DEDICATION

To the Artillery Horse, who, "Over hill, over dale," with traces straight, keeps "The Caisson rolling along."

To the Artillery Team, Lead, Swing, and Wheel, whose shoulders always in the collar, enables the guns, "In the storm, in the night," to blaze the rough road of our Infantry—this book is dedicated.

THE ARTILLERY SONG

(Key—D)

Over hill, over dale, as we hit the dusty trail,
And the Caissons go rolling a-long.
In and out, hear them shout, counter march and right about,
And the Caissons go rolling a-long.

Chorus

Then it's hi! hi! hee! in the field artillery,
Shout out your numbers loud and strong,
Where'er you go, you will always know,
That our Caissons are rolling a-long (Keep them rolling).
And our Caissons are rolling a-long (Keep them rolling).
Keep our Caissons a-rolling a-long.
Battery Halt!

In the storm, in the night, action left or action right,
See the Caissons go rolling a-long.
Limber front, limber rear, prepare to mount you cannoneer
And our Caissons go rolling a-long.

PREFACE

"For want of a nail, the shoe was lost; for want of a shoe, the horse was lost; for want of a horse, the rider was lost; for want of a rider, the battle was lost"—

Because of war, an army; because of an army, Field Artillery; because of Field Artillery, guns must get into action; because of guns, teams of horses; because of the horses, drivers; and for want of drivers who lack the necessary knowledge of the care of their horses and equipment, the teams are lost; for want of good riding, good driving is lost; and for want of good driving, guns fail to get into position, and the fire of the battery is lost.

The purpose of this MOUNTED INSTRUCTION is to carefully cover these important subjects so vital to the necessary mobility of our horse-drawn Field Artillery.

The object and need of this text can be most forcibly emphasized by the actual experience of the Field Artillery in the World War, as illustrated by the following extract quoted from a letter written during a critical period of the war by the Chief of Field Artillery, A. E. F., to the Chief of Field Artillery, U. S. Army:

"I want to emphasize two things especially: 1st, Get the officers and men as thoroughly disciplined as you possibly can. It is more than knowledge—more than everything else combined, because with it we can soon get the other things: without it we cannot get them at all; 2nd, TEACH THEM ALL YOU POSSIBLY CAN ABOUT THE **CARE** OF THE HORSE. WE CANNOT HOPE IN THE SHORT TIME AVAILABLE TO MAKE HORSEMEN OR GOOD DRIVERS OUT OF THEM, BUT IF WE CAN TEACH THEM HOW TO TAKE CARE OF THEIR ANIMALS AND HOW MUCH THEY CAN STAND, IT WILL HELP GREATLY. WE ARE HAVING SO MUCH DIFFICULTY GETTING HORSES OVER HERE THAT WE DO NOT GET MAN AND HORSE TOGETHER UNTIL JUST BEFORE THE BRIGADES LEAVE THE TRAINING CAMPS SO THAT THERE IS NOT TIME TO TEACH THE MEN ANYTHING ABOUT THE HORSE. AT THE FRONT IT IS WELL-NIGH IMPOSSIBLE TO TEACH THEM THESE THINGS; SO THE HORSES SUFFER IN CONSEQUENCE."

On account of the lack of a single volume covering a complete course of instruction for officers, noncommissioned officers and drivers of the Regular and National Guard Field Artillery, for Reserve Officers, and specially for students of R. O. T. C. Field Artillery Units, this book has been compiled with the hope that drivers may be taught "all they possibly can about the care of the horse," and to assist not only in teaching "how to take care of animals and how much they can stand," but also "to make good horsemen and drivers out of them," for the

reason that "at the front it is well-nigh impossible to teach these things" and so that "the horses may not suffer in consequence."

Mobility must always be a prime factor in assuring the utmost usefulness of our Field Artillery. Experience in France demonstrated that the driver must be capable of getting his gun **anywhere, under all circumstances.** Perhaps ill-trained recruits can ride their pairs over a smooth road along level ground, but to drive the same pair to position in war, over broken, shell-torn battle areas, requires the most skillful team of drivers, horsemen who can drive with the least wear and tear on their animals and equipment. The capable driver must know not only what he wants to do, but how to do it, which will enable him not only to "think it over" but to "put it over." The successful horseman must first know how to care for his mounts, as a successful driver must first know how to ride.

The result of the intensive war training has brought out much careful thought on this subject from many sources, but requires a condensation and explanation of the best subject matter, in logical sequence for the most efficient instruction in mounted courses for our horse drawn Field Artillery. Endeavor has been made in this compilation to present a comprehensive, instructive, attractive and compact textbook for the mounted student in the school of Field Artillery.

The subjects covered herein have been taken almost wholly or in part from service manuals, various official handbooks, lectures and instruction matter from The School of Fire, Brigade Training Pamphlets from Artillery Centers, the Field Artillery Drill Regulations, the Cavalry Drill Regulations, the Army Horseshoer, the Stable Sergeants' Manual, The Army Horse in Accident and Disease, instruction notes of the Mounted Service School, The F. A. C. O. T. S. Black Book used at Camp Taylor, Ky., instruction in draft by Colonel William P. Ennis, F. A., the English Gunners', Drivers', and Mounted Soldiers' Handbook and many other sources.

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PART I

THE CARE OF ANIMALS AND EQUIPMENT

The Artillery Horse.
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Care of Animals in Sickness and Disease.
Care of Harness and Equipment.

GENERAL

Object.

To keep the greatest possible number of animals in a fit condition at all times.

How Accomplished.

This can be accomplished only by a thorough knowledge of animals and their needs, the establishment and maintenance of systematic methods and strict stable discipline, and by close supervision of details. The old saying that "an ounce of prevention is worth a pound of cure" is especially true in the care of animals, for it is a well established fact that the prevention of disease and other causes of disability of animals is of far greater importance than any treatment which can be given for the cure of disabilities.

Animals are by many thoughtless people in and out of the service, all too frequently considered as just so many articles of issue, which will render the prescribed amount of service regardless of the conditions affecting their health and general welfare.

On the contrary, there is probably nothing issued to our troops which is so perishable or so dependent upon the proper care. Despite their great physical strength animals have extremely delicate constitutions, and must be watched over, fed and tended with the greatest care if we are to profit by the splendid service they are capable of performing when in fit condition.

All men who have to do with animals must be trained in their care. For convenience of supervision, animals can best be observed in small lots such as platoons or sections. Leaders of these units must be held responsible by their superior officers. This does not relieve the organization commander from his responsibility, for he alone is responsible to his superiors for the results in his command.

Existing conditions may be such that it seems impossible to obtain any sort of satisfactory conditions. In such cases ingenuity and resourcefulness will often produce results which at first appear to be impossible.

COMMON HORSE SENSE

1. Kindness is the best policy. Far better results are obtained from animals by kindness than by rough treatment. Nearly all bad horses are made so by brutal treatment.

2. Horses and mules are animals, not machines. They have feelings just as we have, and should be treated with consideration.

3. Horses are strong if properly cared for. They cannot care for themselves. If we neglect them they suffer and we lose their service.

4. An animal is no stronger than his weakest part. It will avail us nothing for him to have wonderful muscles and poor feet. Every part must be cared for.

5. The human voice has great effect on animals. They read our emotions by the tone. We can increase our control 50% by using the voice. Contract the habit of talking to your animals; they understand more than you think.

6. Always speak on approaching an animal to attract his attention, so that you will not startle him.

7. Horses and mules are naturally timid. Gain their confidence and respect, by gentleness, patience and persistence.

8. Never punish an animal in anger. It would be only satisfying your own brutal instinct. Most faults committed by them are through lack of understanding or fear, seldom through viciousness. If punishment is necessary it must follow the offense immediately and then be commensurate with the offense.

9. Reward gains far more for us than punishment. In training, always reward a correct performance, no matter how slight. It is our only means for telling him "well done."

10. Every animal is an individual and must be studied and treated according to his needs. There is no greater mistake than treating them like so many biscuits in a pan.

11. Feed animals so that they may get the best value from their rations; you want it from yours. Feed clean food, properly prepared, frequently, and in small quantities.

12. Feed animals so that it will not injure them. Never when they are heated.

13. Water animals rationally. They should have all they want to drink. Never water when heated unless the exercise is to continue immediately. Never immediately after feeding, wait an hour. Before feeding is the best time.

14. Work animals rationally, never to exhaustion. If hard work is to be expected, have them in condition to perform it.

15. Keep animals well by proper care; don't wait until they become sick and cure them. Prevent sickness, and cures will be unnecessary.

16. Give animals clean stalls and clean beds. They will be healthier, rest better and serve you better.

17. Save them from exposure, by proper shelter. They will last longer and require less food.

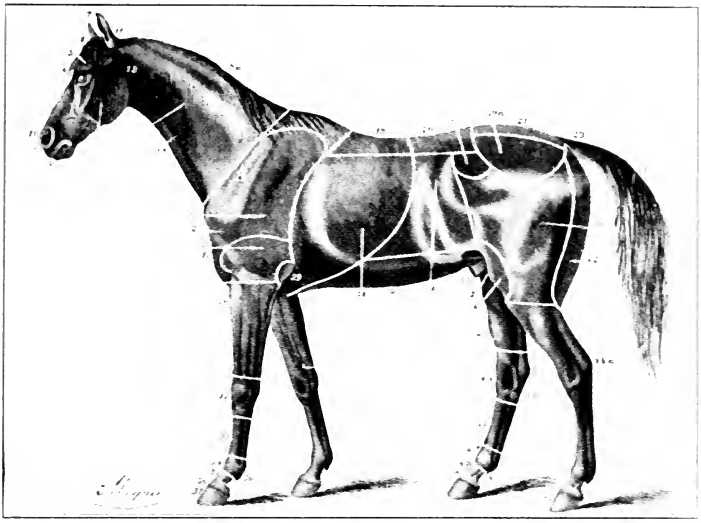
18. Keep them from standing in mud. Few things will break them down more quickly.

19. Groom animals thoroughly and keep them trimmed. They will be far healthier and stronger, and you will be proud to ride or drive them.

20. Watch their feet and see that they are well cared for. Their feet are delicate and require great care.

21. Keep your equipment in top shape. It will last much longer and be a satisfaction to you.

22. Have the best cared for horse and equipment in the "outfit," and you'll have something to be proud of.



Points of the Horse

1. Lips.
2. Muzzle.
3. Face.
4. Forehead.
5. Eyebrows.
6. Forelock.
7. Ears.
8. Lower jaw.
9. Cheek.
10. Nostril.
11. Poll.
11*a*. Throat.
12. Parotid.
13. Neck.
13*a*. Mane.
14. Jugular channel.
15. Breast (front of chest)
16. Withers.
17. Back.
18. Ribs, or barrel.
19. Girth.
20. Loins.
21. Croup.
22. Tail.
23. Dock.
24. Flank.
25. Belly.
26. Sheath.
27. Testicles.
28. Point of shoulder.
28*a*. Shoulder.
28*b*. Arm.
29. Elbow.
30. Forearm.
31. Chestnut.
32. Knee.
33. Cannon.
34. Fetlock joint.
35. Pastern.
36. Coronet.
37. Foot.
38. Fetlock.
39. Point of the hip.
39*a*. Haunch.
40. Thigh.
41. Stifle.
42. Buttock.
43. Gaskin.
44. Hock.
44*a*. Point of hock.
45. Chestnut.
46. Cannon.
47. Fetlock joint.
48. Fetlock.
49. Pastern.
50. Coronet.
51. Foot.

TYPES OF ARTILLERY HORSES

The general conformation of an Artillery horse involves a massive form, a compact and blocky body, and a comparative shortness and strength of limb, the whole being in harmonious proportion. Weight is a most important consideration, for a true Artillery horse must weigh heavy compared with the lighter type. Grouped into classes, the light Artillery horse weighs 1,300 lbs. and the heavy from 1,300 up. In order to pull heavy loads, the Artillery horse must possess plenty of weight. It becomes very evident that the heavy horse, in harness, brings greater power into the collar than does the light horse. The height is not material, provided there is the necessary weight. Artillery horses usually stand from 15 to 17½ hands, though occasional exceptions occur. The light Artillery represents the lesser height, and as the weight increases the height may also bear a relationship to it. Quality and substance, as shown in hair, bone, and joints, should be preëminent with this horse. The hair should be fine and silky, even if long, and the bone smooth and attractive, with neatly turned joints, the lower limbs being generally free from all superfluous flesh. Coarse joints are usually associated with coarse bones and poor feet; often with a coarse and undesirable head.

The action of the Artillery horse should be true and bold. As the horse comes toward one, or goes from him the line of movement of the limbs should be true, the feet being carried straight-away, with no so-called paddling or irregularity of gait. The feet should be picked up with snap, whether at walk or trot, and carried clear of the ground, showing the sole of the foot clearly in the movement. High knee action is not essential, but a strong, full, true movement of both knee and hock, without dragging or stiffness, is very important. The Artillery horse should have an active gait, for the value of a fast walker considerably exceeds that of the sluggish type. A free and easy movement of knee and back is essential to high class action. In connection with good action the head and neck should be carried high, with style and body action, not out of proportion with the body, have plenty of breadth between the eyes. The eyes should be reasonably prominent and bright, free from cloudiness and spots; lids thin, well open, and evenly curved. The nose and muzzle should be broad yet not coarse, with nostrils of ample size for easy breathing. Nicely matched lips, and strong cheeks and lower jaws help to make a strong head with character. The head should be crowned with fine ears of medium size gracefully placed and carried. Polls smooth and free from enlargements and scars. Throat and parotid region clear and free from swollen and enlarged glands.

Neck: The neck of the Artillery horse is strong and muscular, supporting the head gracefully, and being joined smoothly and deeply at the body. Some arch to the neck is desirable; this appears in a very small degree with mares and geldings. A neck with a concave upper border is known as a ewe neck and is unsightly.

Withers: Extending well back, muscular, but not fleshy—high but not to the extreme as is seen in saddle horses.

Shoulders: The shoulders should not be as long and sloping as with a light driver, but more upright, being well set into the back, a happy medium between the straight and sloping shoulder, giving the best power and movement for the Artillery horse. Too straight a shoulder promotes excessive concussion and bone trouble of the limbs and feet. Smoothness of shoulder is essential, for roughness and prominence will be sure to involve soreness and trouble from fit of collar.

Chest: The chest should be full and deep, indicating large capacity of the vital organs. Narrowness behind the shoulders is quite common, and indicates defective constitution. Too much thickness of chest, an unusual occurrence, may cause a swaying movement in action.

Arm: The arm must be large and muscular, and placed so as to bring the legs in proper position under the body, not standing out at the corners.

Forearm: The forearm should be comparatively long, broadly and strongly muscled in its upper part and gradually tapering to the knee. A powerful forearm on the Artillery horse is slightly important and its value is not likely to be overestimated.

Knee: The knee must be broad, as viewed from the front, be well carried back and be amply supported from below. This part should be neat and cleanly jointed. A knee bent backwards is called a "calf-knee"; the opposite condition is known as "knee-sprung."

Pastern: The pastern is an important part of the leg. It should be fairly long, be perfectly smooth and free from extra flesh and stand at an angle of about 45 degrees. At this slope concussion is received in perhaps the least degree, and with least injury to the foot and leg. There is some difference of opinion among horsemen on the length of the pastern, some preferring one reasonably long and others one of medium length. The slope is more important than the length, but no doubt better feet prevail where the pastern tends toward length rather than shortness. Sidebones, ringbones and other foot troubles are most prevalent with short, straight pasterned Artillery horses. As the horse naturally places the foot in action the pressure first comes on the frog and is then distributed over the rest of the foot. If the pastern is straight, the toe and front of the foot strike first and thus the concussion is greatest.

Cannon: The cannon bone is round, but has tendons extending down its back edge, more or less separated from the bone. As viewed from one side the cannon and its attachment should be deep, amply supporting the knee; and viewed from rear and front, should be quite flat, thus representing the strongest conformation. Often the cannon is tied in beneath the knee, which indicates weakness. A long or rounded cannon shows faulty conformation with the best development. A fair girth at the smallest point is 9¾ inches. A large girth, however, does not always indicate proper development as the leg may be coarse and out of proportion.

Fetlock: The fetlock must be smooth and deep with no roughness.

Foot: The foot ought to be large, the hoof dense and preferably dark in color, the sole concave and the frog large. There is an old saying, "No foot, no horse." Sound feet are absolutely essential to comfort and efficiency of work. The interior of the foot contains very sensitive nerves and membranes. If the foot is too small and contracted, if the frog is too narrow and low, inflammation of the membranes will frequently follow. The ample foot, wide on top and behind, well supported at the heel, and carried true in movement, turning neither in nor out at the toe, is least likely to be troubled with disease.

Body: The body should be short on top, long below, broad along the back, with ribs strongly arched and of great depth. A long back indicates weakness of both constitution and Artillery power, while a short deeply muscled back means strength. If the ribs are well sprung and deep, it shows capacity for the internal organs, indicates a good feeder and materially adds to the weight, which is necessary in the Artillery. Usually satisfactory rib development provides a proper body conformation. Often immature horses appear to lack depth of body to some degree, but age and feeding establish the proper proportions. The horse that lacks depth of body will also lack the power of endurance.

Loin: The loin should be broad and thickly muscled. Narrow, thin loin indicates weakness of a serious character. Often the loin is depressed, directly in front of the space between the hips, a distinctively undesirable conformation. Animals with a sway back as a rule show this weakness of loin.

Croup: The croup should be broad, wide, fairly level and heavily muscled. A steep croup is very objectionable, and affects both the beauty and power of the horse. A short, steep croup is less strongly muscled than one that is long. The Belgian and French Artillery breeds seem most subject to steepness of rump and low setting of tail.

Thigh: The thigh should be strongly muscled and the quarters should be thick and free. A horse split up high behind, with a thin, sharp tapering thigh, lacks good Artillery form at this place. The gaskin, or lower thigh, where properly made, is deep from the front to rear and heavily covered with muscle.

Hock: The hock is a part which requires careful study. As viewed from one side, it should show considerable depth, while from the rear it should possess a certain degree of thinness, though broad in front, the entire point being free from extra flesh. Thick hocks are very common with Artillery horses, due to various reasons. The joint may be fleshy, puffiness may occur for lack of exercise, or a form of spavin may exist. The hock should be smooth and its various natural curves well defined. As the horse stands in a natural position on his feet, the hocks should be straight and true as viewed from behind, showing no evidence of weakness. Where the hock holds a true position the hind foot also stands true, neither toeing in nor out. When toeing out the points of the hock come too close together, while if toeing in notably the points may be wide apart and the hocks

DEPARTMENT OF HORSEMANSHIP

CONFORMATION JUDGING

ANIMAL IDENTIFICATION

Type _____

Sex _____

Age _____

Height _____

Weight _____

Color _____

Markings _____

HOOF BRANDS

Right Fore | Left Fore

Name _____

Name _____

Rank _____

Class _____

Platoon _____

Date _____

GENERAL APPEARANCE: To be studied and rated—Excellent, Good, or Bad:

Form _____

Quality _____

Temper _____

GAITS: To be studied and rated—Excellent, Good, or Bad:

Walk _____

Trot _____

Gallop _____

POINTS	MAX. PERCENTAGE	ESTIMATED PERCENTAGE	REASONS
HEAD			
Ears	10		
Eyes	15		
Muzzle	15		
Forehead	15		
Face	5		
Jowl	5		
Cheeks	5		
Total	70		
NECK			
Shape	25		
Set on	25		
Total	50		
FOREQUARTERS			
Shoulders	50		
Arms	10		
Elbows	10		
Forearms	30		
Knees	30		
Cannon	25		
Fetlocks	15		
Pasterns	20		
Feet	50		
Legs, general shape & direction	40		
Total	280		
BARREL			
Withers	40		
Chest	30		
Ribs	30		
Back	50		
Loin	50		
Flanks	25		
Belly	25		
Total	250		
HINDQUARTERS			
Hips	30		
Croup	30		
Dock	10		
Buttocks	35		
Thighs	35		
Stifles	10		
Gaskins	30		
Hocks	40		
Cannons	20		
Fetlocks	15		
Pasterns	15		
Feet	40		
Legs, general shape & direction	40		
Total	350		
GRAND TOTAL	**1000**		

Note: This card is designated to give the student a general idea of the relative importance of the various points in the conformation of a horse and familiarize him by practice in judging different horses, with the points and their desirable qualities.

It is in no way intended as a means of rating HORSES. One bad defect in his conformation could render him useless regardless of his other fine points. Each POINT is rated separately for its own merits only.

Foot: dark in saying, comfort sensitiv tracted, branes v well su neither

Body the bacl indicate a short sprung a good in the proper depth of proporti power c

Loin: loin inc depresse tively u show th

Croup muscled beauty muscled breeds s

Thigh should l sharp t gaskin, to rear

Hock from on it shoul the enti commor may be spavin curves v feet, th showing position When t while if

appear springy and weak when in action. The hock should be supported by a wide, thin, cleanboned cannon, which may be about 11 inches in girth at its smallest point. From rear position a line dropped from the point of the buttock or croup viewed from behind, should pass the center of point of hock, cannon, pastern and foot. From one side it should pass parallel to the entire edge of cannon and when suspended from the point of the hip should pass the gaskin at the center and drop to the center of the foot. Such a horse is likely to have a good constitution and be able to resist hard work, fatigue and disease to a maximum degree. On the other hand a poor constitution is indicated by a shallow, narrow chest, small bones, long loins, coarse neck and head, with thick throat, small, long and musclar development, short thighs and forearms, small joints, long, round cannons, and hoofs of open texture with flat soles.

The temperament is indicated by the manner in which the horse responds to external stimuli. When the horse is spoken to or when he sees or feels anything that stimulates or gives alarm, if he responds actively, quickly and intelligently, he is said to be of a lively or nervous temperament. On the other hand, if he responds in a slow, sluggish manner, he is said to have a sluggish or lymphatic temperament. The temperament is indicated by the gait, by the expression on the face and by the carriage of the head and ears. The nature of the temperament should be taken into consideration in an endeavor to ascertain the severity of a given case of illness, because the general expression of an animal in disease as well as in health depends to a large extent on the temperament.

SOUNDNESS

To be theoretically sound a horse must have no disease or other condition that interferes or is likely to interfere with his usefulness. A horse may have a disease from which he will recover. At the time of the examination he will be technically unsound.

A blemish does not interfere with his usefulness, but is unsightly, as ewe neck, Roman nose, wire cut, scars, etc.

An examination for soundness should be systematic and thorough, although it may be rapidly done. Examination should be made with the horse in the stall; as he backs out, stands at rest and in motion. In the stall, examine to see whether the horse cribs or weaves, or has any other stable habit which is objectionable. As the horse backs out of the stall, he may show peculiar use of the hind legs or imperfect control, due to serious disorders of the nervous system. Very frequently the first intimation of spavin may be had as the horse is made to step from side to side, particularly as he steps toward the spavined leg.

At Rest: With the horse at rest the observer should begin in front and examine the ears for hearing, for tumors that may develop around the base, for split ears, etc.

The eyes should be examined to test the sight, bearing in mind that moon blindness, which recurs at intervals and leaves the eye more or less normal between times, still shows a weakened or squinting appearance that is suggestive.

The nasal chambers should be examined for ulcers, scars, or discharges which would suggest possible glanders.

The teeth should be examined for evidence of cribbing, for age, and for a condition commonly known as parrot mouth, which interferes with a horse feeding, i.e. overhanging upper jaw teeth.

The lips should be examined for evidence of paralysis. The glands under, or rather between the portions of the lower jaw should be examined particularly with reference to glanders.

The poll should be examined for scars or other evidences of present or previous poll-evil.

The withers should be examined for scars, for discharging sores, and other evidences of fistulous withers.

The shoulders should be examined for sore neck and particularly so-called collar boils. The latter are either flat and broad or more prominent tumors, which will usually subject a horse to sore shoulders whenever he is put to work.

While passing along the side and flank the breathing should be observed, as to whether it is even and regular, or jerky, suggesting heaves. The flank and lower part of the abdomen must be examined for possible ruptures.

Stepping behind the horse, the two hips are compared for evidence of fractures, or what is commonly known as hipped or hipped shot. This disorder does not interfere seriously with the horse's working ability, but gives the horse a very awkward appearance.

An examination should be made for the following unsoundnesses in the leg:

Splints: Are found on the inside of the leg, from the knee near which they are frequently found, downward to about the lower third of the principal cannon bone. They are of various dimensions and are readily perceptible both to the eye and to the touch. They vary considerably in size, ranging from that of a large nut downward to very small proportions. In searching for them they may be readily detected by the hand if they have attained sufficient development in their usual situation, but must be distinguished from a small, bony enlargement that may be felt at the lower third of the cannon bone, which is neither a splint nor a pathological formation of any kind, but merely the button-like enlargement at the lower extremity of the small metacarpal or splint bone.

Ringbones: Extend around the coronary band when on the front of the foot, and even when not very largely developed, assume the form of a diffused convex swelling. If situated on the lower part, it will form a thick ring, encircling that portion of the foot immediately above the hoof; when found on the posterior part, a small, sharp bony

growth somewhat projecting, either on the inside or outside and sometimes may comprise the entire coronet.

As with splints, ringbones may result from severe labor in early life, before the process of ossification has been fully perfected; or they may be due to bruises, blows, sprains, or other violence; injuries of tendons, ligaments, also may be among the accountable causes.

Spavin: Bone spavin is an exostosis of the hock joint. The general impression is that in a spavined hock the bony growth should be seated on the anterior and internal part of the joint, and this is partially correct, as such a growth will constitute a spavin in the most nearly correct sense of the term. But an enlargement may appear on the upper part of the hock also, or possibly a little below the inside of the lower extremity of the shank bone, forming what is known as a high spavin; or, again, the growth may form just on the outside of the hock and become an outside or external spavin. Serious in its beginning, serious in its progress, it is an ailment which, when once established, becomes a fixed condition which there is no known means of dislodging.

Blood Spavin: Is situated in front and to the inside of the hock and is merely a varicose or dilated condition of the vein. It occurs directly over the point where the bog spavin is found, and has thus been frequently confused with the latter.

Bog Spavin: Is a round, smooth, well-defined, fluctuating tumor situated in front and a little inward of the hock. On pressure it disappears at this point to reappear on the outside just behind the hock. If pressed to the front from the outside it will then appear on the inside of the hock. On its outer surface it presents a vein which is quite prominent, running from below upward, and it is to the unnatural dilation of this blood vessel that the term blood spavin is applied.

Thoroughpin: Is found at the back and on the top of the hock in that part known as the "hollows," immediately behind the shank bone. It is round and smooth, but not so regularly formed as the bog spavin, and is most apparent when viewed from behind. The swelling is usually on both sides and a little in front of the so-called hamstring, but may be more noticeable on the inside or on the outside.

Sprains: Express a more or less complete laceration or yielding of the fibers of the muscles, tendons, or the sheaths surrounding and supporting them. The usual cause of a sprain is external violence, such as a fall or a powerful exertion of strength, with following symptoms of soreness, heat, swelling, and a suspension of function.

Curb: Is the bulging backward of the posterior part of the hock, where in the normal state there should be a straight line, extending from the upper end of the point of the hock down to the fetlock. The cause may be a sprain of the tendon which passes on the posterior part of the hock, or of one of its sheaths.

Capped Elbow: Or "shoe boil," is a term applied to an enlargement often found at the point of the elbow. This lesion is due to injury

or pressure of the part while it is resting on the ground. If the leg is flexed under the body so that the hoof or shoe is directly in contact with the elbow, which may occur in horses having an extremely long cannon bone or excessive length in the shoes, the greater part of the weight of the chest is concentrated at this point and the pressure may cause a bruise or an inflammation.

Capped Hock: Is a bad habit of rubbing or striking the partitions of their stalls with their hocks which prevails among some horses, with the result of an injury which shows itself on the upper points of those bones. From its analogy to the condition of capped elbow the designation of capped hock has been applied to this condition.

Stringhalt: Is an involuntary movement of one or both hind legs, in which the foot is suddenly and spasmodically lifted from the ground much higher than it is normally carried, with excessive flexion of one bone upon the other. This peculiarity is usually prominent, although it may disappear with work, only to reappear after a short rest. Veterinarians and pathologists are yet in doubt in respect to the cause of this affection, as well as to its essential nature.

Flatfoot: Is that condition in which the sole has little or no convexity. It is confined to the fore feet, which are generally broad and low-heeled.

In flatfoot there can be little or no elasticity in the sole, for the reason that it has no arch, and the weight of the animal is received on the entire plantar surface, as it rests upon the ground instead of on the wall. For these reasons such feet are particularly liable to bruises of the sole and corns. Horses with flatfoot should be shod with a shoe having a wide web, pressing on the wall only, while the heels and frog are never to be pared. Flatfoot generally means weak walls, and as a consequence the nails of the shoe are readily loosened and the shoe cast.

Clubfoot: Is a term applied to such feet as have the walls set nearly perpendicular. When this condition is present the heels are high, the fetlock joint is thrown forward, or knuckles, and the weight of the animal is received on the toes. The shoe should not be pared, but the heels are to be lowered as much as possible and a shoe put on with a long, projecting toe piece, slightly turned up, while the heels of the shoe are to be made thin.

Crookedfoot: Is that condition in which one side of the wall is higher than the other. If the inside wall is the higher, the ankle is thrown outward, so that the fetlock joints are abnormally wide apart and the toes close together. Animals with this deformity are "pigeon toed," and are prone to interfere, the inside toe striking the opposite fetlock. If but one foot is affected, the liability to interfere is still greater, for the reason that the fetlock of the perfect leg is nearer the center plane.

When the outside heel is the higher the ankle is thrown in and the toe turns out. Horses with such feet interfere with the heel. If but one foot is so affected, the liability to interfere is less than when both

feet are affected, for the reason that the ankle of the perfect leg is not so near to the center plane. Such animals are especially liable to stumbling and to lameness from injury to the ligaments of the fetlock joints. This deformity is to be overcome by such shoeing as will equalize the disparity in length of walls and by proper boots to protect the fetlock from interfering.

Interfering: An animal is said to interfere when one foot strikes the opposite leg, as it passes by, during locomotion. The inner surface of the fetlock joint is the part most subject to this injury, although, under certain conditions, it may happen to any part of the ankle. It is seen more often in the hind than in the fore legs. It may cause lameness, dangerous tripping, and thickening of the injured parts. Faulty conformation is the most prolific cause of interfering.

Knuckling: Is a partial dislocation of the fetlock joint, in which the relative position of the pastern bone to the cannon and coronet bones is changed, the pastern becoming more nearly perpendicular, with the lower end of the cannon bone resting behind the center line of the large pastern, while the lower end of this bone rests behind the center line of the coronet. While knuckling is not always an unsoundness, it nevertheless predisposes to stumbling and to fracture of the pastern.

Windgall: Joints and tendons are furnished with sacs containing a lubricating fluid called synovia. When these sacs are overdistended by reason of an excessive secretion of synovia, they are called windgalls. They form a soft, puffy tumor about the size of a hickory nut, and are most often found in the fore leg, at the upper part of the fetlock joint, between the tendon and the skin bone. When they develop in the hind leg it is not unusual to see them reach the size of a walnut. Occasionally they appear in front of the fetlock on the border of the tendon. The majority of horses are not subject to them after colthood has passed. The tumor is more or less firm and tense when the foot is on the ground, but is soft and compressible when the foot is off the ground. In old horses windgalls generally develop slowly and cause no inconvenience. If they are caused by excessive tension of the joint the tumor develops rapidly, is tense, hot and painful, and the animal is exceedingly lame.

Overreach: When the shoe of the hind foot strikes and injures the heel or quarter of the fore foot the horse is said to overreach. It rarely happens except when the animal is going fast; hence is most apt to appear in running and trotting horses. In trotters the accident generally happens when the animal breaks from a trot to a run. The outside heels and quarters are most liable to the injury.

Frostbites: Excepting the ears, the feet and legs are about the only parts of the horse liable to become frostbitten. In mountainous districts, where the snowfall is heavy and the cold often intense, frostbites are not uncommon, even among animals running at large.

Quittor: Is generally seen in but one foot at a time, and more often in the fore than in the hind feet. It nearly always attacks the inside quarters but may affect the outside, the band in front, or the heel,

where it is of but little consequence. It consists in the inflammation of a small part of the coronary band and adjacent skin, followed by sloughing and suppuration, which in most cases extends to the neighboring sensitive laminæ. Injuries to the coronet, such as bruises, overreaching, and calk wounds, are considered as the common causes of the disease. Still, cases occur in which there appears to be no existing cause, just as in other forms of quittor, and it seems fair to conclude that subhorny quittor may also be produced by internal causes.

Canker: Of the foot is due to the rapid reproduction of a vegetable parasite. It not only destroys the sole and frog, by setting up a chronic inflammation in the deeper tissues, but prevents the growth of a healthy horn by which the injury may be repaired. The essential element in the production of canker is the parasite; consequently the disease may be called contagious. As in all other diseases due to specific causes, however, the seeds of the disorder must find a suitable soil in which to grow before they are reproduced. It may be said, then, that the conditions which favor the preparation of the tissues for a reception of the seeds of this disease are simply predisposing causes. The condition most favorable to the development of canker is dampness—in fact, dampness seems indispensable to the existence and growth of the parasite; the disease is rarely, if ever, seen in high, dry districts, and is much more common in rainy weather than in dry seasons. Filthy stables and muddy roads have been classed among the causes of canker, but it is very doubtful whether these conditions can do more than favor a preparation of the foot for the reception of the disease germ.

Corns: A corn is an injury to the living horn of the foot, involving the soft tissues beneath, whereby the capillary blood vessels are ruptured and a small quantity of blood escapes which, by permeating the horn in the immediate neighborhood, stains it a dark color. If the injury is continuously repeated, the horn becomes altered in character and the soft tissues may suppurate or a horny tumor develop. Corns always appear in the sole in the angle between the bar and the outside wall of the hoof. In many cases the laminæ of the bar, of the wall, or of both, are involved at the same time. The fore feet are almost exclusively the subjects of the disease, for two reasons: first, because they support the greater part of the body; secondly, because the heel of the fore foot during progression is the first placed upon the ground whereby it receives much more concussion than the heel of the hind foot, in which the toe first strikes the ground. It may be said that all feet are exposed to corns, and that even the best feet may suffer from them when conditions necessary to the peculiar injury are present. Among the causes and conditions which predispose to corns may be named high heels, which change the relative natural position of the bones of the foot and thereby increase the concussion to which these parts are subject; contracted heels, which in part destroy the elasticity of the foot, increase the pressure upon the soft tissues of the

heel, and render lacerations more easy; long feet, which by removing the frog and heels too far from the ground deprive them of necessary moisture; this, in turn, reduces the elastic properties of the horn and diminishes the transverse diameter of the heels; weak feet, or those in which the horn of the wall is too thin to resist the tendency to spread, whereby the soft tissues are easily lacerated. Wide feet with low heels are always accompanied with a flat sole whose posterior wings either rest upon the ground or the shoe and as a consequence are easily bruised; at the same time the arch of the sole is so broad and flat that it cannot support the weight of the body, and in the displacement which happens when the foot is rested upon the ground the soft tissues are liable to become bruised or torn.

It is universally conceded that shoeing, either as a direct or predisposing cause, is most prolific in producing corns. A shoe so set as to press upon the sole or one that has been on so long that the hoof has overgrown it until the heels rest upon the sole and bars become a direct cause of corns. Indirectly the shoe becomes the cause of corns when small stones, hard, dry earth, or other objects collect between the sole and shoe. Lastly, a rapid gait and excessive knee action especially on hard roads, predispose to this disease of the feet.

Bruise of the Frog: Generally happens from stepping on a rough stone or other hard objects. It is more liable to take place when trotting, running or jumping than when at a slower pace. A stone wedged in the shoe and pressing on the frog or between the sides of the frog and the shoe, if it remains for a time, produces the same results. A cut through the horny frog with some sharp instrument or a punctured wound by a blunt pointed instrument may also cause suppuration and gangrene of the plantar cushion. Broad, flat feet with low heels and a fleshy frog are most liable to these injuries.

Contracted Heels, or Hoofbound: Is a common disease among horses kept on hard floor in dry stables, and in such as are subject to much saddle work. It consists in an atrophy, or shrinking, of the tissues of the foot, whereby the lateral diameter of the heels is diminished. It affects the fore feet principally, but is seen occasionally in the hind feet, where it is of less importance, for the reason that the hind foot first strikes the ground with the toe, and consequently less expansion of the heels is necessary than in the fore feet, where the weight is first received on the heels. Any interference with the expansibility of this part of the foot interferes with locomotion and ultimately gives rise to lameness. Usually but one foot is affected at a time, but when both are diseased the change is greater in one than in the other. Occasionally but one heel, and that the inner one, is concentrated; in these cases there is less liability of lameness and permanent impairment of the animal's usefulness.

Sand Cracks: May occur in any part of the wall, but ordinarily are only seen directly in front, when they are called toe cracks; or on the lateral parts of the walls when they are known as quarter cracks.

Toe Cracks: Are most common in the hind feet, while quarter cracks nearly always affect the fore feet. The inside quarter is more liable to the injury than the outside, for the reason that this quarter is not only the thinner, but during locomotion receives a greater part of the weight of the body. A sand crack may be superficial, involving only the outer parts of the wall, or it may be deep, involving the whole thickness of the wall and the soft tissues beneath.

The toe crack is most likely to be complete—that is, extending from the coronary band to the sole—while the quarter crack is nearly always incomplete, at least when of comparatively recent origin. Sand cracks are most serious when they involve the coronary band in the injury. They may be complicated at any time by hemorrhage, inflammation of the laminæ, suppuration, gangrene of the lateral cartilage and of the extensor tendon. Relative dryness of the horn is the principal predisposing cause of sand cracks. Heavy shoes, large nails, and nails set too far back toward the heels, together with such diseases as canker, quittor, grease, and suppurative corns, must be included as occasional causes of sand cracks.

Sidebones: A sidebone consists in a transformation of the lateral cartilages found on the wings of the coffin bone into bony matter by the deposition of lime salts. The disease is a common one, especially in heavy horses used for draft, in cavalry horses, cow ponies, and other saddle horses, and in runners and trotters.

Sidebones are peculiar to the fore feet, yet they occasionally develop in the hind feet, where they are of little importance since they cause no lameness. In many instances sidebones are of slow growth and, being unaccompanied with acute inflammation, they cause no lameness until such time as, by reason of their size, they interfere with the action of the joint. Sidebones often grow in heavy horses without any apparent injury and their development has been attributed to the overexpansion of the cartilages caused by the great weight of the animal. Blows and other injuries of the cartilages may set up an inflammatory process which ends in the formation of these bony growths. High-heeled shoes, high calks, and long feet are always classed among the conditions which may excite the growth of sidebones. They are often seen in connection with contracted heels, ringbones, navicular disease, punctured wounds of the foot, quarter cracks, and occasionally as a sequel to founder.

Ringbones: Is the growth of a bony tumor on the ankle. This tumor is, in fact, not the disease, but simply the result of an inflammatory action set up in the bone tissue proper of the pastern bone.

Injuries such as blows, sprains, overwork in young, undeveloped animals, fast work on hard roads, jumping, etc., are among the principal exciting causes of ringbone. Horses most disposed to this disease are those with short, upright pasterns, for the reason that the shock of locomotion is but imperfectly dissipated in the fore legs of these animals. Improper shoeing such as the use of high calks, too great

DEPARTMENT OF HORSEMANSHIP

INSPECTION FOR COMMON UNSOUNDNESS

ANIMAL IDENTIFICATION

Name_____

Color_____

Markings_____

Name_____

Rank_____

Class_____

HOOF BRANDS

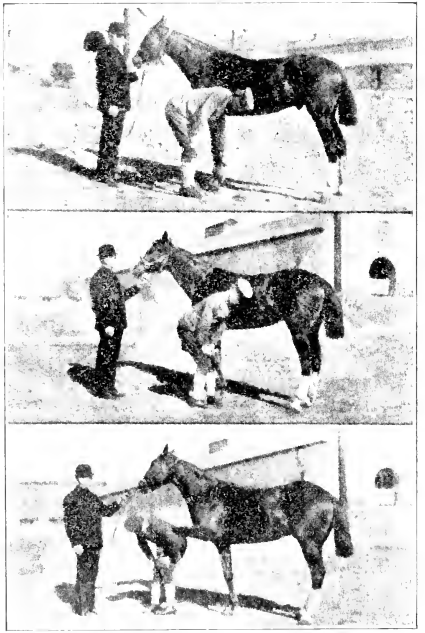
Right Fore | Left Fore

Platoon _____

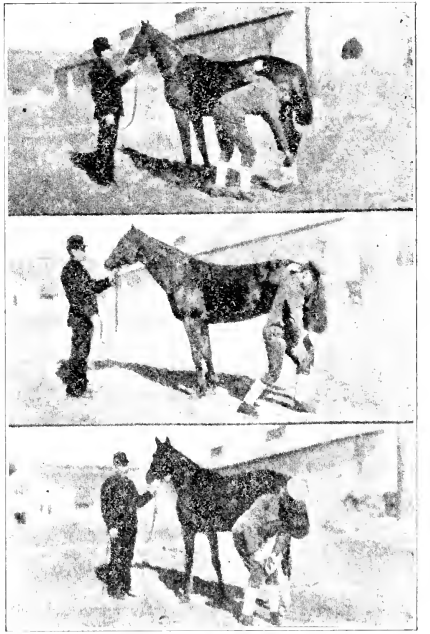
Date_____

	YES or NO	REMARKS
Over Age		
Under Age		
Blindness		
Poll Evil		
Fistula of Withers		
Chronic Sore Back		
Splint		
Ringbone		
Sidebone		
Quittor		
Navicular Disease		
Contracted Heels		
Dropped Sole		
Bone Spavin		
Bog Spavin		
Curb		
Bad Mouth		

GENERAL REMARKS:



Raising the Foot



Raising the Foot

a shortening of the toe and correspondingly high heels, predispose to this disease by increasing the concussion of the feet.

In Motion: The horse should be examined while walking and trotting. The movements of the neck and head are studied as he comes toward the observer; then, as he passes by, the movements of the limbs are noted as to the height to which they are raised; the bend of the joints whether easy and natural or otherwise. The way in which the foot lands upon the ground, whether flat, on the toe, one side, or on the heel, is to be noted and considered. As the horse passes from the observer the movements of the hips and hind legs are noted with a view to detecting lameness in those parts. Examination in motion on a hard road or pavement should be made, especially to bring out diseases of the feet. Then motion in deep mud or in snow should be studied. If these are not available, the horse should be made to step over a rail or plank held up about a foot from the ground in order to detect or make more prominent possible soreness or lameness in the shoulder or hip.

The Lungs: Finally, the horse should be given vigorous exercise on a full stomach; for instance, a run to a heavy wagon, or a short run uphill to determine whether the lungs are normal, or, in other words, for the purpose of testing his wind. It is possible to partially disguise abnormal breathing while the horse is at rest, but it is practically impossible to do so if the horse is given violent exercise, and the latter should preferably be done after feeding and watering. The pulse and temperature are also taken at this time.

Raising the Foot: In preparing to raise a horse's foot never approach the animal suddenly, for he will not only be startled, but a sudden pull at his foot will probably disturb his balance, and the lifting will be more difficult for both man and horse.

To raise the fore foot, the shoer stands with his back to the horse's head and places his inside hand on the horse's shoulder. Then, bending over, he runs his hand gently down the back of the leg until the fingers, with the thumb on the outside, are just above the fetlock. The shoer's shoulder is pressed against the shoulder of the horse, forcing the weight upon the other fore foot. A slight grasp of the hand on the tendons is usually sufficient to induce the horse to raise the foot.

The shoer next straddles the horse's leg and holds the foot upon his knees, standing so that his body is about opposite the horse's shoulder, and in close to him, so that the horse's leg is not pulled outward in a strained position. The shoer's toes should be turned in to give strength to the position.

Raising the hind foot is performed in two different ways. In the first method the shoer, standing at the horse's flank and with his back to the animal's head, bends until his shoulder presses the horse's thigh, runs his hand gradually down the tendons and grasps them as in raising the fore foot. In the second method, the one generally employed, the shoer stands as in the first method, but with his outside

foot advanced; the hand nearest the horse is placed upon the animal's hip, gently pushing him over and forcing the weight upon the opposite hind foot; meanwhile the other hand is run slowly down the back tendons from below the hock. The leg is grasped under the fetlock and is slightly raised forward. The shoer now swings his inside leg under the horse's leg, presses it with his knee and extends it to the rear. Care must be exercised that the foot is not held too high nor carried too far to the rear or outward, for the discomforts of these strained positions will induce the horse to pull his leg away.

GROOMING

The Skin Consists Primarily of Two Parts:

1. The superficial layer containing no blood vessels and known as the epidermis. This layer consists of cells placed side by side, and more or less modified in shape by their mutual compression and by surface evaporation and drying. As these cells dry, they form scales which fall off continually and form dandruff.

2. The second or deeper layer contains a large number of blood vessels and is called the dermis or true skin. This layer is formed of somewhat rounded cells and have the selective power of what they shall take up for their own nourishment and on what they shall admit into the circulation from without. Thus certain agents, like iodine and belladonna, are readily admitted, whereas others, like arsenic are excluded. This layer contains fibrous bundles, cells, blood vessels, nerves, glands, gland ducts and hairs.

Hairs grow from follicles, sacs hollowed out in the skin and extending to its deepest layers. The hair itself is formed of the same kind of cells, firmly adherent to one another by a tough intercellular substance and overlapping each other like slates on a roof, in a direction toward the free end. There are glands ending in the above sacs which secrete an oily substance which gives glow to the hair and prevents its becoming dry and brittle, and keeps the skin soft and pliable.

The fibrous bundles of the true skin contain plain, muscular fibers, which are not controlled by the will, but contract under the influence of cold and under certain nervous influences, as in some skin diseases and in chill or fever, and lead to contraction, tightening or corrugation of the skin, contributing to produce what is commonly called "hidebound." Besides these, the horse's skin is furnished with an expansion of red, voluntary muscle, firmly attached to the fibrous bundles, and by which the animals can not only dislodge insects and other irritants, but even shake off the harness. The fleshy envelope covers the sides of the trunk and the lower portions of the neck and head, the parts unprotected by the mane and tail, and serves to throw the skin of these parts into puckers, or ridges, in certain irritating skin diseases.

There are numerous isolated glands, opening directly on the surface of the skin, producing a somewhat thicker and more odorous secretion. They are found in large numbers in the folds of the skin, where chafing would be liable if the surface were dry, as on the sheath, scrotum, and inner side of the thigh, around the anus, in the hollow of the heel, beneath the fine horn of the frog, on the inner side of the elbow, on the lips, nostrils and eyelids. When closed by dried secretion these glands may become distended so as to form various sized swellings on the skin, and when inflamed they may throw out offensive liquid discharges, as in "grease," or produce red, tender, fungous growths, commonly called "grapes."

The cutaneous covering presents such an extensive surface for the secretion of dermis scales, hairs, horn, sweat and other excretory matters, that any extensive disorder in its functions may lead to serious internal disease and death. Again, the intimate nervous sympathy of different points of the skin with particular internal organs renders certain skin disorders causative of internal disease and certain internal diseases causative of affections of the skin. The mere painting of the skin with an impermeable coating of glue is speedily fatal; a cold draft striking on the chest causes inflammation of the lungs or pleura; a skin eruption speedily follows certain disorders of the stomach, the liver, the kidneys, or even the lungs; simple burns of the skin cause inflammations of internal organs, and inflammation of such organs cause in their turn eruptions of the skin. The relations—nervous, secretory, and absorptive—between the skin and internal organs are most extensive and varied, and therefore a visible disorder in the skin may point at once and specifically to a particular fault in diet, to an injudicious use of cold water when the system is heated, to indigestion and improper grooming.

The sweat glands of the horse, like those of man, are composed of simple tubes which extend down through the cuticle and dermis in a spiral manner, and are coiled into balls in the deeper layer of the true skin. In addition to their importance in throwing offensive waste products out of the system, these tend to cool the skin and the entire anatomy of the animal through the evaporation of their watery secretion. Their activity is therefore a matter of no small moment, as besides regulating the animal heat and excreting impurities, they influence largely the internal organs through the intimate sympathy maintained between them and the skin.

Chafing is a common cause of disease of the skin and is especially liable to affect the fat horse between the thighs, by the side of the sheath or scrotum, on the inner side of the elbow, or where the harness chafes on the poll, shoulder, back, breastbone and under the tail. The accumulation of sweat and dust between the folds of the skin and on the surface of the harness, and the specially acrid character of the sweat, in certain horses contributes to chafing. The heels often become congested owing to the irritation caused by the short bristly hairs in clipped heels. Again congestion may occur from friction by

halter, harness, or other foreign body under the pastern, or inside the thigh or arm, or by reason of blows from another foot (cutting, interfering, overreaching). Finally erythema is especially liable to occur in spring, when the coat is being shed, and the hair follicles and general surface are exposed and irritable in connection with the dropping of the hairs.

The Value of Grooming

"The value of grooming is dependent upon the force with which the brush is used and the thoroughness of the other work. As is seen above, grooming is essential to the general health and condition of the domesticated horse. Horses improperly groomed with ragged manes, unkept pastern, feet improperly looked after, form an indication of an inefficient organization. Clean horses properly harnessed and smartly turned out, add to the esprit of an organization and give a fair indication of the discipline and efficiency." D. & S. R. F. A.

"To Judge the Cleanliness of a horse: The hand may be passed the reverse way of the hair to get a view of the skin. When the points of the fingers are run firmly against the set of the coat, lines of gray are left on the coat of a dirty skin and the points of the fingers are covered with scurf. Between the branches of the under jaw, under the crown piece of the halter, at the bends of the knees and hocks, under the belly and between the forelegs and thighs are the places usually neglected when the work is not thorough and which should be looked at when the horse is being inspected." D. & S. R. F. A.

Cracked Heels (Scratches or Chaps on Knee and Hock): This usually sets in with swelling, heat, and tenderness of the hollow of the heel, with erections of the hair and redness (in white skins), with stiffness and lameness, which may be extreme in irritable horses. Soon slight cracks appear transversely and may gain in depth and width and may even suppurate. More frequently they become covered at the edges or throughout by firm incrustations resulting from the drying of the liquids thrown out, and the skin becomes increasingly thick and ridged. A similar condition occurs behind the knee and in front of the hock, and may extend from these points to the hoof, virtually incasing that side of the limb in a permanent incrusting sheath.

Causes: Besides a heavy lymphatic constitution, which predisposes to this affection, the causes are overfeeding on grain, unwholesome fodder, close, hot, dirty stables, constant contact with manure or urine and their emanations, working in deep irritant mud; above all in limestone districts, irritations by dry limestones or sandy dust in dry weather on dirt roads; also cold drafts, snow and freezing mud, washing the legs with caustic soap, wrapping the wet legs in thick woolen bandages which soak the skin and render it sensitive when exposed next day, clipping the heels, weak heart and circulation, natural or supervening on overwork, imperfect nourishment, impure air, lack of sunshine, chronic exhaustion, or debilitating diseases, or functional

or structural diseases of the heart, liver or kidneys. These last induce dropsical swelling of the limbs (stocking), weaken the parts, and induce cracking. Finally, the scar of a preëxisting crack, weak, rigid and unyielding, is liable to reopen under any severe exertion; hence rapid paces and heavy draft are active causes.

Warts: These are essentially an overgrowth of the superficial layer of the skin. They are mostly seen in young horses about the lips, eyelids, cheeks, ears, beneath the belly and on the sheath, but may develop anywhere. The smaller ones may be clipped off with scissors and the raw surface cauterized with bluestone. The larger may be sliced off with a sharp knife, or if with a narrow neck they may be twisted off and then cauterized. If very vascular they may be strangled by a wax thread or cord tied around their necks, at least three turns being made around and the ends being fixed by passing them beneath the last preceding turn of the cord, so that they can be tightened day by day as they slacken by shrinkage of the tissue. Very broad warts that cannot be treated in this way may be burned down with a soldering bolt at a red heat to beneath the surface of the skin, and any subsequent tendency to overgrowth kept down by bluestone.

Vegetable Parasites of the Skin: Ringworm. This is especially common in young horses coming into training and work. In the horse the symptoms are the formation of circular, scurfy patch where the fungus has established itself, the hairs of the affected spot being erect, bristly, twisted, broken, or split up and dropping off. Later the spot first affected has become entirely bald, and a circular row of hairs around this are erect, bristly, broken and split. These in turn are shed and a new row outside passes through the same process, so that the extension is made in more or less circular outline. The central bald spot, covered with a grayish scurf and surrounded by a circle of broken and split hairs is characteristic. The eruption usually appears on the back, loins, croup, chest and head.

The most effective way of reaching the parasite in the hair follicles is to extract the hairs individually, but in the horse the mere shaving of the affected part is usually enough. It may then be painted with tincture of iodine twice a day for two weeks. Germs about the stable may be covered up or destroyed by a whitewash of freely burned quicklime, the harness, brushes, etc., may be washed with caustic soda and then smeared with a solution of corrosive sublimate one half dram and water one pint.

Another parasite which attacks the horse's head where the harness presses, leads to the dropping of the hair, leaving bald patches covered with a branlike scurf, without any eruption, heat, tenderness, swelling, or rigidity of the skin. A lotion of carbolic acid one dram and water 2½ ounces is usually applied to effect a cure.

Animal Parasites of the Skin: Mange. The mite is nearly microscopical, but may be detected with a magnifying lens among moving scurf taken from the infected skin. It burrows little galleries in and beneath the scurf skin, where it hides and lays its eggs and where its

young are hatched. It is therefore often difficult to find the parasite on the surface, unless the skin has been heated by a temporary exposure to the sun or in a warm room.

Symptoms: The symptoms are an incessant, intolerable and increasing itching of some part of the skin (head, mane, tail, back, etc.) the horse inclining himself toward the hand that scratches him and moving his lips as if himself scratching. The hairs may be broken and rubbed off, but the part is never entirely bald, as in ringworm, and there may be papules or any kind of eruption or open sores from the energy of the scratching. Scabs of any thickness may form but the special features are the intense itching and the presence of the parasite.

Treatment consists in dipping the horses and a dipping vat is usually at every remount station for this purpose and, if necessary, a brush and a thorough application of tobacco 1½ ounces and water 2 pints, prepared by boiling.

Grooming. Pulling Manes and Tails. Trimming Manes and Fetlocks. Clipping. Washing.

Grooming: Grooming is essential to the general health, condition and appearance of animals.

The specific benefits derived from grooming are: The removal of dirt and body waste from the skin and coat; the maintenance of health and condition by the stimulation of skin secretions; the prevention of skin diseases (mange, lice, etc.); and the improvement in the appearance of the coat and animal generally.

The value of grooming depends upon the thoroughness and speed with which it is done. Men should be encouraged to work hard and fast, skip nothing, and get through. Each man's grooming should be inspected as soon as possible after completion, and if satisfactory, the man dismissed.

Every animal in the stable should be groomed thoroughly at least once a day. Before leaving the stable for work or exercise, horses will be brushed off, mane if any neatly arranged, tail brushed out, eyes cleaned, nostrils and dock wiped out, and feet cleaned.

On return from work or exercise grooming should be proceeded with immediately, except for such delay as is necessary incident to wiping off and putting away equipment. Heated, wet, or sweating horses should be cooled out before being groomed. In the case of such horses, the equipment should be removed and quickly put aside, then the horse given a brisk rubbing with the wisp or drying cloth, blanketed and walked until thoroughly cool. A couple of swallows of water every few minutes will assist the cooling out and is beneficial to the animal.

Grooming Tools: Each mounted man should have the following grooming kit: curry comb, horse brush, dandy brush (if procurable), hoof hook, grooming cloth, and wisp.

The Currycomb: The currycomb is not beneficial to skin or to the coat except in removing mud and dirt. This can generally be done with the horse brush, if properly used. On the other hand the currycomb often scratches the skin and irritates the horse, and not infrequently makes horses "conscientious objectors" to be groomed.

The Horse Brush: The horse brush is the principal tool in grooming. When properly used it reaches the skin, the bristles or fibers penetrating through the hair of the coat. It removes scurf, dirt and dust, stimulates the skin and hair growth and to a certain extent massages. Too much stress cannot be laid upon its use.

The Dandy Brush: The dandy brush is not an article of regular issue, but its use is strongly recommended whenever it can be procured. When used it takes the place of the currycomb and cleans the horse far more quickly than the horse brush alone. When used it should be followed by the horse brush.

The Hoof Hook: The hoof hook is used to clean out the feet. It is frequently found attached to the back of the horse brush, but if not, can be easily made by the horseshoer. Three-eighths inch iron wire or a horseshoe drawn out to that dimension will make excellent ones. The wire should be about eight inches long to start with. The end is sharpened slightly and given a round point, then bent at right angles about 1¼ inches from the point. The other end can be turned into a small ring for a handle. The point should not be sharp as there is danger of injuring the feet by going too deep into the commissures and cleft of the frog. It is a very necessary tool and no trooper should be without one.

The Grooming Cloth: The grooming cloth is used to remove dirt and dust from the coat, to wipe off the head and clean the dock, and to polish the coat. It is also used to dry horses with. It is usually made from old toweling or condemned blankets which serve the purpose satisfactorily. It should be from a foot and a half to two feet square, or even larger.

The Wisp: A wisp is a pad of straw or hay made by twisting the material into a rope and doubling it into convenient sized pads as follows: Take a rope of twisted straw or hay eight to ten feet long. Make two loops at one end (fig. 1) one loop being slightly longer than the other. The remainder of the rope is now twisted alternately around each loop until the end is reached when it is passed through the extremity of each loop and tucked under one of the twists (fig. 2). A really good wisp should be no wider than can be conveniently grasped by the hand, about one foot long and two or three inches thick. Care must be taken not to waste material in making wisps. It is used in regular grooming and in drying out wet horses. In regular grooming it should be dampened slightly to make the straw less brittle. With wet horses this is unnecessary as sufficient moisture is absorbed from the horse.

Wisping is really a form of massage and is a most valuable means of improving the condition of the skin and coat and for making muscle.

It stimulates the skin generally, produces a vigorous circulation and glosses the coat. It should not be omitted from grooming unless prevented by shortage of straw or the necessity for great haste.

In wisping wet horses the wisp should be worked forward and backward well into the coat, so that full advantage may be taken of the friction. After drying in this manner, the coat should be laid flat.

Washing and Disinfecting of Grooming Tools: Whenever necessary to wash and disinfect currycombs or brushes, either to clean them or as a precaution against the spread of disease proceed as follows: First clean thoroughly by dipping them in a strong soda solution, followed by dipping in a strong salt solution to stiffen the bristles. Then immerse in a 1% solution of creosol for 15 minutes, shake out and stand with bristles down to dry. Grooming cloths can be treated similarly.

Normal Method of Grooming: (For average thick-coated horse.)

(a) Clean out the foot with the hoof hook being careful not to use too much pressure.

(b) Take the currycomb in the right hand, fingers over the back of the comb, and the brush in the left hand; first use currycomb on near side of the horse, beginning on the neck, then breast, withers, shoulder, foreleg down to the knee, then back, side, belly, loin, flank, croup and hind leg down to hock.

Change currycomb to left hand and brush to the right, and proceed in a similar manner on the off side of horse.

Strike currycomb against heel frequently to free it from dirt.

The currycomb should never be used on the legs from the knees and hock downward, nor about the head. When occasionally required to loosen mud or matted hair on the fleshy parts of the body, it must be applied gently.

(c) Take brush in left hand and currycomb in right; brush entire near side of horse in same order as when currycomb was used, except that in brushing legs, brush down to the hoof.

Change brush to right hand, currycomb to left, and proceed in similar manner on the off side.

After every few strokes, clean dust and hair from brush with the currycomb.

In using the brush, the man should stand well away from the horse, keep his arm stiff and throw the weight of the body against the brush. Absolutely nothing is gained by standing close to the horse and pawing him gently with the brush.

In grooming the belly apply the brush the way of the hair, the brush in the left hand on the near side, and in the right hand on the off side. The skin under the flanks and between the fore and hind quarters must be soft and clean.

Next brush head, mane, and tail.

In cleaning mane and tail, begin brushing at the ends of the hair and gradually work up to the roots, separating the locks with the

fingers so as to get out all the scurf and dirt. Tails require frequent washing with warm water and soap.

(d) Having done with currycomb and brush, go over the horse with the wisp. The wisp should be held about the middle in the full grasp of the hand, and brought down with a bang on the coat in the direction of the hair. The pressure should be continued throughout each stroke, and the process repeated all over the body.

(Note: Should service condition render wisping impracticable, it may be omitted.)

(e) Finally with grooming cloth, wipe about the face, eyes, nostrils and dock, and give final polish all over.

(f) No horse will be considered in order until he is thoroughly clean, his mane and tail brushed out and laid flat, his eyes, mouth, nostrils and dock wiped or washed out, and his feet cleaned.

It should be a matter of pride with each man to have the best groomed horse. He should be encouraged in his efforts, and stimulated by competition and rewards.

Special Method of Grooming: (For fine coated and clipped horses). Use normal method omitting the use of currycomb, except occasionally to remove caked mud. The dandy brush can be used in place of the currycomb in these cases to good advantage. It will remove the mud and is less likely to scratch or irritate the horse.

Grooming By Detail

To groom by detail the instructor causes the men to stand to heel and commands: 1. By detail. 2. **COMMENCE GROOMING.** Clean and brush front legs from the knees down, rubbing under the fetlocks and around the coronets with the brush and hand; time, 2 minutes. 3. CHANGE. Same as at second command, the hind legs from the hocks down; time, 2 minutes. 4. CHANGE. On the near side, with currycomb and brush, groom neck, shoulder, arm, elbow, back, side, flank, loins, croup, and the hind leg to the hock; time, 4 minutes. 5. CHANGE. First on the near side, after finishing up on the off side, groom chest between the forelegs, the belly, and between the hind legs; time, 3 minutes. 6. CHANGE. Same as 4, on the off side; time, 4 minutes. 7. CHANGE. Brush head, ears, and throat; with the hand rub the throat and between the forks of the lower jaw; time, 1 minute. 8. CHANGE. Brush and lay forelock and mane; time, 2 minutes. 9. CHANGE. Brush out the tail, time, 2 minutes. 10. CHANGE. With the grooming cloth, or with a damp cloth or sponge if the parts are foul, wipe out the eyes and nostrils; wipe the muzzle, dock, sheath, and up between the hind legs; time, 2 minutes. 11. CHANGE. Clean out the feet; time, 2 minutes. 12. CHANGE. Complete any unfinished work. 13. CEASE GROOMING. 14. STAND TO HEEL.

Hand Rubbing: Hand rubbing is beneficial, being soothing and restful to tired muscles and stimulating to the circulation. It also removes loose hair and helps to produce a glossy coat. The hands

are slapped down briskly on the coat, one after the other, with the weight of the body behind them while they are moved over the skin with firm pressure.

After very hard work, the horse's legs should be hand-rubbed briskly with the fingers and palms, up and down, and then bandaged loosely.

The Sheath: Sheath should be kept clean by washing when necessary with warm water and castile soap.

The Feet: At "Stables" each man should carefully inspect his horse's feet for any evidence of picked-up nails, thrush, or other disease. Any horse in need of shoeing or of attention for other cause must be reported to the Stable Sergeant, who will see that the necessary action is taken. The Stable Sergeant will also inspect carefully all animals shod since last "Stables."

As a preventative against thrush, the feet should be washed out with a 3% solution of creolin or creosol, and careful attention must be paid to the standings.

Pulling Manes and Tails: Manes and tails should be kept pulled thin and even. This is done by grasping a few hairs at a time and sliding the hand up close to the roots, then giving a quick jerk so as to pull them out by the roots. Always work on the longest hairs and on the under side of the mane or tail.

Tails should be shortened to about four inches below the hocks. The dock and upper part of the tail should be kept free from coarse hairs.

Trimming Manes and Fetlocks: Fetlocks should be neatly trimmed, and that part of the mane upon which the crown piece rests should be closely clipped.

Clipping manes is optional with Regimental Commanders. It is, however, strongly recommended, especially for field service. When manes are clipped it should be done close, all the way up.

Clipping: The clipping of heavy coats is strongly recommended for many reasons. It should be done in the fall before the winter sets in and as often thereafter as necessary. During cold weather it should be done over the neck and body only, leaving the hair on the legs. The principal reasons for clipping are as follows:

Except under field conditions in the coldest climates, animals can be kept sufficiently warm when clipped, hence the long coat is unnecessary. Long hair prevents thorough cleaning, causes loss of condition and may cause respiratory diseases. Long hair on field service is a menace to the whole command, as it harbors lice, mange and other skin diseases, and makes them most difficult to combat. Special care must be taken to blanket clipped animals during sudden changes of weather and when it is extremely cold or damp.

Power clippers are the best, but hand clippers will serve. Clipper heads and blades must be used with care as they are easily dulled and broken. They can be resharpened and should be as often as may be necessary. While using power clippers a small pan of oil should

be at hand, and the head immersed frequently with the machine running.

Washing: The practice of washing horses, although not injurious in warm weather, should be discouraged. It is a lazy man's way of grooming and while it removes dirt and sweat, the benefit derived from the action of the brush on the skin and coat is lost. Cleaning legs by washing should not be permitted as scratches and grease heel will result. Whenever a horse is washed he should be treated as described above for cooling out horses.

AGE OF HORSES AS INDICATED BY TEETH

The horse is provided with two sets of teeth, temporary and permanent. The temporary, or milk teeth, are those of the first growth or dentition. The permanent differs in appearance from the temporary one by being larger, longer, darker or more yellowish in color, and by having a well-marked groove down the anterior or front face of the crown. It does not have the constricted neck which is characteristic of the milk tooth.

The three principal tooth substances are called dentine, enamel, and cement. The dentine composes the main body of the tooth. It is protected by a covering of enamel, which is very white in color and is the hardest of all animal substances. The cement is a yellowish colored bony material found in the center of the tooth. The grinding surface of tooth is called the table, and there is an unfolding of the enamel on the table of the teeth, which forms in the incisors a cavity, the bottom of which is filled with cement to a depth which varies in different animals. The unfilled portion of this cavity forms what is called the cup. The cups are deeper in the upper incisors than they are in the lower ones. They soon become stained by food juices so that they appear very black in color. Ordinarily after a lower incisor has been in wear for three years its table surface has been worn down to the cement filling and the blackened cup cavity has disappeared. It is often difficult for the inexperienced observer to determine when the cup has actually disappeared. He expects to see the table surface perfectly level and of uniform color, whereas the enamel being so much harder than either the dentine or the cement, stands in relief on the table surface, and envelops a very shallow and sometimes slightly stained depression (of cement) for several years after the black cup cavity is considered to have disappeared. In the center of the tooth, and extending almost its entire length, is the pulp cavity channel, which in life is filled with a fleshy tissue or pulp through the medium of which the tooth derives its nourishment. As the tooth is worn off with age the outer extremity of the sensitive pulp, which would otherwise became exposed, is changed into a yellowish colored ivory-like substance that completely fills and closes the cavity. Hence, when the tooth has worn down to the pulp cavity, the latter appears on the table surface (just in front of the remains of the cup) as a yellowish colored mark called the dental star. This usually makes its appearance

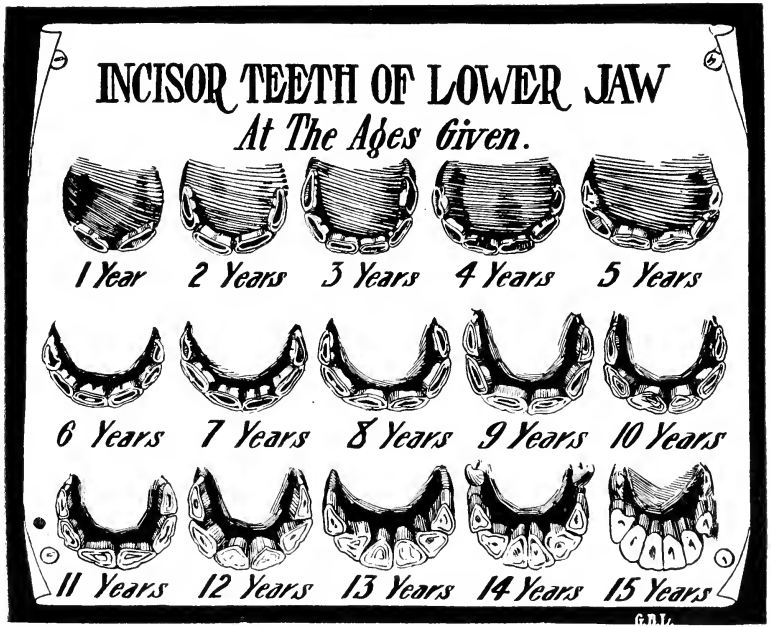
when the animal is eight years old, although in very hard teeth it is often not apparent until about eleven years. Depending upon the hardness of the dentine and the character of the food, the teeth wear away at the rate of about one-twelfth of an inch per year. As an incisor is not of uniform shape or size from its crown to its roots, it is at once apparent that wear will continually change the form of its table surface.

By their growth, changes of form and wearing, the teeth of the horse furnish a very reliable guide to determine the animal's age. In the adult animal they number from thirty-six in the female to forty in the male, and are classed according to their location, form and functions, as incisors, canines, and molars. The incisors, or cutters, occupy the front part of the mouth. They are twelve in number, six in the lower, and six in the upper jaw. In each jaw there are two central, two lateral, and two corner incisors. The canines, or tushes, occupy the front part of the interdental space. The tushes are usually absent in the mare, or if present, are very small. They are four in number, two in each jaw. The molars, or grinders, occupy the back part of the mouth. They are twenty-four in number, six in each side of the jaw. Naming from front to rear they are designated first, second, third, etc. Quite frequently supplementary molars, called "wolf teeth," are present. If so, they appear directly in front of the first molar, in the upper jaw. To obtain the best view of the mouth, grasp the upper lip firmly with the right hand, and place the left in the interdental space from the right side, using the thumb to depress the lower lip, and the back of the hand to press the tongue upward and backward. In this way the right hand serves as a twitch to hold the horse, while the left one uncovers the lower incisors.

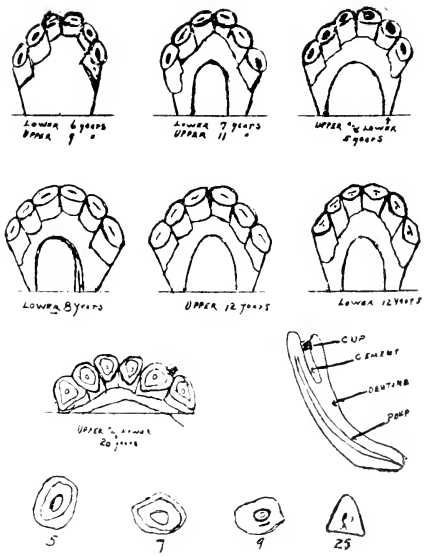
DENTITION OF THE HORSE

Kind	Number	When Appear	When Replaced
Incisors	Center	Birth	2½ years
	Middle	4 to 6 weeks	3½ years
	Corner	6 to 9 months	4½ years
Canines		4 to 5 years	
Molars	First	Birth	2½ years
	Second	Birth	2½ years
	Third	Birth	3½ years
	Fourth	10 to 12 months	
	Fifth	2 years	
	Sixth	4 to 5 years	

Ages of horses by the teeth are determined by shedding and appearance of the teeth up to four years, according to table. Cups wear out of center pair of incisors of lower jaw at about six years; middle pair of


INCISOR TEETH OF LOWER JAW
At The Ages Given.
1 Year
2 Years
3 Years
4 Years
5 Years
6 Years
7 Years
8 Years
9 Years
10 Years
11 Years
12 Years
13 Years
14 Years
15 Years

incisors at about seven years; and corner incisors at about eight years; cups wear out of center of incisors upper jaw at nine years, middle pair at eleven years, and corner incisors at about twelve years. Quality of the teeth, kind of food, and the way the teeth fit together to be considered.



SHOEING

The horse's foot is particularly liable to disease both from the delicacy of its mechanism, and the injury to which it is exposed. The feet of the stabled horse bear eloquent testimony to the class of management which is in vogue. Cleanliness is an all-important feature. Under the influence of manure and urine the horn of the foot is very liable to suffer, the urine acts chemically by its alkaline nature, in which horn is more or less soluble. This corrosive action is particularly evident in the matter of the sole and frog, especially the latter, where in conjunction with wet and filth, inflammatory trouble is set up in the sweat glands of the frog, with destruction of horn and loss of function.

The horn of the foot requires for its healthy condition to be kept in contact with the ground; the effect of pressure is remarkable, and especially is this seen in the frog.

Pressure also keeps the foot normal in shape and width; the parts are intended for contact with the ground and pressure, and if the pressure is not obtained the foot atrophies, wastes away; this shrinkage, besides other effects, also means a loss of bearing surface.

The care of the feet in the stable or on the picket line is comprised in the words "cleanliness and ordinary dryness." Cleanliness to insure the horn undergoing no change as the result of the action of urine and fæces, ordinary dryness to avoid the rotting of horn by constant exposure to wet. It has been known for ages that horses kept on dry surface have stronger and better feet, more capable of resisting injury, than those brought up on filthy and moist ground.

As the wear is greater than secretion, the excessive wear of the foot which results from work necessitates some protection being afforded, and this is given by shoeing.

In the application of the shoe to the foot the functions of the various parts must be borne in mind. A horse's weight is carried by the wall of the foot and that part of the sole adjacent to it, the bars and the frog. All of these parts in an unshod foot are in contact with the ground. The sole being concave, would not rest upon the ground excepting in soft soil, nor is it intended to carry weight excepting where it joins with the wall.

When a shoe is placed on the foot the natural condition just mentioned should be complied with, the shoe should rest on the wall, adjacent circumference of the sole, and the bars. The frog should rest on the ground; it is one of the anti-concussion mechanisms and cannot perform this function unless on the ground. This India rubber-like structure acts like a non-skidding, pneumatic tire to the body, excepting that it does not wear out from constant use.

I wish to draw your attention to an important part of the foot which is greatly ill-treated or neglected in shoeing, and that is the heel. We find that all its parts are constructed with an elastic structure intended to yield, to expand and contract, to act as a buffer or cushion for the lateral cartilages; furthermore the wall is one-third thinner, one-third lower and one-third younger at the heel than at the toe, all helping the elastic cushion in its function. With this positive knowledge of the rational requirement of this part of the foot, it is most essential that we should shoe accordingly. That is to retain, as much as it is possible to do, the natural functions of the heel. There is no form of shoeing that prevents and blocks these functions more effectively than the application of calks to shoes, consequently calk shoes are not to be recommended except for winter shoeing when the roads are icy and slippery. At no other time, whether for draft or other purposes, roads hilly or not, should calk shoes be tolerated.

It is useless to elaborate here and explain the why and wherefore of every point brought out; it is sufficient to state that every statement made is the result of study, observation, and experience.

The art of horseshoeing is simple, and not complicated. It mainly consists in the removal of the wall, at the lower or bearing surface, which has grown since the previous shoeing, the foot rasped to a proper level all around, the shoe adjusted to its entire circumference and applied. No other manipulation of the foot should be allowed, except for therapeutical or surgical reasons and under proper authority. There is an excellent order published, which I herewith submit for your information:

"G. O. No. 16, A. G. O. 1888. In preparing the horse's foot for the shoe do not touch with the knife, the frog, sole, or bars.

"In removing surplus growth of that part of the foot which is the 'seat of the shoe' use the cutting pinchers and rasp and not the knife. The shoeing knife may be used if necessary in fitting the toe clip. 'Opening the heels' or making a cut into the angle of the wall at the heel must not be allowed. The rasp may be used upon this part of the foot when necessary, and the same applies to the pegs. No cutting with a knife is permitted; the rasp alone is used when necessary. 'Flat-footed horses' should be treated as the necessity of each case may require. 'In forging the shoe to fit the foot' be careful that the shoe is fitted to and follows the circumference of the foot clear around to the heels; the heels of the shoe should not be extended back straight and outside of the walls at the heels of the horse's foot, as is frequently done. Care must be taken that the shoe is not fitted too small, the outer surface of the walls being then rasped down to make the foot short to suit the shoe, as often happens. Heat may be used in preparing and shaping the shoe, but the hot shoe must not be applied to the horse's foot under any circumstances. Make the upper or foot surface of the shoe perfectly flat so as to give a level bearing. A shoe with a concave ground surface should be used."

The only rasping of the wall that can be allowed is in the removal of the fringes which are left after levelling the surface for the shoe, and the only cutting of the sole that can be permitted is the removal of the loose flakes. A slight impression of a hot shoe to the foot may be used to determine an uneven surface and level accordingly, but nothing beyond this use of the hot shoe should be allowed. As the bars are part of the wall, it goes without saying that their bearing surface should be maintained and never cut beyond the level of the wall.

In proper shoeing the frog should be flush with the shoe, with no nails driven close to the heel. In flat feet, accompanied with low broad heels, "swelling" of the shoe at the heel may be allowed to avoid excessive frog pressure.

In contracted feet brought on from any cause, except navicular disease, tips should be used to develop the frogs and heels till normal shoeing can again be restored. "To maintain a level foot bearing, tips should be counter-sunk."

The practice of hoof-dressing with oily substances or hoof-stuffing with clay or other material is not to be recommended when the foot is sound and in normal condition, even if it should happen to be hard.

Such practices, when once started, have to be kept up and it then becomes a nuisance.

In garrison a shoeing list should be kept on the table bulletin board showing the name and hoof number of each horse, the date of last shoeing, and the class of shoes then used. The corresponding entries should be made daily, and at each "stables" the horses appearing on the list as shod since the last prior "stables" should be carefully inspected by the responsible officer. In general, horses should be shod every four or five weeks.

Shoeing: All officers must understand the principles of proper shoeing and be able to supervise the work of the horseshoers.

A trooper should know how to put on a shoe in an emergency. The following extracts from the manual *The Army Horseshoer, 1912* are therefore here incorporated.

"The foot should be prepared so that it will approximate as nearly as possible to a state of nature, and only such trimming as necessary.

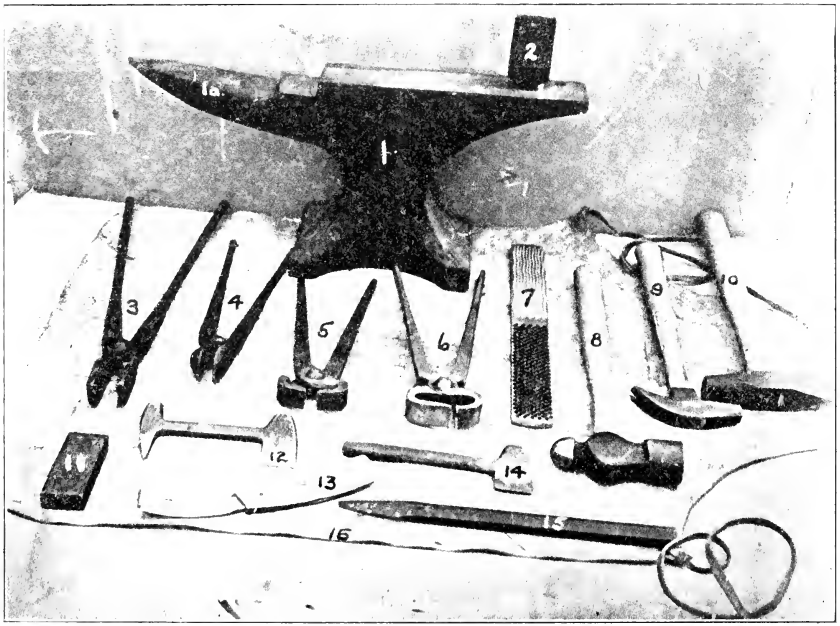
"(h) Does the shoe rest evenly on the wall, covering the buttress and showing no air space at any point?

"(i) Is the shoe properly concaved so as to avoid pressure on the shoe?

"(j) Has the knife been used on the bars, sole or frog?

"(k) Are the nails well seated and of the proper size?

"(l) Are the heels of the shoe correct in width and thickness, and are they properly rounded without sharp edges or points? Is their length even with the bulb of the frog?"



HORSESHOEING TOOLS

1 Anvil.
1*a* Horn
1*b* Face.
1*c* Heel.
2 Hardie.
3, 4 Shoeing Tongs.
5 Pinchers.
6 Cutting Nippers.
7 Horseshoer's Rasp.
8 Ball-peen Hammer.
9 Driving Hammer.
10 Chisel for Hot Iron.
11 Clinching Iron.
12 Clinch Cutter
13 Shoeing Knife.
14 Creaser.
15 Pritchel.
16 Apron.

INSPECTION OF SHOEING

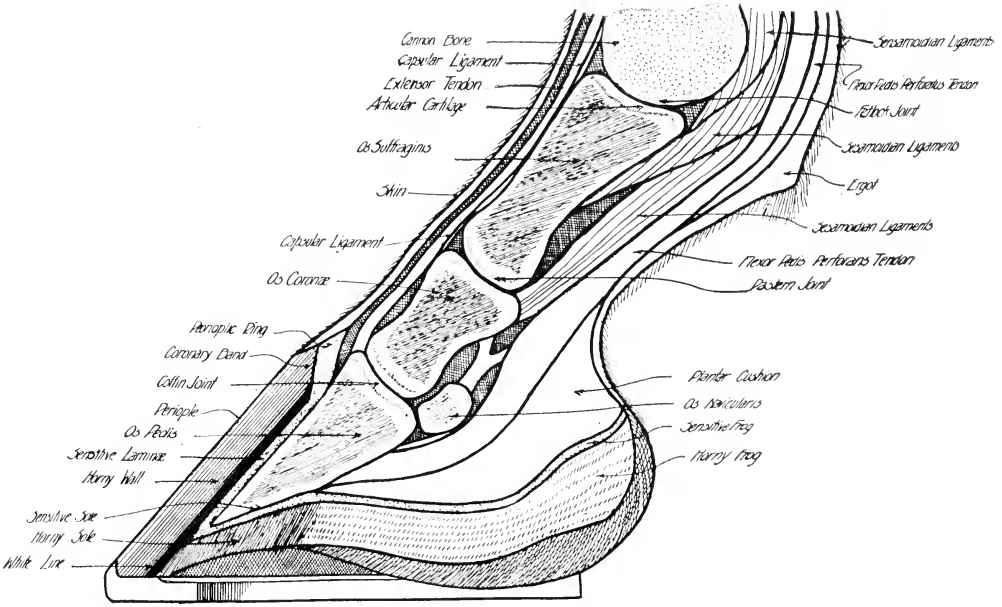
R. F., L. F., R. H., L. H.	STUDENT'S REMARKS	INSTRUCTOR'S REMARKS
Pastern & foot axes		
Outline of shoe		
Toe clip		
Clinching		
Nailing		
Size of shoe		
Nails		
Level of foot		
Is the foot down		
Use of knife		
Bearing surface		
Concaving		
L. & F. of heels		

....
Student's Signature Instructor's Signature

NUMBER OF HORSE	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
4	3	2	7	18								
5	3	2	7	18								
6	3	2	7	18								
7	3	2	7	18								
8												

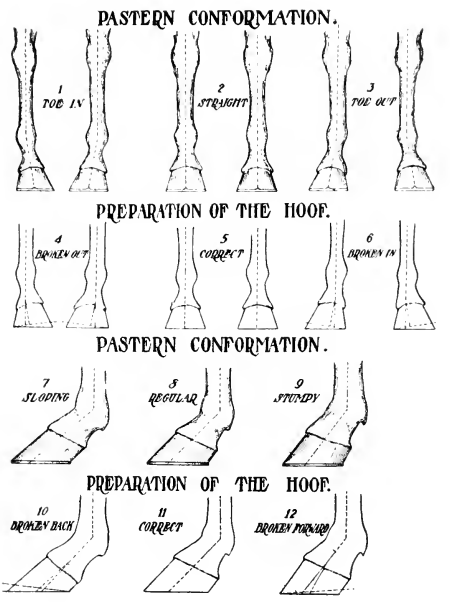
Key to Chart. On January 3, Horse No. 4 was shod all-round. On March 8, Horse No. 7 was shod right foot front and left hind foot.

Every horse should be shod at least once a month.



SECTION OF

HOOF AND PASTERN



Shoeing Correction for Faulty Pasterns

CARE OF THE FEET

This is a most important but often neglected part of animal management. The old saying "No foot, no horse," always has been and always will be true. A horse is no better than his feet, and they require constant and intelligent care to keep them in condition.

Every officer in charge of animals must continually watch the condition of their feet and see that they receive proper care. Every man that rides or drives an animal must do the same, reporting promptly to his Squad Leader or Stable Sergeant any need for attention, no matter how slight. A loose shoe if reported at once may be quickly tightened, while if neglected it will probably be lost, and very possibly cause lameness.

The principles and methods of horseshoeing are given in the *Manual for Army Horseshoers*, and only a few points will be considered here.

Every mounted unit should have one or two trained horseshoers, and one or two understudies in training.

Any unit which finds itself without a competent horseshoer is in a pitiful plight, for it will not be mounted long.

A shoeing roster should be kept showing when and what shoeing was done for each animal.

An average day's work of thorough shoeing is about eight feet shod with new shoes. If many old shoes can be reset, i. e., the shoes pulled off, feet trimmed down and shoes replaced, considerably more than eight can be done. If many special or pathological shoes are required, not so many can be expected.

No shoe should be allowed to remain on an animal's foot longer than thirty days. The wear on the shoe depends upon the nature and the amount of work and the kind of roads or terrain over which it is performed.

Macadam roads and rocky soil will cause the shoes to wear much faster than soft roads and turf. But the growth of horn is approximately the same for all cases, and after a month's growth the horn is too long and needs taking down.

The resetting of old shoes whenever it is justified by the amount of wear left in them, is recommended as an economical measure.

The horseshoer knows from his shoeing roster exactly when each animal must be shod to conform to the thirty-day requirement. He should inspect the feet of all animals daily, preferably at "Stables," and attend to any that need it, also attend to any that are specially reported to him.

When the soil, the nature of the work, and the condition of the feet permit, it is advisable to remove the shoes and allow the animals to go barefooted. Going barefooted rests the feet, favors freer expansion, toughens the horn, and assists nature in restoring the foot to its natural condition. However, the feet must have sufficient horn to allow for wear.

On removal of shoes the feet must be trimmed slightly to prevent chipping or splintering of the horn.

It is only very rarely that animals can be permitted to go barefooted in the field, as there is too much uncertainty as to what work troops may be called upon to do on short notice.

On going into the field troops should, whenever possible, start out freshly shod, and each man should have one extra fitted front and hind shoe with sufficient nails, for each horse. The field shoeing kit should never be left behind unless absolutely unavoidable.

Any animal losing a shoe on the march must be attended to **then.** If neglected, lameness will almost surely result.

Organization Commanders and Platoon Leaders should inspect all animals under their command daily. At stables they should inspect the animals freshly shod, the Stable Sergeant and Horseshoer being present for this inspection.

The horse should be examined on a level floor, as otherwise it is impossible to determine whether he is standing correctly or not.

The following points should be carefully noted and any improper or carelessly shod animals returned to the shop the next day:

(a) Pastern and foot axes. View the foot from the front and side to determine whether the axes are correct.

(b) The fit of the outline of the shoe. Does it correctly follow the outline of the wall to the last nail hole, and from there extend outward, allowing proper space for expansion? Note particularly whether the wall has been rasped to fit the shoe.

(c) The toe clip. Is it in the center? Is it of sufficient strength, height, properly finished and seated?

(d) The nails. Are they evenly driven, the proper height and distance apart? Have any old nail stubs been left in the wall?

(e) The clinches. Are they of proper size? Are they well turned and set in? Are they smoothed off and not rasped sufficiently to weaken them?

The foot should then be raised and the examination continued in the following manner:

(a) The shoe. Is it the proper size and weight? The last nail hole not farther back than the bend of the quarter?

(b) The preparation of the foot. Has enough horn been removed? Has too much been removed? Is the foot level?

(c) Bearing surface of the foot. Does the shoe rest evenly on the wall, covering the buttress and showing no air spaces at any point?

(d) Concaving the shoe. Is the shoe properly concaved? No sole pressure at any point?

(e) Use of the knife. Has the knife been used on the bars, sole, or frog?

(f) The nails. Are they well seated in the crease? Are they the correct size? Are they all of the same size?

(g) The heels of the shoe. Are they the correct width and thickness, properly rounded, without sharp edges or points? Is their length even with the bulb of the frog?

In cases where animals have been shod with calk shoes the following should so be noted:

(a) Toe calk. Is it properly secured and of proper height and length?

(b) Heel calk. Are they of same height as the toe calk? Are they properly turned and finished?

After becoming accustomed to making the daily inspection the time necessary should not exceed five minutes for each horse.

EXERCISE AND CONDITIONING

Exercise and conditioning are very closely related, as conditioning is largely dependent upon the exercise and feed given. Condition means much more than looking well. Animals are considered to be in fit condition when the body and muscular organs are in a condition to perform without injury the work required. Hence conditioning depends upon the degree of fitness required of the animal for the class of work to be done. In the service it means the ability to do ordinary work satisfactorily with a minimum of strain and at the same time to be able to meet any reasonable special demand. This is accom-

plished by systematic exercise and feeding, which must be continued even after the condition has been attained.

The exercise must be regular and graduated and always within the limits of the animal's strength. Working tired animals when unfit is very apt to cause accidents or disease. This is the time when they are most likely to sustain bad falls and sprains. But once they are put in fit condition, any work within reason will not only be performed without great effort, but will add to the quality of the condition already attained.

If animals are thrown out of work for any considerable time the process of conditioning will have to be repeated. The minimum amount of systematic exercise necessary to maintain animals in working condition is two hours daily, and those responsible for the care of animals must see that that amount is given.

Ordinarily animals regularly exercised will not suffer by resting on Sunday, but the ration must be reduced accordingly.

The kind and amount of exercise given to animals depends upon the work they are to perform, the condition of the animals and number of men available to give it. When there is one man available to exercise one or two animals, as in a troop of Cavalry, the most satisfactory exercise can be had, for each man can give his animals the kind and amount they need. But when there are many animals and very few men as at Remount Depots and Veterinary Hospitals, exercise becomes a more difficult matter and special means must be adopted to get the animals exercised at all.

When individual exercise can be given, as in the first case, the animals can be ridden, driven, led, or longed. In leading, one man should lead but one animal. When the proportion of men to horses is small the lead line is recommended. This consists of a rope either of one piece or jointed, to which animals are fastened in pairs. The forward end of the line attaches to a single or double tree of the harness on the lead horse or horses. Neck straps will serve almost as well as the breast strap harness as there is very little pulling required. Two short tie ropes about a foot long with snaps are spliced or secured to the line at intervals of eleven or twelve feet. The rear end of the line is attached to the harness of one or two horses with breeching. Horses are snapped to each tie rope.

These lines can be made for any number of animals, but experience has proven that lines of from 20 to 30 animals are the best all around. Twenty-four animal lines are recommended. They require but four men to operate, or one man to six animals. One man rides a lead horse, one the rear horse of a middle pair and one a rear horse. The fourth man is an outrider and rides whenever he may be needed. Care must be taken in starting and stopping to keep the line taut or else tangles will result. In long marches the rear horses must be relieved two or three times a day as the work on them is exhausting. The heaviest horses should be selected for this purpose.

Exercise tracks, or rings, are probably the most economical means of exercise considering man power, but there is more danger of accidents than when using the lead line. A circular or oval track about fifteen feet wide with fences five feet or more in height and a well drained, springy track surface is all that is necessary.

Animals should be let onto the track in lots of not more than twenty-four at a time, and there must be a rider to lead and one to follow the lot. By this means the gait can be regulated and stamping or crowding eliminated. If done carefully and quietly very few accidents will occur. Turning animals loose in corrals and driving them around is not recommended as too many accidents usually occur.

In any form of exercise, it should always be begun at a walk, for ten or fifteen minutes, so that the animals' feet and legs may have good circulation established before more violent exercise is taken up. It should always end in the same way, at the walk, so that the animals may be returned to the stable dry and breathing normally. No fast exercise should be given on hard roads. When one man is exercising two horses, he should ordinarily ride one out and the other in, and he should lead each horse partly on one ride and partly on the other. Playful or vicious animals should be led with very short rein to prevent accidents. A lead rein consisting of a single rein with a snap which is passed through the snaffle ring nearest the rider, under the jaw, and snapped to the opposite snaffle ring is excellent.

Ordinarily the greatest part of the exercise should be at the walk. A fair proportion for the average troop horse in normal condition would be for a two hour period; walk 7, trot 2, gallop 1. Of course this varies greatly with the conditions.

The routes selected for exercise should be varied from day to day, to avoid monotony. And it is best to return by a different route from the one taken going out so that the animals will not fret when they are headed towards stables.

Draft and pack animals should do a considerable part of their exercise drawing leads and carrying packs so that their muscles may be hardened to the work.

The quality and quantity of sweat are generally taken as an indication of condition. Thirst and sweat are to be expected in animals under exercise. Some sweat profusely from purely nervous causes. Such causes should be avoided as far as possible, as a great deal is taken out of the animal unnecessarily. The weather has considerable influence on sweating and must be taken into consideration. Warm or damp, muggy days will cause abnormal sweating while on cool days it is often difficult to get up a sweat.

CARE, CONDITIONING AND TRAINING OF HORSES

It is essential that the Field Artillery Officer have a thorough and practical knowledge of how to care for, condition and train the horses under his charge. Herein lies his chief value as a horseman. De-

ficiency in this knowledge will result in needless and avoidable wastage of horses in time of war.

A horse requires intelligent care in order that his health and strength may be preserved; he must be in hard and physically fit condition, else the amount of useful work he is able to perform will be greatly reduced and his power of resistance to injury and disease lowered; and he requires careful training in order that he may work intelligently and obediently and with the minimum expenditure of muscular and nervous energy.

Officers should make themselves thoroughly acquainted with the natural history and physiology of the horse, and with the effects of different methods of treatment, changes of diet, etc., upon his system and powers of endurance.

They should have a familiar knowledge of the symptoms and methods of treatment of diseases that are common to horses, what to do in emergencies, and a good knowledge of the effects of medicines issued. They should also possess a practical understanding of the principles of horseshoeing.

An officer in charge of horses must carefully instruct his men in the treatment, stabling, management, watering, feeding, grooming and exercising of the horses, and by continuous supervision and inspection assure himself that his instructions are thoroughly understood and fully carried out.

The horse is a creature of habit. Even in his native state, as well as when domesticated, if left to his own resources he forms habits that become more or less fixed and the matter of eating and drinking influence to a great extent his physical welfare. A sudden departure from his accustomed way of living will have a decidedly detrimental effect upon his health. These facts have been borne out by recent experiments by the Department of Agriculture and must be considered in the proper care and feeding of animals.

For the above reasons the method of feeding and water in garrison should be regulated and as near to normal field condition as possible.

CARE AND CONDITIONING OF HORSES

Section 1. Rules for the Care of Horses

All drivers and all individually mounted men will be taught and must thoroughly understand the following rules for the care of horses.

Horses are nervous animals, and for that reason require gentle and quiet treatment. Docile but bold horses are apt to retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals.

Before entering a horse's stall and when coming up behind them, speak to them gently, then approach quietly and without sudden or abrupt movement.

A horse must never be struck or threatened about the head. Such treatment quickly makes him head-shy and renders his proper control difficult and exasperating.

Never kick, strike, or otherwise abuse a horse. On rare occasions punishment may be necessary, but it must be administered immediately after the offense has been committed, and then only in a proper manner with whip or spur and never in the heat of anger.

In cold weather warm the bit by blowing on and rubbing it before putting the bit into the horse's mouth.

In taking a horse out always walk him the first mile to start the circulation in his legs. Habitual disregard of this rule leads to foot and leg troubles that will render the horse unserviceable before his time.

Always walk the last mile, or farther if necessary, to bring the horse in cool and breathing naturally.

To be certain of no ill effects, a horse brought to the stable in a heated condition must be cooled out and dried before he is left tied up in his stall. To cool the horse walk him about slowly under a blanket if the air is chilly. Occasionally interrupt the walking by giving him a good brisk rub-down and two or three swallows of water. Walking is especially valuable, because this gentle exercise keeps the muscles moving slowly and so assists in working any excess of blood out of them and out of his vital organs. The brisk rubbing dries him and assists in bringing the blood back to the skin, and so aids in restoring the circulation to the normal. If the surface of the body becomes chilled or if the cooling out is too sudden the congestion existing in the lungs or in the feet may not be relieved, and pneumonia, laminitis, or other troubles will then result. A sudden stoppage of hard work is always bad for the feet and is very liable to result in laminitis. The water given in small quanities slowly cools the horse internally and so aids in sending the blood back to the surface and restoring the normal circulation and temperature. The cooling out process must always be a gradual one. To throw water on any part of a heated horse is particularly dangerous.

Never allow stocks to be used for shoeing or for any except veterinary purposes. It never gentles a horse nor in itself teaches him to stand for shoeing. You cannot have it in the field and, after all, efficiency in the field is the goal of all our training.

Except as directed in the preceding paragraph, never water a horse when heated unless the exercise or march is to resume immediately; if the exercise or march is to be resumed at once, water will be of the greatest benefit to the horse, no matter how heated he may be. But a horse should not be called upon to do hard or fast work for at least a half an hour after a big drink.

Never feed grain to a horse when heated or fatigued. Grain is a highly concentrated food that requires high digestive power. Abnormal temperature impairs the power of the digestive organs. If the animal has been worked to the point of fatigue, all bodily functions

are for a time injuriously affected. For that reason he must be rested and his normal digestive power restored before concentrated food of any kind is given to him. On the other hand, hay, being a bulky food, will not hurt a horse however heated or fatigued he may be.

Never remove the saddle and blanket in such a way as to expose a wet back either in the hot rays of the sun or to a sudden cooling. The pressure of the saddle restricts the blood supply and so weakens the tissues of the back. In this condition a hot sun more readily burns or inflames the skin, while a sudden cooling contracts the blood vessels and prevents the proper return of the blood to nourish the tissues; in either case sores and swellings may result.

When the saddle is removed the back should be promptly rubbed and massaged to dry it and restore the circulation. If this is impossible the next best thing is to replace the blanket with the dry sides next to the skin and again put on the saddle, girthing it loosely.

After a long or hard march it is necessary to restore the circulation in the back gradually, or sores and swellings are liable to result. To do this the girth should be slightly loosened and the saddle should remain on the back for fifteen or twenty minutes. The more gradually the circulation can be restored the less severe will be the pain and swelling.

In hot weather, especially on the march, it is very refreshing to the horse to have his eyes, nostrils, dock, and the inside of his hind quarters sponged with cool water.

When the horse comes in wet with rain he should be scraped, then blanketed and his head, neck, loins, and legs rubbed. If the weather is cold an extra blanket should be put on for twenty minutes. The wet blanket should be changed when the horse dries.

Do not wash the legs. This practice is one of the surest means of causing scratches. The legs should be rubbed dry and bandaged loosely with thick bandages. Strips of gunny sacks are satisfactory for this purpose. It is far more important to have the legs warm and dry than clean. The best method of treating muddy legs in order to avoid scratches is to bandage them to keep them warm until they are dry and then brush them clean.

Never leave a horse for the night until he is thoroughly clean, especially around his legs, pasterns, and feet. Individual men returning from mounted duty or pass will report their return to the stable sergeant, who will inspect each horse and see that he is properly cared for.

STABLE VICES AND THEIR PREVENTION

Stable vices are objectionable habits of horses, practiced while idle, as in the stable or on the picket line, and are caused usually by nervousness and restlessness, but not infrequently by poor stable management.

As a general preventive to their contraction, the animal should be kept occupied and out of the stables as much as possible during the day.

The most common ones are:

Weaving, windsucking, cribbing, biting, kicking against the stall, gnawing the woodwork, eating dung, greedy feeding, tearing blankets, and halter pulling. Most of these when once acquired are incurable, but they may be partially or wholly prevented temporarily at least.

Weaving: A nervous habit in which the animal rocks to and fro continually, similar to a bear kept in confinement. Such animals should be kept tied short and out of sight of other animals which might contract the habit. Weaving is incurable.

Windsucking and Cribbing: Nervous habits, closely related. In windsucking an animal swallows air by arching the neck, drawing the head towards the chest and giving a gulp. The cribber or crib biter accomplishes the same end by catching hold of the manger with his teeth to obtain a pull, and as he gulps emits a grunt. Both of these vices are incurable and are apt to be acquired by other horses stabled nearby. They may be prevented by the use of a broad strap fitted tightly around the neck with a small wooden or leaden gullet plate stitched on so that it projects on each side and sticks into the throat when the neck is bent. Another method which often succeeds is to buckle a narrow leather strap around the neck rather tightly. Neither of these will effect a cure, only a temporary prevention.

Cribbers always show by the wear on their incisors the effects of the habit. Indigestion and colic frequently result from these vices.

Biting: Biting is a vicious habit seen most frequently in stallions. It is usually the result of animals being teased by men in a playful way, but once acquired, a dangerous vice. As a preventative, the teasing must be stopped, and if an animal is dangerous only one man should handle him, his regular groom who must be unafraid of him. The danger may be lessened by the use of a leather muzzle, or a thick wooden bit, or a side stick. The side stick is a short stick attached at ends to the beadstall and surcingle.

Kicking Against the Stall: Kicking against the stall is a habit usually acquired through lack of work. Animals with the habit are apt to injure themselves and others. The danger of injury may be lessened by padding the stalls and providing kicking boards. It may be cured by using a short chain, one end of which is attached to a hobble place around one rear pastern, the other end attached to a small wooden ball.

Gnawing the Woodwork: Gnawing the woodwork is a restless habit of animals kept tied up without work, or when deprived of hay. The cure is plenty of hay. The prevention is to wrap the woodwork with wire or cover it with tin. When used the wire or tin must be watched carefully to guard against injury to animals from loose ends.

Eating Dung: Eating dung is habitual with some animals and may be classed as a vice. It is a morbid appetite resulting from poor condition caused by chronic indigestion. Animals in fit condition seldom form the habit. The only prevention is to keep the animal tied so that he cannot reach his own or other animals' droppings.

Greedy Feeding: Greedy feeding is caused by natural greed or nervousness. A greedy feeder eats as fast as he can, grasping huge mouthfuls at a time and throwing his feed with his muzzle out of the box onto the ground, and eating it from the ground. This results in indigestion, the bolting of feed, eating dirt and trash, and is wasteful on account of the large amount of forage lost.

The preventions are: To place several stones, the size of a goose egg, in the feed box; to feed the grain as chop; to place a wire screen with half-inch mesh inside of the box and resting on the grain; or to feed in a wide bottomed feed box or manger. Any of these will make it difficult for the animal to take large mouthfuls of grain or to throw it out.

Tearing Blankets: Tearing blankets is an expensive habit. The only prevention is the use of a leather muzzle.

Halter Pulling: Halter pulling is also an expensive habit, and a troublesome one. The vice is usually contracted by the use of weak halters and tie ropes, and animals becoming frightened so that they break away. Tying with the reins is apt to have the same effect. The animal soon learns that he can do it, and then it is very likely to become habitual. Once a confirmed puller it is usually a permanent vice.

As a prevention, use box stalls, or else a very heavy neck strap and tie rope. It is sometimes cured by tying a piece of rope around the animal's barrel just in rear of the forelegs, from which is run the tie rope, up between the legs through the halter ring and to manger or picket line. After a few attempts to pull away he will probably give up. This should be applied for several days, and then for a time use just a light cord tied around the barrel as a reminder.

STABLES AND STABLE MANAGEMENT

A lieutenant of the battery is responsible to the captain for all duties in connection with the care of the horses, with the stables, and with the stable management. He is assisted by the stable sergeant who takes immediate charge of the stables, picket lines and paddock, forage and stable property in general. This is Department B. Lieutenant.

The stable sergeant is responsible that the stables and their surroundings are kept at all times thoroughly policed and free from odors; he is usually assisted by one or more stable orderlies.

Sufficient men are detailed as stable police to perform the general police and to remove all manure as it is dropped, either in stables, on the picket line, or in the paddocks, during the day. The stable police also assist in the feeding, watering and bedding of the horses.

STABLE MANAGEMENT

The officer in charge of Department "B" is in charge of the stable and is assisted by the stable sergeant who in turn has a stable orderly to care for the sick and injured animals.

Daily a stable police of four to six men is detailed to perform the necessary work around the stable, such as feeding, watering and cleaning.

STABLE HYGIENE

Ventilation

The two purposes in ventilation are getting fresh air with its oxygen into a stable, and getting impurities out, and these are equally important.

Impurities: The common impurities of air, disease germs and their products, carbon dioxide gas, various volatile matters from the lungs, together with the various excretions and the products which result from their chemical decompositions.

Necessity of Ventilation: To illustrate the effect of poor sanitary conditions, particularly lack of ventilation, it is only necessary to call attention to the common experience of moving an animal affected with a chronic type of glanders or tuberculosis from a well-lighted and well-ventilated stable to one where the conditions are the opposite. Under the latter conditions there is rapid development of a disease which has been mild. Sick animals especially need free ventilation. This is particularly true in certain diseases, e. g. tetanus and diseases of the lungs, and respiratory tract. A moderately warm stable in a cold climate is not objectionable, providing sanitary conditions, such as abundant air, sunlight, good food and water, are provided. But making a stable warm and tight may very easily establish an ideal place for the propagation of germs and the spread of disease.

Natural Forces: The factors that operate in natural ventilation are:

1. The force of the wind.
2. Weight of air, as varied by its temperature.
3. Diffusion of gases in obedience to a natural law.

Wind: The force of the wind is probably the most important one of these factors, and must always be taken into consideration in planning ventilation. It is, of course, irregular, but variations can be made in the ventilation facilities to compensate for this. A fundamental point in using this factor is to see that the incoming air does not pass over or through any contaminating course, over a manure pile, or strike the body of the horse.

Temperature and Weight: The second factor, difference in weight between the lighter warm and heavier cold air, is not so important in natural as in artificial ventilation, and yet it is a factor of considerable importance. The heat which warms the air in the lower levels is that which comes from the bodies of confined animals as it is radiated from the surface or warmed in passing through the lungs.

Diffusion of Gases: Carbonic gas is considerably heavier than air, and the lower levels usually contain a slightly higher percentage than the higher ones in a stable, but the difference is not so great as one would suppose, on account of the diffusion which takes place in response to the law of diffusion of gases—which operates independently of relative weights. This force is so strong in its action that some diffusion takes place through unpainted lumber and through ordi-

nary brick, but to a very slight extent if at all through painted surfaces or paper.

Fresh air, no matter how cold, does not hurt a horse, provided it is not caused by a draft. Foul air is most harmful. For this reason all properly built stables have ventilation at the ridge or highest point.

Foul air and dampness are the causes of many diseases of the horse; hence the importance and economy of spacious, clean, dry and well-ventilated stables.

It is impossible to give the horse too much fresh air even in the coldest weather. Stable windows should be closed only when it is necessary to prevent rain or snow from beating in on the animals. The stables should be considered as merely a shelter from storms. The more nearly the air of the stables approaches the purity and temperature of the outside air, the more nearly are the stables adapted to the health and comfort of the animals.

A practical and satisfactory test that a stable is properly cleaned and ventilated is that, on entering it, the sense of smell detects no apparent change from the air outside.

The picket line should be established in the immediate vicinity of the stables. The floor of the picket line should be raised and trenches to carry off the rain should be provided so that the ground upon which the horses stand may be kept dry.

A horse prefers to stand with his fore feet lower than his hind feet, as this rests and relieves his tendons. Where horses are required to stand for long periods on the picket line the floor should be constructed so that this is possible.

CLEANING

The stables and ground should be kept clean at all times and no manure allowed to remain in the stables, corrals or picket line for more than twelve hours at a time. Floors of stalls and aisles should be thoroughly cleaned each morning and swept again after the noon feed. If the horses are on the picket line or in the stables during the day, the sentry or sentries should keep the line or stalls clean at all times by removing droppings and sweeping urine to the rear. Watering troughs should be washed daily, feed boxes at least once a week and always after feeding a bran mash. Equal parts of water and vinegar should be used for this purpose. Corrals should be cleaned daily after the horses are tied in at evening stables. Keep stalls in repair at all times even if the rest of the stable is in bad condition.

Manure or foul litter must not be allowed to accumulate in or near the stables but must be carried to the manure heap daily.

In the morning stalls are cleaned and the stables policed under the direction of the stable sergeant, assisted by the chiefs of sections.

Paddocks, with shade and water, should be provided near the stables; if there is no shade, shelter from the sun should be extemporized. The picket line and paddocks should be sprinkled to keep down the dust; crude oil may be used to advantage. Racks for drying bedding should be provided near each stable.

The horses are assigned to stalls and placed on the picket line by sections, as nearly as practicable according to usual place in the battery. The name and hoof number of the horse are posted over his place in the stall. Over the middle of each double stall occupied by a driver's pair are displayed the number of the section, the carriage, and the position of the pair in the team, as FIRST, PIECE, WHEEL, or FIFTH, Second Caisson, Swing.

If practicable, all woodwork within reach of the horses should be protected with sheet metal or painted with a thin coat of gas tar; other woodwork and brick should be painted a light shade and then kept clean and free from dust.

BEDDING

A comfortable bed is important for all animals, but especially so for those whose energy must be conserved such as animals in work, sick or weak, and young growing ones. It is possible for them to get a considerable amount of rest standing but the natural way is while lying down. Animals should be encouraged to lie down as it saves their legs and thereby prolongs their usefulness.

A good bed not only induces them to lie but it protects their elbows, hocks, and other exposed portions of the limbs from injury.

A good bed should be level, dry, warm, and elastic and have a clean surface for the animal to lie upon.

There is no one article which is more suitable than good, bright, clean, coarse straw, either wheat, oats or rye. It should not be used if full of chaff or dust, or too fine, wet, or mouldy.

Hay of poor quality is occasionally used and makes a good bed, but care must be taken not to use it when mouldy or very musty for the animals will eat it. Numerous other articles are used for bedding, namely leaves, shavings, sawdust, tanbark and even sand. They make good beds, though when using sand the animals must be watched as sand colic may develop. The bedding is taken up, carefully shaken out and assorted. All parts of the bedding which can be used again are taking to the bedding racks and spread thereon for a thorough drying; parts which can not be used again are sent to the manure heap. Special attention is necessary in this matter, as the allowance of straw, 3 1/3 pounds per day per animal, is insufficient under most favorable conditions. In the evening the dried bedding, mixed with such fresh bedding as may be necessary, is laid down. The bed must be soft and even with the thickest part toward the manger.

It is best to lay the layers of bedding crossways to each other, forming a more elastic and durable bed. It should not be spread up to the mangers as many horses would be apt to eat it, and the presence of partially soiled bedding directly beneath the horse's head might prove injurious.

FEEDS AND FEEDING

General: There is no subject under the Care of Animals which is of greater importance than FEEDS AND FEEDING.

The health and condition of animals depends largely upon the kind of food given them, the manner in which it is prepared, and the hours of feeding.

It is truthfully said of the race horse, that the race is won in the stable, by the selection, preparation and administration of his feed. Similarly, in the army battles and campaigns are to a certain extent won or lost in the stable.

To feed so as to obtain the best or even good results requires a knowledge of: the digestive system of animals; the food elements or constituents required for their sustenance; the correct proportions of these elements; the proper methods of preparation; and the best hours for feeding. Also a knowledge of the characteristics of good and poor qualities of foods is necessary. This knowledge alone will not insure good results, as much experience is required for one to know what and how to feed under the various conditions found in the service. It is only by careful study of the subject, and by paying close attention to the condition of animals under different feeds that one can hope to become efficient in the art of feeding.

The Digestive System: The organs of the digestive system form what is called the alimentary canal, and consist of the mouth, pharynx, esophogus, small and large intestines and the anus.

The stomach is the principal organ of digestion. It is very small as compared with the size of the horse and the amount of food he consumes. Its capacity is from three to four gallons.

The intestines are also organs of digestion but have a much greater capacity than the stomach, being some ninety feet in length.

Food is taken into the mouth and masticated. It passes through the pharynx and esophogus into the stomach where it is partially digested, and prepared for complete digestion in the intestines. In the intestines digestion is complete and the nutriment and moisture extracted. The residue is discharged through the anus as dung.

The time required for stomach digestion varies with the class of food. Grain being a concentrated diet requires approximately twice as long as hay, and as they do not mix during the process, they should not be in the stomach at the same time, except when fed together as chop.

For this reason, hay being the more quickly digested, should precede the grain ration, or else follow it by an hour. The latter is best when a large hay feed is given as in the evening.

A small feed of loose hay shortly before the grain is advisable since it greatly stimulates the saliva and stomach secretions and is an aid to digestion in furnishing the bulk necessary for the best action of the stomach.

Water remains in the stomach for only a short time. It is passed quickly into the intestines where it is collected in a part of the large

intestine called the cæcum. If given soon after feeding it will flush a considerable portion of the food from the stomach before it is sufficiently digested and into the intestines, causing indigestion. Watering should therefore be done before feeding or not until an hour or two afterwards.

Every precaution should be exercised in the manner of feeding and watering so as to insure the proper action of stomach digestion.

Food Constituents: They are classified according to the function they perform in the animal system; as follows:

(a) Flesh making; such as linseed meal, oats, peas, beans, etc.

(b) Fat, heat, and energy producing; such as corn, wheat, rye, oats.

(c) Bone making; such as grass, hay, bran, bone meal, milk, etc.

(b) Bulk supplying, necessary to digestion (fibrous and woody material); such as hay, grass, bran, oats, etc.

(e) Watery; such as carrots, potatoes, green grass, etc.

There is no one food containing all of the required constituents hence two or more must be combined to obtain the desired ration.

Natural grasses come nearer to serving this purpose than any other food when animals are at pasture. Similarly for stabled animals, oats are the best grain feed. Other grains which more or less closely approximate oats in food value and which may be substituted if necessary are barley, corn, wheat, rye, and rice, all of which, though, must be fed sparingly when first used.

The Proportions of Various Food Components in a Ration: The components of any ration depend upon: the class and condition of the animals and work required of them; the variety of valuable foods; the kind of shelter afforded; the climate; the season; etc.

They must be selected in such proportions as to form a balanced ration and fed in such quantities at such hours as to enable the animal to obtain the greatest possible amount of nutrition from them.

The army ration of twelve pounds of oats and fourteen pounds of hay with its permissible substitutes as prescribed in Army Regulations, furnishes a ration which will generally be found to be sufficiently balanced for the service.

Methods of Preparation of Feed: Object: The object of special preparation of feed is to enable the animal to get the maximum amount of nutriment from it, and for the sake of economy.

Grain: Grain must be fed clean and free from sticks, stones, and other litter. If necessary it should be fanned or screened, or both. Screening is easily accomplished by the use of a sieve made by fastening wire screening to a frame. Fanning can be done by dropping loose grain and subjecting it to a draft while falling.

Crushed or rolled grain is recommended as being much more easily digested and economical than whole grain. It should be fed whenever it is practicable to have the grain crushed.

Steamed or boiled grain is an excellent conditioner and is used to build up convalescent or poor animals. It can be used to good advantage also for strong, healthy animals, immediately preceding a

day of rest or light exercise. In effect it is appetizing, affords a variety in diet, has a mechanical laxative effect, and as proven by experience animals improve and pick up very rapidly on it.

It should be thoroughly cooked and fed lukewarm with a little salt added.

A cooker can be easily improvised from old buckets, boilers, g. i. cans, etc.

Bran: Bran is an excellent food for growing horses. Bran mashes have the same general effect as the cooked feeds and are frequently used. In preparing them bran is saturated with boiling water and allowed to steam. Bran is frequently fed uncooked, mixed with the chop.

Hay: The hay should be shaken out over a screen on a paulin or clean hard floor. The mesh of the screen should be about two inches. That part which falls through the mesh, called the screening, contains leaves, seeds, flowers, and other small particles of hay which would otherwise be lost, and dirts. This hay screening is the most nutritious part of the hay and except in the case of prairie hay which has practically no flowers, represents about ten per cent of the nutriment in the hay. This is separated from the dirt, or cleaned by collecting and immersing in water, and is then added to the grain feed to help form the chop.

About 30% (10% at each grain feed) of the loose hay should be chopped (to about one-inch lengths) and added to the grain to form the chop.

Hay must always be dampened before mixing with grain, in order to lay the dust and so that the grain and hay will mix and stay mixed.

The balance of the hay is fed long, preferably in hay nets, otherwise in mangers or hay racks.

Chop: Chop, as has been seen, is grain mixed with screened and chopped hay. Any other available food that can be added to it, such as carrots, or other edible green plant, will increase its palatability, digestibility and nutriment. A little salt added also increases its palatability.

Due to its bulk it is eaten much more slowly than grain alone, and is consequently digested more thoroughly.

Hours of Feeding: Small feeds fed at short intervals are preferable to large ones fed at long intervals. This is shown by the physiology of digestion and is proven by experience; also it approximates more closely the natural way of feeding of animals at liberty.

Small feeds are easier on the digestive system and more economical as more nutriment is obtained from the same amount of food.

The following feed schedule based on the normal ration of the twelve pounds of oats and fourteen pounds of hay will afford an example of feeding which under normal conditions enables the animals to obtain the maximum food value from the ration.

Hours	Feed
Reveille	2 lbs. long hay
½ Hour after Reveille	3 lbs. oats, 1 lb. chaff (4 lbs. chop)
½ Hour before Noon	2 lbs. long hay
Noon	4 lbs. oats, 1½ lbs. chaff (5½ lbs. chop)
5:00 p. m.	5 lbs. oats, 1½ lbs. chaff (6½ lbs. chop)
7:00 p. m.	6 lbs. long hay

The above hours are intended simply as an example which carries out the principle of correct feeding. It can be followed or departed from according to circumstances. If the animals are not on full ration the feeds should be reduced proportionately. If, in exceptional cases they are getting a larger ration, it is preferable to give a fourth grain feed than to increase the size of the above feeds. The morning and noon feeds might be increased by one pound each, but the additional feed is much preferable.

Animals should be grazed whenever the opportunity occurs. Green and even dried grasses form a valuable addition to the ration. Green grass assists greatly in conditioning animals, being a natural food and acting as a laxative and tonic for both sick and healthy animals.

CHARACTERISTICS OF FOODS

Oats: Good oats should be plump, short, of good color (preferably white), without odor, breaking sharply when bitten, of agreeable taste, of uniform size, and weighing not less than thirty-four pounds to the bushel. There should be but few beards, and when grasped firmly in the hand and squeezed should give imperceptibly. They vary in color from white to red and black, but the red and black are not desirable. The best oats are naturally good and have not been bleached or kiln dried. Bleached oats may be detected by the odor of sulphur when rubbed together. Other defective oats are sprouted, mouldy, light weight, foxy (foul odor), damp, new, and dirty. These can be detected upon careful examination, and excepting mouldy oats, may be fed in an emergency, although the rule should be to feed only the best.

Other Grains: Other grains should have the same general characteristics. They should be clean, free from foul odor, of healthy color, firm, plump, short, of uniform size and of good weight. They should not be sprouted, mouldy, damp, new, or objectionable in any other way.

Bran: The quality of bran depends almost entirely upon the amount of flour it contains. It should be flakey, sweet, and pleasant to the taste, free from dirt and impurities and not finely ground. The hand when thrust into it and withdrawn should be covered with flour.

Hay: Hay consists of grasses and certain plants cut and cured before ripening. There are many kinds of hay which are valuable

as foods for animals. Those commonly used are timothy, unripened grains, prairie, red clover, and alfalfa.

Hay of good quality should have a sweet aromatic odor, be pleasant to the taste, of greenish or natural color, have stems of medium size and should have natural blossoms. It should not be dusty, musty, mouldy, caked or mowburnt. Mouldy hay should never be fed to horses.

FEEDING MAXIMS

1. Water before feeding or not until at least one hour afterwards.
2. Feed in small quantities and often.
3. Never feed grain to heated animals; hay will not harm them.
4. Put at least a double handful of chaff in every grain feed.
5. If expecting hard work immediately after feeding, give only a half-feed.
6. When practicable have the oats crushed.
7. Shake out the hay and save the shakings for feed.
8. Use hay nets.
9. When practicable give a small feed of hay before each grain feed.
10. Never feed a large hay feed immediately before grain.
11. Give a bran mash or cooked grain feed at least once a week, preferably before a day of rest.
12. Salt your horses. If cakes are supplied, always have one in each container or feed box. If granulated, feed the ration in the chop and cooked feeds.
13. Never feed hay on the ground if it can be avoided.
14. When feeding in feedbags, remove them as each animal finishes.
15. Keep feeding utensils clean.
16. Feed clean food.
17. Watch your horses feeding and know which are the slow and the shy feeders.
18. Watch their condition and fix the ration for each horse according to his needs.
19. Graze whenever the opportunity occurs.
20. Encourage men to bring handfuls of grass or other food to their horses.
21. Be economical in feeding, waste nothing, let the horse get the full value of his ration just as you want it of yours.

WATERING MAXIMS

1. Never water your horse while in heated condition.
2. It is desired that horses have free access to water at all times, and if not before feeding do not water until two hours after feeding.
3. A horse requires from five to fifteen gallons of water daily, depending upon temperature.
4. Except in very cold weather horses should be watered at least three times daily; in the morning, two hours after feeding, before the noon feeding, and before the evening feeding.

5. In warm weather chilled water must be allowed to stand before watering.
6. A horse should be allowed ample time to drink his fill and not be led away the first time he raises his head from the water.
7. On the march the oftener the animals are watered the better.
8. Horses must be watered quietly, without confusion. The manner of performing this duty is a good test of the discipline of a mounted organization.
9. Horses are always led at a walk from and to the watering place, and no horse should be led away until all have had their fill.

HINTS ON STABLE MANAGEMENT

Do the officers and chiefs of sections know the following:

1. Do you know what your horse's forage ration is and do you see that they get full weight? Do you know good oats or hay from bad oats or hay?

2. Do you attend "Stables" as often as possible, and, if in charge, do you see that the grooming, watering, and feeding are well regulated?

3. Do you see that your horses are in good condition and comfortable—i. e., that their shelters are good and water-tight; that there are no drafts of cold air; the standings are in good order and out of the mud and water; that the horse covers and nosebags are kept in good order?

4. Do you examine each horse at stable hour to see that he is clean, free from vermin, and, particularly, that his feet and heels are in good condition?

5. Do you understand the shoeing of horses, and do you see that your horses are properly shod; that spare shoes are in their proper place; and that the horseshoer's tool bags are properly equipped?

6. Do you know the various grains and seeds which can be used for fodder in the absence of oats, equivalent amounts, and their effects?

7. Have you seen whether the entrances to your horse lines are well metalled and dry, and that the approaches to and surroundings of water troughs are similarly treated?

8. Do you understand the symptoms and cure of simple ailments, and has your battery instructions regarding the prevention of the spread of infectious diseases, such as mange?

9. Do you know who your veterinarian is and where he can be found? Do you know what the farrier's equipment is, what the articles are for, and where they can be found?

10. If horses are out late at night, have you a noncommissioned officer detailed to see them come in and properly cared for at once?

11. Do you inspect your harness frequently to see:
    (a) That the leather work is well cleaned and oiled, and especially that working parts, such as breast collars, girths, sweat flaps, are kept soft and pliable?

DATE	HAY, BALES			OATS, BUSHELS			BRAN, POUNDS			STRAW, BALES		
	Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance	Received	Issued	Balance

(b) That the steelwork is thoroughly cleaned and then rubbed lightly over with clean oil?
(c) That every article of harness fits its wearer properly, as laid down?

12. Have you got good covers for your harness? Is the cover large enough to enable the drivers to clean their harness under shelter?

13. Do you ever inspect the drivers' "kits," and do you know what each should contain?

14. Do you inspect all battery vehicles frequently to see that nothing is wrong with them? "A stitch in time saves nine."

15. If on the march and a horse goes so sick that it has to be left behind, do you know what disposition you should make of it?

16. How often are your horses fed? "Little and often" should be your policy. Never less than three feeds a day, first feed as early as possible, and the last (and biggest) as late as possible.

17. Do you appreciate that in cold weather a cover is as good as an extra 2 pounds of oats?

18. Do you know the regulations regarding clipping, trimming, and plucking?

19. Do you realize how much a horse's condition depends on good water, and plenty of it? Always water from troughs if possible.

20. Do your men really work hard when grooming? Short stable hours and hard work while at it should be the rule.

21. Remember that the essence of horse mastership is the "master's eye."

INDICATIONS OF HEALTH AND OF DISEASE

Health: The indications are as follows: head and ears alert; eyes bright; appetite and spirit good; body well filled out; muscles firm and standing out; skin elastic; coat bright; the animal standing on all four legs or resting a hind one; droppings moderately firm and not slimy; urine bright yellow, thick, and passed in moderate amounts, and no undue fatigue or profuse sweating after ordinary exercise.

Diseases and Lack of condition: The indications are as follows: head and ears drooping; eyes dull, partly closed, or watering; coat dull or staring; partial or total loss of appetite; temperature elevated; easily fatigued; loss of flesh; dung hard, coated or very soft and sometimes of offensive odor; urine excessive or insufficient and passed with difficulty; profuse sweating without cause; pointing of a fore foot; stiffness of gait; limping; excessive stumbling; labored or accellerated breathing; abnormal color of mucous membrane; local heat or tenderness of certain parts; skin eruptions; itching; uneasiness or distress; unusual nasal discharge; suspicious sores, etc.

Troopers and drivers should watch their animals carefully and report any suspicious indication to the Stable Sergeant. Two very good indications may be observed in the stable. If any animal is passing a considerable amount of whole grain in his droppings, and if he fails

to clean up his feed, he usually has something out of order about him and should be carefully examined and watched.

The early detection of indications of disease and the necessary action promptly taken is of far greater importance than any treatment that can be given once the disease has developed. Often the detection and isolation of one animal suffering from a communicable disease means the saving of thousands of dollars in horse flesh and the prevention of an animal shortage which would have disastrous results.

CAUSES AND PREVENTION OF DISEASE

Definition: Living germs constitute the specific and primary cause of certain diseases and may be transmitted from one animal to another.

Description: Bacteria are vegetable microörganisms. Each individual consists of a single cell. They are of almost infinite number of species and varieties, and are present in the atmosphere in particles of room dust, in drinking water, in the soil, and, in fact, almost everywhere in great abundance.

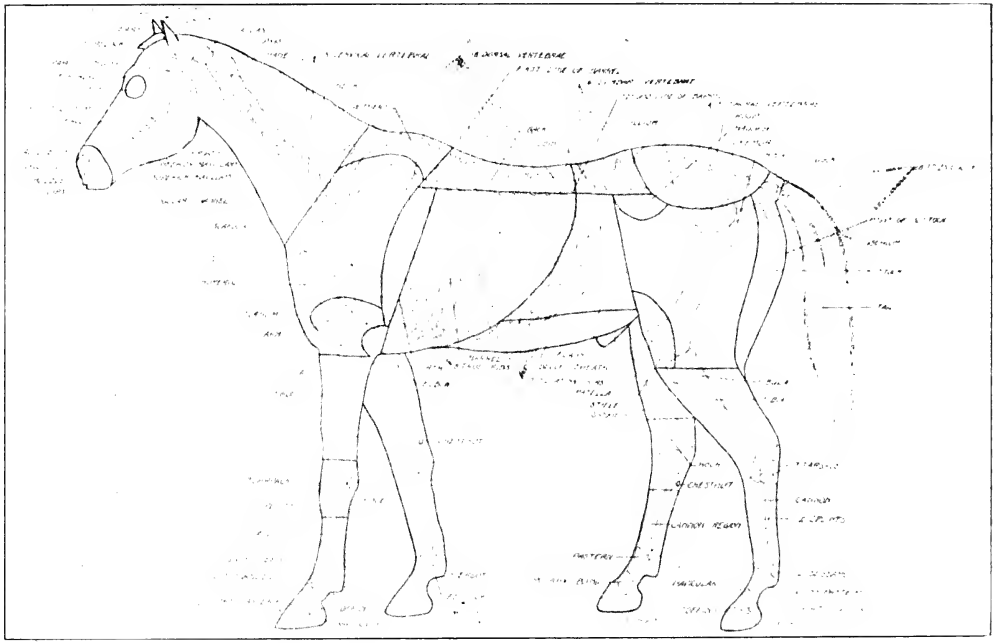
Size: They are extremely small, requiring the highest powers of the microscope to make them distinctly visible. It is estimated that millions may live comfortably in a single drop of fluid. An average bacillus is from 1-25,000 to 2-25,000 of an inch long.

Nutrition: Bacteria use for their food compound formed from the chemical elements, oxygen, nitrogen, carbon, hydrogen, phosphorus, and sulphur. Like higher beings, they vary in their likes and dislikes. What is wholesome for one may be very injurious to another. Each species has its certain conditions of moisture, temperature, and chemical reaction which are most favorable.

How Scattered: Germs of diseases are scattered by a very great many agencies. Germs are disseminated by means of diseased carcasses, stock cars, and they may be easily transferred by the shoes or clothing of persons who walk through an infected area. Dogs undoubtedly serve to scatter diseases over wide areas, and possibly birds. It is possible also for the germs to be scattered by particles of dust and litter in high winds. Watering troughs, tanks, ponds, and sluggish streams are all common courses for spreading infectious diseases.

Development of Outbreaks: It seems to be true of several and possibly so of a great many diseases, that the germs may be present with the animal or his surroundings but not virulent enough to produce disease. Under favorable conditions and perhaps after passing through the bodies of several susceptible animals in succession they may increase in virulence sufficiently to produce disease.

Some of the germs producing diseases of domestic animals are believed to live for very long periods of time and even vegetate outside the animal body, possibly upon or within the tissues of plants. Some germs, especially in the resting or spore stage, may live for very long periods of time, and under very unfavorable conditions and retain virulence.



EXTERNAL REGIONS AND SKELETON OF THE HORSE

Heavy black outlines denote areas of the points of the horse. Dotted lines refer to the nomenclature of the skeleton; plain lines to the nomenclature of the points.

Some outbreaks of infectious diseases appear very suddenly, with the most virulent and rapidly fatal cases appearing earliest in the outbreak. The outbreak then gradually loses virulence, the last cases being of a decidedly chronic nature, and some of them possibly recovering. It is possible however, that, before the virulent form was noticed, there may have been a series of very mild cases, the animals not being appreciably sick; but the germs in passing through susceptible bodies greatly increased in virulence until they were able to produce a rapidly fatal type of the disease.

Body Entrance: Germs gain entrance through the respiratory organs with the inspired air; through the digestive organs; through cuts or scratches in the skin and mucous membranes.

Method of Injury: Germs cause injury and disease in at least two different ways: First, by rapid multiplication and direct attack in inconceivable numbers upon the tissue. As an example of condition caused by germs in this way, we have fistulous withers. Second, germs which by chemical action may produce intensely poisonous substances in the blood and body tissues. As an example of this we have tetanus.

How Disposed of in Nature: Nature disposes of disease germs in a variety of ways, principally by oxidation, by the devitalizing effect of sunlight, and by scattering them over wide areas by means of wind and water.

Bacteria or germs usually require very favorable conditions for existence, and especially for retaining disease-producing power. Make conditions unfavorable for them by vigorous health, by high resisting power on the part of the animal, and by sunshine and ventilation. Bear in mind that germs are actual substances, tiny particles of living matter, and may be carried about in any way that very fine particles of dust may be scattered.

The beginning of an outbreak may come in two ways: First, by recent introduction of germs; or second, an outbreak of infectious disease may be caused by increased virulence in case of germs already present, but not previously capable of producing disease. This increase of virulence may be due to surrounding conditions especially favorable to germ life.

Apparently it makes great difference in many diseases as to the number of germs taken into the body,—hence the necessity of sunshine to reduce virulence and destroy germs and of ventilation to carry as many of them as possible out into the open air.

DISINFECTION AND DISINFECTANTS

Causes of Infection: In any process of disinfection it is important to know something concerning the nature of the infecting germ and the sources from which it comes. Germs of diseases are spread in a great variety of ways; for instance with the body fluids of sick animals, by soiled water or food, or by any contaminated matter. Air may be contaminated from the skin and lungs of diseased animals. The soil may be contaminated by the burial of diseased animals or by the deposit

of any infectious material upon the surface. In any such case, germs may be washed to ponds, sluggish streams, or shallow wells, thus contaminating the water. Hides, offal and even the hair of a diseased animal may be the source of spreading disease.

Bearing in mind now what has been said of germs, it is easy to see how glanders with infection left in feed boxes or water pails may be spread from horse to horse; how disease with infection, especially in the manure may be easily and rapidly spread; or how disease may be spread with its germs in the pus scattered from abscesses.

Must Be Thorough: Disinfection is not reliable and should not be depended upon unless done most thoroughly. A small area may be disinfected by having straw burned over it, or the earth may be removed to a depth of at least four inches and replaced with fresh earth. Paved flooring may be disinfected by burning over it any inflammable material. Cracks should be disinfected by free use of corrosive sublimate solution. Food which may have been contaminated should ordinarily be destroyed. Drinking places, feed boxes and mangers are cleaned and disinfected. Manure and bedding must be removed, piled up on the outside, and burned. All equipment,—bridles, halters, harness, blanket, grooming utensils, attendants' clothing, forks, brooms, etc., should be washed with soap and water, then scrubbed with a disinfectant. **Do not use bichloride of mercury** as a disinfectant on bits, curb-chains, etc.; it will corrode them.

Attendants: Attendants for sick animals should be very careful about their clothing, particularly trousers and shoes. It is well to use special overalls and overshoes, which should be left at the infected stall or building. Dogs, rats, and any of the smaller animals which are liable to convey the disease should be guarded against.

Fire: The most reliable disinfectant, and the one that should be invariably used where an article may be destroyed.

How to Burn a Carcass: Dig a cross-shaped trench, about twelve inches deep in the center, becoming shallow toward the edges, about seven feet long each way. The earth is thrown in the angles; two bars of iron are placed across for a bridge, and upon them the fuel is placed. The trunk of the carcass is placed upon the fuel, then another layer of fuel, then the internal organs and limbs of the carcass, and finally another layer of wood. The cross-shaped trench gives a draft—no matter which way the wind may be blowing.

By Burying: When burning is impracticable, carcasses should be buried. The grave should be at least eight feet deep and the carcass should be well covered with unslacked lime, after which the grave is filled in and the earth well packed. Earth which has been soiled by blood, manure, nasal discharges, etc., should be scraped up and thrown into the bottom of the grave. Wagons, etc., in which animals dead of contagious disease are hauled, should be cleaned and disinfected.

Moist Heat: More active and reliable than dry heat at same temperature. Boiling for an hour is probably sufficient to destroy any known disease-producing germs.

Sunshine: Destroys germs. Whenever sufficient time may be had, infected clothing or any article to be disinfected, especially where the infection is on the surface, can be rendered safe by long exposure to sunshine. The germs of some diseases cannot lurk and produce in sunlight or in the presence of oxygen, but indefinitely in dark, damp places.

Chemical: There are a number of chemical agents that are frequently used and most of them are coal tar products. These are supplied by the veterinary with directions for using same.

Isolation: Is a preventative measure wherein an animal affected with contagious disease, or one suspected of such disease, is separated from the healthy animals and placed by itself.

Each isolated animal must be provided with a separate feed box, water bucket, blanket, and grooming outfit, none of which should be removed from the place of isolation until properly disinfected. Attendants should have no duties which bring them in contact with other animals. No animal carcass, forage, bedding or manure should be removed from the place of isolation without proper authority. After an animal has been removed from the place of isolation, his entire equipment, watering bucket, feed box, etc., should be disinfected.

Care of the Corral: Manure, soiled bedding, and refuse about the feed boxes and mangers should be removed daily and hauled to the dump. Feed boxes and mangers should be swept or brushed out daily, and once a week the feed boxes and a portion of the wood work immediately surrounding them should be well scraped and washed clean with boiling water. The doors and windows should be kept open at all times, excepting during storms, and bales of hay or straw, and empty sacks or sacks filled with grain that may have become wet by rain blowing through open windows or doors should be scattered about and allowed to dry. The corrals and picket lines should be swept daily, and special attention must be paid to the ground beneath the watering trough to see that it is kept clean and dry. If the floor of picket line should be of soft earth, it should be sprinkled once a week with crude oil. Horse covers and saddle blankets that have been used and which for any reason are to be stored away in the stable should be thoroughly dried before storing.

COMMON DISEASES, WOUNDS AND LAMENESS

In control of infectious diseases prevention is the most important procedure. The isolation of healthy animals from infected animals should be primarily considered, and if at any time an animal shows the symptoms of an infectious disease it is essential to protect the others from such a source of danger. In some of the infectious diseases it is or may become advisable to kill the infected animals in order to avoid the spread of the disease.

INFLUENZA

The term influenza is applied to a contagious disease of horses, which is characterized by a blood infection, causing inflammation of the mucous membranes and frequently involving the lungs.

In order to prevent the introduction of the disease it is advisable to isolate animals that are issued to organizations for at least one week. Furthermore, the stabling of healthy horses in feed stables should be guarded against. At the beginning of an outbreak the disease may be checked by immediate isolation of the infected horses, and later by the segregation of those showing a marked increase in temperature. Contagious pneumonia is an acute inflammation of the lungs. The same procedure as given for influenza should be carried out in the prevention of this infection.

GLANDERS AND FARCY

Let it be understood at the outset that the glanders and farcy are one and the same disease, differing only in that the first is usually applied to the disease when the local lesions predominate in the internal organs, especially in the nostrils, lungs, and air tubes, and that the second term is applied to it when the principal manifestation is an outbreak of the lesions on the exterior or skin of the animal. The term glanders is sometimes applied to the disease in both forms, while the term farcy is limited to the visible appearance of the external troubles only; but in the latter case internal lesions always exist, although they may not be evident. It is characterized by the formation of nodules of connective tissue which degenerate into ulcers, from which exudes a peculiar discharge.

THICK WIND AND ROARING

Horses affected with a chronic disease that causes a loud unnatural noise in breathing are said to have thick wind, or to be roarers. Their class does not include those affected with severe sore throat, as in these cases the breathing is noisy only during the attack of the acute disease. Thick wind is caused by an obstruction to the free passage of the air in some part of the respiratory tract.

The comfort and surrounding of the patient must be attended to first. The quarters should be the best that can be provided. Pure air is essential. Avoid placing the animal in a stall where he may be exposed to drafts of cold air and sudden changes of temperature. It is much better for the animal if the air is cold and pure than if it is warm and foul. It is better to make the animal comfortable with warm clothing than to make the stable warm by shutting off the ventilation. From the start the animal should have an unlimited supply of fresh, cold drinking water. Blanket the body.

HEAVES, BROKEN WIND

Heaves is usually associated with digestive disorders or an error in the choice of feed. Feeding on clover hay or damaged hay or straw, too bulky and innutritious feed, and keeping the horse in a dusty

atmosphere or a badly ventilated stable produce or predispose heaves. Horses brought from a high to a low level are predisposed. When the disease is established there is no cure for it.

Proper attention paid to the diet will relieve the distressing symptoms to a certain extent, but they will undoubtedly reappear intensified the first time the animal overloads the stomach or is allowed food of poor quality. Clover hay or bulky feed which contains but little nutriment is a common cause of the disease, and therefore should be entirely omitted from the diet. It has been asserted that the disease is unknown where clover hay is never used. The diet should be confined to feed of the best quality and in the smallest quantity. The bad effect of moldy or dusty hay, fodder, or feed of any kind can not be overestimated. A small quantity of the best hay once a day is sufficient. This should be cut and dampened. The animal should be watered before feeding; never directly after a meal. Exertion when the stomach is full invariably aggravates the symptoms.

MENINGITIS, CEREBRITIS

Exposure to extreme heat or cold, sudden and extreme changes of temperature, excessive continued cerebral excitement, too much nitrogenous feed, direct injuries to the brain, such as concussion, or from fracture of the cranium, overexertion, sometimes sequel to influenza, pyemia, poisons having a direct influence upon the encephalic mass, extension of inflammation from neighboring structures, food poisoning, tumors, parasites, metastatic abscesses, etc.

TETANUS, OR LOCKJAW

The disease is characterized by spasms affecting the muscles of the face, neck, body, and limbs and all muscles supplied by the cerebrospinal nervous system. The spasms or muscular contractions are rigid and persistent, yet mixed with occasional convulsions.

This disease is caused by a bacillus that is often found in dust. This germ forms spores which grow only in the absence of oxygen. It produces a powerful nerve poison, which causes the symptoms of tetanus. The germ itself multiplies at the first point where it is introduced, but its poison is absorbed and is carried by the blood to all parts of the body, and thus the whole nervous system is poisoned. Deep wounds infected by this germ are more dangerous than superficial wounds, because in them the germ is more remote from the oxygen of the air. Hence, nail pricks, etc., are especially dangerous. In the majority of instances the cause of tetanus can be traced to wounds, especially pricks and wounds of the feet or of the tendinous structures. It sometimes follows castration, docking, the introduction of setons, inclusion of a nerve in a ligature, etc. It may break out three or four months after the wound is healed. Horses with a nervous, excitable disposition are predisposed to infection.

When a valuable horse has sustained a wound that is feared may be followed by tetanus, it is well to administer a dose of tetanus antitoxin. This is injected beneath the skin with a hypodermic syringe. A very high degree of protection may in this way be afforded. This antitoxin should be administered by a veterinarian.

LAMINITIS

Laminitis is a simple inflammation of the sensitive laminæ of the feet. Causes of laminitis are many and varied. The most common are concussion, overexertion, exhaustion, and rapid changes of temperature. (First) Concussion produces this disease by local overstimulation. (Second) Overexertion, as heavy pulling or rapid work, even when there is no immoderate concussion, occasionally results in this disease. (Third) Exhaustion causes those cases where the disease follows a hard day's work, physical strength being impaired. (Fourth) Rapid changes of temperature are exciting causes of laminitis, by impairing the normal blood supply. (Fifth) Certain kinds of grain will cause laminitis though the reason does not seem to be clearly understood.

AZOTURIA

A disease of the liver and blood forming functions, with a loss of control of the hind limbs and the passage of soapy and dark colored urine. It is directly connected with high feeding, especially on highly nitrogenous feed (oats, peas, etc.) followed by idleness in the stall.

Restrict diet and give daily exercise when the animal is not at work. A horse that has had one attack should not be left idle for a single day in the stall or on the picket line.

LYMPHANGITIS

Special inflammation of the lymphatic structures usually affecting the hind legs; very seldom a fore leg.

Usually attacks well-fed animals, and in such cases may be due to an excess of nutritive elements in the blood. Sudden changes in work or in habits of the animal may induce an attack. Prevention same as in azoturia.

COLIC

An excessive accumulation of gas in stomach, contraction of small intestines, sand in stomach and small intestines, or infection of the large intestines.

Sudden changes of feed, too long fasting, feeding while animal is exhausted, and giving feed that has been in the manger for some time and has become sour; anything that produces indigestion, such as watering when the animal is warm, driving a heated horse through streams, and feeding on sandy picket lines.

LAMENESS

Usually the discovery that the animal is becoming lame is a comparatively easy matter to the careful observer. Such a person will readily note any changes in movements which will have taken place in the animal he has been accustomed to ride or drive, unless they are very slight. But what is not always so easy after having discovered the fact of an existing irregularity, is the locality of its point of origin, and whether its seat be in the near or off leg, in the fore or hind leg, or some other part of the body. These are questions, too often wrongly decided, notwithstanding the fact that with a little careful scrutiny the point may be easily settled. The error, which is too often committed, of pronouncing the leg upon which the animal travels soundly as the seat of the lameness, is the result of a misinterpretation of the physiology of locomotion in the crippled animal. Much depends upon the gait with which the animal moves while under examination. The act of walking is unfavorable for making an accurate observation, though the decision is easy to reach if the animal walks on three legs. The action of galloping will often by the rapidity of the muscular movements and their quick succession, interfere with an accurate study of their rhythm, and it is only under some peculiar circumstances that the examination can be safely conducted while the animal is moving with that gait. It is while the animal is trotting that the investigation is made with the best chances of an intelligent decision, and it is while moving with that gait, therefore, that the points should be looked for which must form the elements of the diagnosis. The causes for lameness are taken up in *Instruction Memorandum No. 17-G, on Soundness.*

WOUNDS

A wound is an injury to any part of the body caused by violence, with or without laceration of the skin. An accidental wound is a simple cut made with a sharp instrument, such as a knife, producing merely a division of the tissue. In a cut wound the edges are even and definite, while those of a lacerated wound are irregular and torn. The checking of the flow of blood may be accomplished by several methods, such as compress bandages, hot iron, and ligatures. The heat from a hot iron will cause the immediate clotting of the blood in the vessels and this clot is further supported by the production of a scab, or crust, over the portion seared. The iron should be at a red heat. If at a white heat the tissue is charred, which makes it brittle and the bleeding is liable to be renewed. If iron is at black heat, the tissue will stick to the iron, and will pull away from the surface of the wound. Cold water and ice bags will quickly stop capillary bleeding, while hot water is preferable in more excessive bleedings or hemorrhages. Some drugs, called styptics, possess the power of contracting the walls of blood vessels and also of clotting the blood. A solution of chloride of iron placed on the wound alone or by means of cotton drenched in the liquid produces a rapid and hard clot. Tannic acid, alum, acetic acid, alcohol,

and oil of turpentine are all more or less active in this respect. To check rapid and dangerous bleeding from large vessels compression may be adopted. When it is from an artery, the fingers may be used for pressing between the wound and the heart, but if from a vein, the pressure should be exerted on the other side of the wound.

Bruises: Are nothing but wounds where the skin has not been ruptured.

Punctured Wounds: Are produced by the penetration of a sharp or blunt-pointed instrument, such as a thorn, fork, nail, etc., and the orifice of these wounds is always small in proportion to their depth. In veterinary practice punctured wounds are very much more common than the others. They involve the feet most frequently, next the legs and often the face and head from nails protruding through the stalls and trough. They are not only the most frequent, but they are also the most serious, owing to the difficulty in obtaining thorough disinfection. Another circumstance rendering them serious is the lack of attention that they receive at first. The external wound is so small that but little or no importance is attached to it, yet in a short time swelling, pain, and acute inflammation, often of a serious character, are manifested. Considering the most common of puncture wounds, we must give precedence to those of the feet. The animal treads upon nails, pieces of iron or screws, forcing them into the soles of the feet. If the nail or whatever it is that has punctured the foot is attached to some heavier body and is withdrawn as the horse lifts his foot, lameness may last for a few steps only, but unless properly attended to at once the horse will be found in a day or two to be very lame in the injured member. If the foreign body remains in the foot, he gradually grows worse until the cause is discovered and removed.

From the construction of the horse's feet and from the elasticity of the horn closing the orifice, punctured wounds of the feet are almost always productive of lameness. Inflammation results, and as there is no relief afforded by swelling and no escape for the product of inflammation, this matter must and does burrow between the sole or wall and the sensitive parts within it until it generally opens "between hair and hoof." From the fact that the pain is so much more severe, and that tetanus more frequently follows wounds in the feet, and from the extensive, or at times complete, separation and "casting" of the hoof, these wounds must always be regarded with grave apprehension.

The practice of picking up each foot, cleaning the sole, and thoroughly examining the foot each and every time the horse comes into the stable will enable us to reduce to the minimum the serious consequences of punctured wounds of the feet. If the wound has resulted from pricking, lameness follows soon after shoeing; if from the nails being driven too close, it usually appears from four to five days or a week afterwards. We should always inquire as to the time of shoeing, examine the shoe carefully, and see whether it has been partially pulled and the horse has stepped back upon some nails or the clip. The horse is seen to raise and lower the limb or hold it from the ground alto-

gether; often he points the foot, flexes the leg, and knuckles at the fetlock. Swelling of the fetlock and back tendons is also frequently seen and is liable to mislead us. The foot must be carefully examined, and this cannot be properly done without removing the shoe. The nails should be drawn separately and carefully examined. If there is no escape of pus from the nail holes, or if the nails themselves are not moist, we must continue our examination of the foot by carefully pinching or tapping it at all parts. With a little practice we can detect the spot where the pain is the greatest or discover the delicate line or scar left at the point of entrance of the foreign body.

Punctured Wounds of Joints, or Open Joints: These wounds are more or less frequent. They are always serious, and often result in anchylosis of the joint or the death of the animal. The joints mostly punctured are the hock, fetlock or knee, though other joints may, of course, suffer this injury. Probably the most common injury is the stab from the fork, but it may result from the kick of another horse that is newly shod or in many other ways.

Gunshot Wounds: Vary in size and character, depending on the size and quality of the projectile and also the tissue injured. Oftentimes a ball may be so lodged that it can not be removed, and it then may become encysted and remain for years without giving rise to any inconvenience. It is often difficult to locate a bullet, as it is very readily deflected by resistance met with after entering the body. The entering wound is the size of the projectile, the edges being inverted and often scorched. The wound produced in case of the bullet's exit is larger than the projectile, the edges are turned out and ragged. A bullet heated by the friction of the barrel or air often softens and becomes flattened on striking a bone or other tissue. Modern bullets that have an outer steel layer may pass through bone without splintering it. Lead bullets may split, producing two exit wounds. Spent bullets may only produce a bruise. Should bones be struck by a ball they are sometimes shattered and splintered to such an extent as to warrant us in having the animal destroyed. A gunshot wound, when irreparable injury has not been done, is to be treated the same as punctured wounds, i. e., stop the hemorrhage, remove the foreign body if possible and apply hot fomentations or poultices to the wound until suppuration is fairly established. Antiseptic and disinfectant injections may then be used. Should pus accumulate in the tissue, openings must be made for its escape.

Harness Galls: Are wounds of the skin frequently caused by ill-fitting harness or saddles. When a horse has been resting from steady work for some time, particularly after being idle in a stable on a scanty allowance of grain, as in winter, he will be soft and tender and will sweat easily when put to work again. In this condition he is liable to sweat and chafe under the harness, especially if it is hard and poorly fitted. This chafing is likely to cause abrasions of the skin, and thus pave the way for an abscess or for a chronic blemish, unless attended to very promptly. Besides causing the animal considerable pain, chafing,

if long continued, leads to the formation of a callosity. This may be superficial, involving only the skin, or it may be deepened, involving the subcutaneous fibrous tissue and sometimes the muscles and even the bone. This causes a dry slough to form, which is both inconvenient and unsightly. Sloughs of this kind are commonly called "sitfasts" and, while they occur in other places, are most frequently found under the saddle.

Abrasions are best prevented by bringing the animal gradually into working shape after it has had a prolonged rest, that the muscles may be hard and the skin tough. The harness should be well fitted, neither too large nor too small, and it should be cleaned and well oiled to remove all dirt and make it as pliable as possible. Saddles should be properly fitted so as to prevent direct pressure on the spine, and the saddle blankets should be clean and dry. Parts of the horse where chafing is likely to occur, as on the back under the saddle, should be cleaned and brushed free of dirt. The remedies for simple harness galls are numerous. Among them may be mentioned alcohol one pint, in which are shaken the whites of two eggs; a solution of nitrate of silver, ten grains to the ounce of water, sugar of lead or sulphate of zinc, twenty grains to an ounce of water, carbolic acid, one part in fifteen parts of glycerin, and so on almost without end. Any simple astringent or powder will effect a cure, provided the sores are not irritated by friction. If a sitfast has developed, the dead hornlike slough must be carefully dissected out and the wound treated carefully with antiseptics. During treatment it is always best to allow the animal to rest but if this is inconvenient, care should be taken to prevent injury to the abraded or wounded surface by padding the harness so that the chafing cannot occur.

Fistulas: This word is applied to any ulcerous lesion upon the external surface of the body which is connected by ducts, or passages, with some internal cavity. Because of this particular formation the term fistulous tract is often used synonymously with the word fistula. Fistula may exist in any part of the body, but the name has come to be commonly accepted as applicable only to such lesions when found upon the withers. Poll evil is a fistula upon the poll, and in no sense differs from fistulous withers except in location. The description of fistula will apply, then, in the main, to poll evil equally well. Quittor presents the characteristic tubular passages of a fistula and may, therefore, be considered and treated as fistula of the foot.

COMMON MEDICINES, ACTION, USES AND METHODS OF ADMINISTRATION

DEFINITIONS

Antiseptics: Agents used on or in the body in the treatments of wounds or diseases which prevent the growth and development of germs. Example: Carbonic acid, bichloride of mercury, iodine, creolin, etc.

Astringents: Agents which contract tissues and check secretions. Example: Alum, zinc, tannic acid, etc.

Carminatives: Agents which aid in the expulsion of gas from the stomach and intestines. Example: Ginger, turpentine, aromatic spirits of ammonia.

Disinfectants: Agents which destroy the germs that cause infectious diseases. Example: Chloride of lime, carbolic acid, creolin, formalin.

Deodorants: Agents which disguise or destroy odors. Example: Creolin, carbolic acid.

Laxatives: Mild cathartics. Example: Small doses of oil, bran mash, green foods.

Purgatives: (Cathartics). Agents which empty the bowels. Example: Aloes, salts and linseed oil.

Parasiticides: Agents which kill animal and vegetable parasites infesting the skin. Example: Carbolic acid, creolin, salicylic acid.

Stimulants: Agents which promptly but temporarily increase nervous vigor. Example: Alcohol, aromatic spirits of ammonia, ether.

Styptic: Agents which check hemorrhage. Example: Tincture of iron.

COMMON MEDICINES

Aloes Barbados: Purgative dose, six to eight drams. This is a slow but powerful acting cathartic taking about twenty-four hours to operate. Of value whenever an active purge is desired. May be given in the form of a ball or in solution in hot water. It should not be given when there is great weakness, a tendency to diarrhœa, or in respiratory diseases. Ginger is generally given with aloes to overcome the griping which it causes.

Ammonia, Aromatic Spirits: Stimulant and carminative. Dose one to two ounces diluted with pint of water. Of great value in exhaustion, and in the treatments of colics.

Charcoal: A mild antiseptic and deodorant. Used as a dry dressing for foul smelling wounds, either alone or in combination with other drugs.

Acid, Boracic (boric acid): Nonirritant antiseptic. Used in all strengths up to a saturated solution as a mild, soothing antiseptic in diseases of the eyes, and a wet or dry dressing for wounds. Also in the form of an ointment for burns, etc. Strength ten per cent or in combination with other drugs.

Acid Tannic—Astringent: Dose one-half to two drams. Used internally in the treatment of diarrhœa and dysentery, given alone or in combination with other drugs. Externally it is used to check bleeding from raw surfaces. In solution with alcohol or witch hazel, it may be used to harden tender shoulders. It is also useful in the form of an ointment, one to four for scratches, etc.

Formalin: Antiseptic, disinfectant, and deodorant. Used externally only. It is very irritating and should not be used stronger than one dram to a quart of water approximately one-two hundredth for ordinary purpose.

Iodine: Disinfectant and antiseptic. Used externally iodine is a powerful antiseptic. Either the tincture or the solution is valuable in the treatment of wounds, sores, ulcers, curles, splints, enlarged tendons, etc. For such purpose it must be applied once or twice daily with a small cotton swab.

Leau Acetate of Sugar (sugar of lead): Astringent. Used externally in the form of white lotion for its cooling and soothing action in the treatment of sprains, bruises, itching skin diseases, cuts, burns, and scratches. All local conditions with heat, pain and swelling are benefited by its use. White lotion is made as follows:

Lead	Ounce one.
Zinc-sulphate	Ounce one.
Water to make	Quart one.

Shake well and apply twice daily.

Lime, Chloride of: Disinfectant and deodorant. Must be fresh and kept in sealed jars. Use six ounces to the gallon of water to disinfect stables.

Oil, Linseed: Laxative. Dose one to two pints. Much used in treatments of colics. Raw oil should always be used.

Oil, Turpentine: Stimulant, antiseptic, carminative, and vermicide. Dose one to two ounces, well diluted with oil. This is a most useful drug and of great value in the treatment of colics, especially flatulent colics. Used externally in stimulating liniments and to disinfect nail wounds. Given as an inhalation in respiratory diseases, one to two ounces in a pint of boiling water.

Potassium Permanganate: Antiseptic, disinfectant, and deodorant. Used externally as an antiseptic in the treatment of wounds, one to two drams to a pint of water. Full strength is mildly caustic.

Epsom Salts: Causes a large secretion of fluids from the intestinal walls, thus rendering the bowel contents very fluid. Epsom salts is useful in small doses given to horses in feverish condition. Will dissolve in its own weight of water.

Soap, Castile: A cleaning agent used in removing grease and dirt from the skin surrounding the margin of wounds. Should not be applied to raw surfaces. Also used in making soap liniment.

Zinc, Sulphate: Antiseptic and astringent. Used externally in the form of white lotion, for the treatment of bruises, collar sores, sore shoulders, saddle sores, etc.

BANDAGES

Flannel: Use chiefly on the legs for warmth, support, protection.

Cotton: Used for the retention of bandages and the protection of wounds.

Zince Oxide: Mildly astringent and antiseptic. Used as a dry dressing for wounds, either alone or in combination with other drugs.

DRESSINGS

Absorbent Cotton: Used as a substitute for sponges in the cleaning of wounds; to make packs by soaking in medical solutions; and to retain dry dressings in contact with the surface of wounds.

Antiseptic Gauze: A light, loosely woven variety of cloth which has been saturated with an antiseptic and dried. Used as a covering for wounds. Gauze must be kept clean and the part that is to come in contact with the wound should never be touched with the fingers or hands.

Oakum: Prepared fiber from old ropes. Used principally in packing horses' feet. It may also be used as a substitute for sponges, and in the absence of cotton and gauze as a covering for wounds.

Packs: Packs are made by soaking cotton gauze, oakum or similar material in hot or cold medical solutions, after which they are applied to the part with a bandage.

Poultices: Poultices are a preparation for the local application of heat and moisture. They are made usually of flaxseed meal and bran, but other substances, such as oatmeal and bread, may be used. The material from which they are to be made is stirred up in hot water until thick and pasty. This mass is then spread on a piece of sacking or cloth of any kind and applied while hot, directly to the part and held by bandages or other appliances. When poultices are intended for use on wounds, such as punctures of the foot, etc., from two to four drams of carbolic acid or creolin should be added to the mass to render it antiseptic.

Poultices are most useful about the feet. They should be changed twice daily and immersed in hot water to keep them fresh and to prevent drying. Their application should not be continued for more than three or four days at a time.

METHODS OF ADMINISTERING MEDICINES

By the mouth: Medicines can be given by the mouth in the form of solids, as powders or pills, liquids and pastes, or electuaries.

Powders: Solids administered as powders should be as finely pulverized as possible, in order to obtain rapid solution and absorption.

Their action is in this way facilitated and intensified. Those that are without any disagreeable taste or smell are readily eaten with the feed or taken in the drinking water. When placed with the feed they should first be dissolved or suspended in water and thus sprinkled on the food. If mixed dry, the horse will often leave the medicine in the bottom of his manger.

Balls are preferred to drenches when the medicine is extremely disagreeable or nauseating; when the dose is not too large; when the horse is difficult to drench or when the medicine is intended to act slowly. Always loose the horse before attempting to give a ball; if tied, he may break his halter and injure himself or the one giving the ball.

The tongue must be firmly grasped with the left hand and gently pulled forward; the ball, slightly moistened, is then to be placed with the tips of the fingers of the right hand as far back in the mouth as possible. As the tongue is loosened it is drawn back into the mouth and carries the ball backward with it.

The mouth should be kept closed for a minute or two. We should always have a pail of water at hand to offer the horse after balling. This precaution will often prevent him from coughing up the ball or its becoming lodged in the gullet.

Pastes: They are intended, chiefly, to act locally upon the mouth and throat. They are given by being spread upon the tongue, gums, or teeth with a wooden paddle or strong, long handled spoon.

Liquids: Liquids may be given as drenches when the dose is large, or they may, when but a small quantity is administered, be injected into the mouth with a hard rubber syringe or be poured upon the tongue from a small vial. When medicine is to be given as a drench we must be careful to use water or oil enough to dissolve or dilute it thoroughly. Insoluble medicine, if not irritant or corrosive, may be given simply suspended in water, the bottom to be well shaken immediately before given the drench.

The bottle used for drenching purposes should be clean, strong, and smooth about its neck; it should be without shoulders, tapering, and of a size to suit the amount given.

If the dose is a small one the horse's head may be held up by the left hand, while the medicine is poured into the mouth by the right. The left thumb is to be placed in the angle of the lower jaw, and the fingers spread out in such a manner as to support the lower lip. Should the dose be large and the attendant unable to support the head as directed above, the halter strap or rope may be fastened to the nose band and thrown over a limb or beam. Another way of supporting the head is to place a loop in the end of a rope and introduce this loop into the mouth just behind the upper front teeth or tusk of the lower jaw, the free end to be run through a pulley, as before described, and held by an assistant. It is never to be fastened, as the horse might in that case do himself serious injury. The head is to be elevated just enough to prevent the horse from throwing the liquid out of the mouth. The line of the face should be horizontal or only the least bit higher. If the horse

is drawn too high the animal cannot swallow with ease or even with safety.

The person giving the drench should stand on some object in order to reach the horse's mouth on a level, or a little above it. The bottle is then to be introduced at the side of the mouth in front of the molar teeth, in an upper direction. This will cause the horse to open his mouth, then the base of the bottle is elevated, and about four ounces of the liquid allowed to escape on the tongue as far back as possible, care being taken not to get the neck of the bottle between the back teeth. The bottle is to be immediately removed, and if the horse does not swallow, this can be encouraged by rubbing the neck of the bottle against the roof of the mouth, occasionally removing it. As soon as it is swallowed repeat the operation until he has taken all the drench. If coughing occurs, or if, by any mishap, the bottle should be crushed in the mouth, lower the head immediately.

In drenching, swallowing may be hastened by pouring into the nose of the horse, while the head is high, a few teaspoonfuls of clear water, but drenches must never be given through the nose. Large quantities by pouring into the nose are liable to strangle the animal; if the medicine is irritating, it sets up an inflammation of the nose, fauces, windpipe, and sometimes the lungs.

Medicated vapors are to be inhaled by placing a bucket containing hot water to which carbolic acid or any other coal tar product has been added. The horse's nose is to be inserted into the top of the bag, and he thus inhales the medicated steam. Care must be taken not to have it hot enough to scald the animal. The vapor from scalding bran or hay is often thus exhaled to favor discharges in sore throat or "distemper."

By the Rectum: Medicines may be given by the rectum when they cannot be given by the mouth or when they cannot be retained in the stomach; when we want a local action on the last gut; when it is desired to destroy the small worms infesting the large bowels or to stimulate the peristaltic motion of the intestine and cause evacuation. Medicines are, in such case, given in the form of liquid injections. Foods may also be given this way.

Enemas: When given for absorption they should be small in quantity, neutral or slightly acid in reaction, and of a temperature of from 90° to a 100° F. These, like feeds given by the rectum, should be introduced only after the last bowel has been emptied by the hand or by copious injections of tepid water. Enemas, or clysters, if to aid the action of physics, should be in quantities sufficient to distend the bowel and cause the animal to eject them. Simple water, salt and water, or soap and water, in quantities of a gallon or more may be given every half hour. It is best that the horse retain them for some little time, as a liquid serves to moisten the dung and favor a passage. Stimulating enemas, as glycerine, should be administered after those already mentioned have already emptied the last bowel, with the purpose of still further increasing the motion of the intestines and aiding the purging medicine.

DATE TAKEN SICK	NAME OF HORSE	NUMBER OF HORSE	DISEASE OR DISABILITY	DISPOSITION	DATE FOR DUTY	DATE OF ENTRY ON DESCRIPTIVE CARD (Initial of the entering officer)

Ordinary cold water or even ice cold water is highly recommended by many as a rectal injection for horses overcome by the excessive heat of summer.

A FEW USEFUL "CASUALTY" HINTS AND THINGS WORTH KNOWING

1. It is absolutely essential that the horses of every unit should be hard and fit, and free from galls, cracked heels, sore withers, and back sores.

2. An irritable harness or saddle mark may be prevented from becoming a sore or gall if attended to in its initial stages, as either pressure or chafing are always the origin of this.

3. The cause must be sought for and removed as soon as possible.

4. With a saddle gall the blanket or numnah may be so adjusted that no pressure is put upon the part, or it may be necessary to cut a piece out directly over the spot. An extra blanket folded to relieve pressure often gives relief.

5. For BREAST COLLAR, BREECHING AND TRACE GALLS there is nothing better than a piece of sheepskin. The caisson corporal should always have some sheepskin in his saddlebag. As soon as the gall is discovered he can cut out a piece just larger than the gall and splice it to the piece of harness with strong khaki cotton. If time does not permit of this he should put on a sheepskin pad already made up with tapes sewed to each corner and in the middle; he should always have a few of these handy as well as some wither pads. Cotton bandage is indispensible.

6. If a horse starts KICKING (e. g., as in an accident) hold his head UP as high as you can; in this position he loses the power of kicking.

7. If a horse PULLS, loosen the curb chain; also try to ride him with a lighter rein. This sounds contrary to what one would expect ought to be done, but it is a very sound "tip," because the more you pull the horse the more he will pull you.

8. Always LEAD A HORSE by the collar or bridle, not by the bit. Do not look back at horse when leading. Remember Lot's wife, and your horse won't follow you either.

9. A horse drinks from 8 to 12 gallons of water a day.

10. Wet bran acts as a laxative on horses; on most horses it is binding when dry.

11. Teach your horse that raising his feet will do him no harm. Start this lesson at the first grooming. Encourage the horse to surrender his foot and when he does, lower it again quietly and pat him. Later use the brush on the soles of his feet; next tap the soles lightly with a currycomb; finally take the shoer's position and go through the same steps. By following these instructions carefully and using the necessary amount of patience, the feet of even a comparatively vicious horse can be handled with the greatest ease and safety.

12. Teach your horse to stand without being tied when you are dismounted. Feed whenever and wherever you are able to. If you use hobbles, be sure they are soft and will not injure the legs. Be sure that your horse is well shod. When you camp, always tie your horse in as sheltered a spot as possible.

13. Remember the cause of all bruises and sores on march is directly due to negligence in proper fitting of harness and saddlery, or neglect of care of team at halts or lack of knowledge in riding and driving and from no other causes.

14. The driver must report at once to his section chief the slightest rubbing or galls so that it may be remedied in time, and if discovered on march, he should be replaced and dismounted. The chief of section is responsible for condition of every horse in his section.

15. Cold applications, such as a wet cloth bound over a swelling is best treatment to reduce swelling and fever in part. Frequent hand rubbing, stimulation of circulation in back and legs is the golden rule for all drivers to follow on the march. You cannot accomplish a long, continued, successful march without hand massaging at practically all halts.

16. Continually watch the barrels and loins of your team for "thumps" (rapid breathing due to fatigue). Examine your horse's feet at all halts for stones, nails, bruises, etc.

MISCELLANEOUS SUGGESTIONS

1. Be sure and get your horses shod once a month. If you keep the shoes on longer than a month you may set up foot troubles and cause lameness through concussion and strain. See that the horseshoer does not use his hammer too roughly on your horse's feet as it bruises the leg above. If through sickness an animal cannot be used for two weeks or more, always pull the shoes and allow the bare foot to get ground pressure; this keeps the foot healthy and strengthens it.

2. Keep your watering troughs clean. How would you like to drink out of a dirty cup? Feed animals in as clean a way as possible, for grit and sand, when swallowed, cause colic and inflammation of the bowels. Feed boxes should be rinsed with vinegar after feeding bran.

3. Do not tie your animals with too long a halter shank, 18 in. on line; they are liable to get it caught round a hind pastern, causing what is called "a rope burn." This is a painful wound, that takes a long time to heal, and leaves a permanent scar. Do not tie to fences or hitching posts that are not strong and secure, otherwise you may ruin good horses by your carelessness.

4. Tie kicking animals by themselves.

5. Tie sick animals by themselves.

6. The well animals must be exercised regularly every day, to promote proper assimilation of the food and aid digestion, to prevent stocking (swelling) of the legs, and stimulate circulation in the feet, which is so necessary to promote a normal and healthy growth of the horn.

7. When a horse is tired or cold pull his ears and hand-rub his legs, it refreshes him and he will appreciate it.

8. The loins are the most vital parts of the horse to protect against cold.

9. Never upset a horse by constant irritation with the whip; it puts him off his feed.

10. Name your horses: regard them as pals; "Dixie" sounds better than "137."

11. Sick or injured animals should be placed on half rations of grain until such time as they can again be exercised, at which time the rations can be gradually increased to full feed, depending on the individual.

12. Thorough grooming daily is very necessary. It increases circulation in the skin, removes dandruff and old, wornout and cast-off cells. It makes the horse feel good. The currycomb should be used with caution, being careful not to scratch the skin with it.

13. The feet should be cleaned thoroughly with a foot hook, paying particular attention to the removal of dirt and filth which collect daily in the depressions on either side and in the middle of the frog, and, when left, cause thrush and lameness. Always hook towards the toe. Never toward the heel.

14. If a horse starts to rub himself against posts, etc., examine him carefully for lice or mange, put him off by himself, and report the case immediately.

15. A horse's gums sometimes swell from indigestion. A few days' feeding with bran, salt, or corn on the cob, or cutting his grain allowance in half will most likely cure it. Consult veterinarian when possible.

16. If a horse has a cut or open wound of any kind you must keep it clean by antiseptic washing. This should be done by filling a cloth or oakum full of water and then squeezing it above the wound, so that the water flows across the injured surface. Do not apply the cloth or sponge directly to the wound, for that will only irritate the flesh. Never use the same rag or sponge to wash the sores on different animals. Use clean water, boiled if possible. An antiseptic of some kind should be applied. A weak solution of salt is better than nothing. The wound should also be protected from flies and dirt, if possible. If the flies get at a wound it will become "fly blown" and lead to very serious results. If an animal has sore eyes, caused by dust or flies, wash them with a ten to fifteen per cent solution of boracic acid and use an eye covering. If the eye is sore from a blow or scratch, be sure and keep the eye covered with a cloth, as the light causes great pain and retards recovery. Eyes and nostrils should be washed, or carefully wiped, very frequently if they are running from distemper or other causes.

17. If animals eat dirt or lick trees it is because they are craving salt. They should have it at least three times a week and preferably free access to salt at all times. Put daily ration of salt in salt boxes every day.

18. If an animal stops at its work do not ascribe it to balking until you are positive that it is not sick. To find out if a horse is feverish, place hand behind an ear. The normal pulse of a horse is between 50 to 60 beats per minute.

DON'TS

Don't use strong antiseptic on deep wounds.

Don't give heart depressants, unless in case of high, bounding pulse.

Don't give irritating drugs without proper dilution either in water or oil.

Don't allow a wound to heal too rapidly on the outside.

Don't overdose.

Don't give an animal boiled linseed oil.

Don't drench a horse through the nostril.

Don't feed heavily when not at work.

Don't feed musty, dusty food.

Don't work horse hard for first hour after period of a day's rest.

Don't treat a decayed tooth; knock it out. When a veterinary can be reached get him; his job is to treat sick horses and he knows how. Don't take a chance.

CARE OF SADDLERY

The saddlery and equipment must always be cleaned after use. This duty, like the care of the horse, is to be regarded as part of the mounted duty itself; thus a drill is not over until horse, saddlery, arms and equipments have been put again in condition. According to need, the leather is simply wiped off with a damp sponge or fully taken apart and well soaped and cleaned. In no case must it be soaked in water.

If the soap used does not contain a sufficent amount of free oil, the leather must be oiled to keep it pliable. A mixture of one-half neats foot oil and one-half mutton tallow, well rubbed in, keeps leather in good condition. Special care is taken to keep the underside of the skirts of the saddle and the parts which do not come in contact with the clothing well oiled. The seat and outside of the skirts will rarely require oil.

Metal parts are kept clean and free from rust; they may require oiling if not regularly used.

The saddle blanket must be kept clean and soft and free from wrinkles. After use it must be dried and then well shaken (unfolded). It must never be folded wet and left thus with the saddles. Provision will be made in the saddle room or stables for hanging up to dry.

When necessary the blanket should be thoroughly cleaned by repeated immersions in tepid soapsuds and hung over a pole or line to dry without wringing or pressing it.

THE CARE AND PRESERVATION OF LEATHER

Attention is invited to the following: "It is forbidden to use any dressing or polishing material on the leather accoutrements or equip-

ments of the soldier, the horse equipments for cavalry, or the artillery harness except the preparations supplied by the Ordnance Department for that purpose." (A.R. 293)

REASON FOR OILING OF LEATHER

Leather, as it comes from the tannery in manufacture, is hard, rough, brittle, inflexible, and readily absorbs water. To remove these undesirable qualities and render the leather soft, pliable, flexible, and impervious to water, to increase the strength and toughness of the fiber, and to give the leather such a surface color and finish as will make it most sightly and suitable for the purpose for which intended, the manufacture is continued by hand-stuffing it with a dubbing made of pure cod liver oil and tallow, which the experience of curriers has shown to be the best material for this purpose. This dubbing is thoroughly absorbed by the leather, penetrating it completely, and is not merely limited to the surface.

The russet leather now used by the Ordnance Department in the manufacture of all leather equipments is pure oak tanned, of No. 1 tannage and finish, hand-stuffed with a light dubbing made of pure cod liver oil and tallow to preserve the leather, the dubbing being so sparingly used that the oil will not exude. This leather as it comes from the manufacturer contains enough oil to materially improve its quality and prolong its life, but not enough to soil the clothing if the equipment is properly cared for. No oil whatever is added to the leather in the manufacture at the Government arsenals.

CARE OF RUSSET LEATHER

Leather equipments which have become wet should be dried in the shade. Wet leather exposed to the direct rays of the sun or to heat of stove or radiator becomes hard and brittle.

When russet-leather equipments become soiled in service they should be cleaned by carefully washing the leather with a sponge moistened with a heavy lather made of clean water and Castile or Frank Miller's soap, and then rubbing vigorously with a dry cloth until the leather is completely dry. They should then be oiled and the oil well rubbed in.

If the leather becomes harsh, dry and brittle from exposure to water or other causes, clean as above described, and while the leather is still moist apply an exceedingly light coat of neats foot oil by rubbing with a soft cloth moistened (not saturated) with the oil. If it is found that too much oil has been used, the surplus can readily be removed by rubbing with a sponge moistened with naptha or gasoline But these oils are not issued for this purpose.

Where a polish is desired, the leather should first be thoroughly cleaned and the leather polish or dressing supplied by the Ordnance Department should be applied sparingly and thoroughly rubbed in with a soft dry cloth. Scars, cuts, or abrasions of the leather may be

improved in appearance but not obliterated by similar use of the leather polish.

Russet leather may be cleaned, oiled and polished as described above, but it should be noted if more than a light coat of oil be given the leather will be greatly darkened and will quickly soil the clothing. No method of cleaning will restore the original light color of the leather or remove stains or discolorations.

CARE OF BLACK LEATHER

To clean and dress black leather, wash it in water (lukewarm preferred) with Castile soap. An old horse brush will be found very satisfactory for applying the soap and water. Dry in the shade; when almost dry, apply the blacking, rubbing it in thoroughly.

Dry in the shade and then apply neats foot oil with a sponge or rag, rubbing it in well until the leather is soft and pliable.

When dry, a certain amount of oil and blacking will exude from the leather; this should be rubbed off with a dry cloth.

CARE OF HARNESS

For steel work ALWAYS HAVE AN OILY RAG; no driver or mounted soldier is complete without it; it is one of his best friends; use it at halts, especially in wet, damp and showery weather. The oil on the steel will save hours of work. On active service keep your steel work in oil; if harness is not in use wipe off the old oil and renew it.

Always wipe the oil off the bit before putting it into the horse's mouth as the horse dislikes the taste of it as much as you do. To clean steel use oil and silver sand (or better still brick dust), or you can substitute water for oil and oil the steel after it is clean. Use a good rag and place one end of the article to be cleaned on a fixed hook, the other end on the hook on your belt and draw taut.

LEATHER WORK

(Especially girths, breast collars and breechings) must be kept soft and supple; sponge it with clean COLD water and then soap it. Dubbin should be used extensively.

LEATHER AND METAL

Leather: Leather equipment should always be kept in the best possible condition in order to obtain the greatest amount of service from it. When leather is in proper condition it is clean, soft, and pliable, and will stand severe strain. It can only be kept in that condition by constant care.

New leather is usually stiff, dry, and hard, and requires frequent dressings of neats foot or other oil to make it pliable. Once it has been put in proper shape, oiling once a week will ordinarily suffice to keep it so.

Before oiling leather equipment it should be taken apart and each piece thoroughly cleaned.

The proper method of cleaning and oiling new leather is as follows: Take a bucket of clean warm water, a sponge and a can of saddle soap. There should be a rack of some sort, to hang the leather parts on. The wagon pole in the field will answer. Wet the sponge, squeeze out most of the water, and work up a lather with the saddle soap. Now squeeze all the water possible from the sponge and proceed to work on a piece of leather, cleaning it thoroughly, both sides. Clean the sponge and make a fresh lather as often as may be necessary. Change the water in the bucket frequently. Having cleaned a piece of leather, work in the remaining lather with the hands, until it is all absorbed. The piece is now ready for oiling. Put a little oil (neats foot preferably) on a rag and apply it to the flesh side of the leather, rubbing quickly over the whole surface so that it will be evenly distributed and too much will not be absorbed in any one spot. The piece is again worked with the hands until no oil remains on the surface. This hand working is most beneficial as it insures even distribution of the oil and makes the leather soft and pliable. Light applications of oil are much preferable to heavy, as they are absorbed more evenly and gradually and men's clothing is not ruined.

If the oil is applied to dry leather it is absorbed almost as if by blotting paper, and it is impossible to make an even distribution. The presence of the saddle soap and moisture in the leather partially fills up the pores and thus makes absorption slower and more even.

If oil is applied to the hair side of the leather it is sure to leave spots, and nice even-colored leather cannot be had, besides the danger of spoiling any clothing which comes in contact with it.

Those parts which have collected an unusual amount of dirt, such as in and around buckles and keepers, may be best cleaned with a soft, smooth stick of wood, used when the dirt has been softened by soap.

The inside face of collars must never be washed as it would make them harden and wrinkle, which would tend to produce injuries to the neck and shoulders. They can be kept clean by thorough hand rubbing. If additional cleaning is found to be necessary it can be accomplished with the sponge and saddle soap. A paddle of soft wood may be used to remove excess sweat and dirt. Particular care must be taken to squeeze all the water out of the sponge when using it for this purpose.

For use on black leather add one teaspoonful of lamp black to a pint of oil, and mix thoroughly.

Each piece of leather, excepting the collar, should be treated as above and hung up to dry. The parts are then assembled and put away in their proper places.

This operation should be repeated daily until the leather is in shape, after which it should be cleaned thoroughly and oiled lightly at least once a week. All leather must be wiped off with sponge and saddle soap after each use. Leather equipment when not in use should be kept hung on pegs or racks. It should never be allowed to lie around

on the floor or ground. When leather is to be stored or shipped, it should be thoroughly cleaned and lightly oiled on both sides.

Metal: The metal parts of horse equipment should be kept clean and free from rust. The manner of cleaning and removing the rust depends upon the metal and the finish.

Bronzed metal should not have its finish disturbed. Any cleaning material such as emery, sand, or brick dust, which cuts the surface will destroy the bronze finish and hence should not be used. A soft pine stick, comoline and elbow grease will remove rust without damaging the finish.

White metals are, generally, corrosive and non-corrosive. The non-corrosive are easily cleaned and kept clean, but do not take so high a polish as do the corrosive. The corrosive, such as steel and nickel-plated, are freed from rust in various ways. The simplest way is by hand with emery cloth or powder, or with oil and fine sand or brick dust, then burnished with the chain burnisher to remove scratches and restore the smooth polished surface. This however is not recommended for nickel plate as the plating will soon be worn off. It is best to treat it in the same way as bronze.

Other methods of removing rust are used and when much metal has to be cleaned they will save much labor. A number of pieces can be fastened together in a bunch and dragged through sand, or they may be placed in a sack and simply shaken, the different pieces cleaning each other. An excellent device for this purpose is a barrel or keg mounted on an eccentric axle, with crank handle on the end of axle to revolve it. As the barrel revolves the ends are raised and lowered alternately and the metal within is constantly churning about. Fine sand or brick dust in the barrel will greatly hasten the cleaning. All the harness chains of a section of a battery of Field Artillery can be freed from rust in this manner within from a quarter to half an hour. The same means can be used to burnish and polish, if soft material such as leather scraps, sawdust, or small pieces of paper are used in place of the sand. If there is much cleaning to be done it is preferable to have two barrels, one for cleaning and one for polishing. Brass is treated similarly to white metal. It can be given a high finish by the use of almost any kind of polish.

Painted metal requires occasional removal of the old paint and repainting. The paint can be removed by the same means as rust and requires less labor. All metal should be cleaned after use and then wiped off with an oily rag.

EXTRACTS FROM INFORMATION BULLETIN NO. 23, A. E. F.

(From Memorandum No. 8, November 1, 1918)

3. Care Of Animals.

(Following are slightly edited notes of the Commanding General of a Field Artillery Brigade, based on observation of 4 brigades in training, on command of 3 brigades and on service in 4 divisions.)

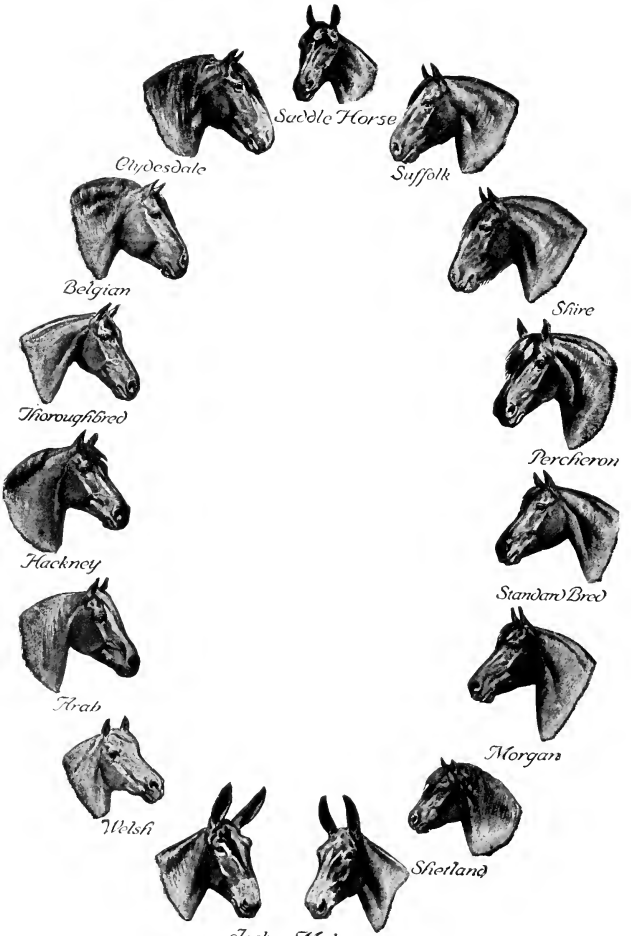
During the movement of active operations, the animals are kept as near the battery positions as possible. As soon as stabilization becomes apparent they should be moved to the rear where fewer losses will be sustained, where horses and men can secure more rest and better care, and where harness and material can be overhauled, etc.

Notwithstanding constant instruction, supervision, and all other precautions the condition of the animals during operations and especially during cold wet weather is far from satisfactory. This is due in most part to the unavoidable demands made upon the animals but also to the lack of proper standard in some of the units and failure to live up to the standard in others. There is no more important duty performed by any artillery officer than that of looking after the echelon; it requires unremitting attention to details, cheerfulness, and ingenuity. Some of the principal faults noted are the following:

(a) Inadequate grooming, both as to time and thoroughness;
(b) Unnecessary changes among personnel at horse lines;
(c) Oats and hay being fed at the same time, the hay being trampled underfood while the oats was being eaten;
(d) Feeding hay on muddy picket lines instead of having a picket line especially for this purpose, or, in its absence, having the horses held by the drivers while they feed.
(e) Use of hay as bedding for men; this requires watching;
(f) Failure to take advantage of every opportunity to graze animals;
(g) Too ready acquiescence in the amount of forage furnished, rather than insisting on obtaining a pro rata amount;
(h) Leaving horses standing in harness unnecessarily;
(i) Not enough men at echelons;
(j) Harness and material inadequately cared for;
(k) Unsanitary conditions surrounding both men and horses not given proper attention.
(l) Inadequate supply of medicines, etc., especially for mange;
(m) Poor choice of roads, etc., and poor road discipline, resulting in unnecessary hard pull, avoidable traffic jams, and ensuing long waits.
(n) In some cases no experienced officer in actual charge and consequently no coördination or complete utilization of the men and means available.
(o) Insufficient supervision by battery commanders and field officers, including Colonels.

For all batteries not motorized animal conservation is vital to mobility. When the number of animals is reduced below a certain minimum some vehicles must be abandoned. In view of the great scarcity of horses and the difficulty of resupply other expedients for transporting ammunition must be found as, aside from the causes above enumerated, it is primarily the excessive transporting of ammunition, that wears the horses out. A satisfactory solution cannot be found in trucks, even those of four wheel drive, since much terrain has

been encountered over which they could not transport ammunition to the guns. I believe that for all classes of horse-drawn artillery operating under present conditions the number or caissons could be reduced to one per gun if trailers drawn by small caterpillar tractors could be provided to carry an additional 200 rounds per gun for light artillery and 100 for heavy artillery. Under such conditions arrangements could be made by which even the guns could be drawn by tractor. This would eliminate a large percentage of the horse supply problem and reduce greatly the labor and worry of keeping the guns supplied.



Courtesy of the Horse Association of America

PART II

RIDING

Saddling and bitting.
Horsemanship.
Equitation.

SADDLES AND SADDLE FITTING

The object of the saddle is to give comfort and security to the rider, to protect the animal's back from injury by making an even distribution of the load over that portion of the back which should bear weight, and to provide means for the attachment of packs.

There are many and varied types used in different countries and for different purposes. The basic principle in design is however the same for all, that of having two bearing surfaces called side bars, to rest upon the back, connected and held in place by two arches, pommel and cantel, and with a seat for the rider, above the bars and between the arches. To secure the saddle on the back, a girth passes under the barrel and attaches to each side bar. To give security to the rider, stirrups are suspended from the side bar on each side. No part of the saddle should touch the back except the side bars.

(From F. A. C. O. T. S. *Black Book*)

Assembling Stirrup Strap

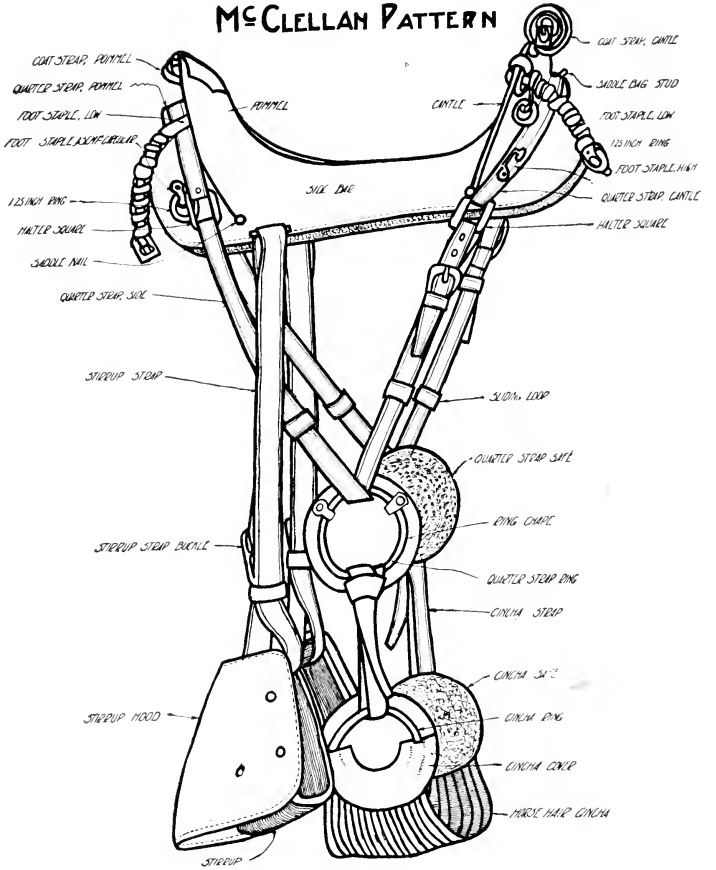
Figure 25. Method of assembling stirrup and stirrup strap. Stand on the side on which the stirrup is to be placed, facing the horse's head. Assemble the stirrup as shown in this view, giving the buckle end one-half turn from the horse in order to bring the standing loop up. Having run the end of the strap through the standing loop, put it through the stirrup staple on the saddle, being careful to enter it from the top. The picture shows the assembling of the near stirrup.

All saddles have certain requisites peculiar to the work for which they are intended.

Military saddles must be strong, durable, comfortable to both horse and rider, with long wide side-bars to distribute the weight over as

CAVALRY SADDLE

McCLELLAN PATTERN



large an area as is possible without interfering with locomotion, and be as light as possible. Numerous types have been experimented with and used from time to time in the United States Army, but none has yet been designed so satisfactory for general military use as the McClellan saddle. The principle of the adjustable side-bars is undoubtedly correct, but so far all efforts have failed to produce a saddle embodying this feature which is as satisfactory as the McClellan. No doubt in time one will be produced.

The back may be defined as that portion of the upper surface of an animal's body which is limited by the withers in front and the loins in rear. The spinal column forms the center of the back, and should be free from pressure. The ribs which spring from the spinal column are covered with muscle and appear to have been specially designed to carry loads. In fitting a saddle then, our effort should be to choose one and so adjust it, that it will cover this bearing surface evenly, without extending so far to the front as to interfere with the play of the shoulder blades, nor so far to the rear as to bear upon the loins. Our guide is to leave at least an inch between the forward end of the side-bar and the point of the shoulder blade, and not to permit the rear end of the side-bar to extend beyond the last true rib.

Sore backs are probably the greatest cause of disability amongst cavalry mounts. They are caused in many ways, though it is seldom that they cannot be avoided. The common causes are: improper saddling; poorly fitting saddles; dirty or improperly folded saddle blankets; careless riding, such as lounging in the saddle; unevenly placed loads; and poor conformation.

Saddles must fit and be properly placed and adjusted. Saddle blankets soften the load on the animals back and serve to distribute it more evenly. They must be kept clean and always, in saddling, put on smooth and without wrinkles.

Riders must sit erect in the saddle. "Riding the cantel" or standing in one stirrup are sure to bring sores. The pack and equipment must be evenly distributed and snugly secured. Poor conformation is the hardest cause to overcome, but it is only very rarely that a horse is found with such a conformation that it cannot be saddled and ridden without sores. If one bears in mind the principles of correct saddling and then uses intelligence to conform to them, sore backs can usually be prevented. The saddle blanket can be folded in such a way as to overcome almost any defect. Small pads made from old blankets, grass or hay, will take the place of lost flesh. There is no mystery about it, just plain common sense.

FITTING THE SADDLE

(Six Axioms)

1. The withers must not be pinched nor pressed upon.
2. The central line of the back must have no pressure upon it.
3. The shoulder blades must have full and unhampered movement.
4. The loins must not carry weight.

5. The weight must be put upon the ribs through the medium of the muscles covering them.

6. The weight must be evenly distributed over a surface which extends from the play of the shoulders to the last true rib.

BITS AND BITTING

There are many varieties of bits for different kinds of riding and driving. They are used singly or in combination. The common varieties are the curb, the snaffle, the bar and the pelham. They vary widely in principle and effect, but there is one essential principle common to all, that of having a mouth piece to bear upon the bars of the mouth by which pressure from the rider or driver's hands through the medium of the reins is transmitted to the mouth. This pressure causes pain, more or elss severe depending upon the type of bit used, the amount of force applied, and the sensitiveness of the mouth. Much unnecessary and harmful pain to mouths can be saved by proper bitting and riding and driving. The best rule is to use the mildest bit and the least amount of force which will accomplish the object of controlling and directing the animal.

The snaffle, plain bar, and pelham, are the bits generally found on driving animals.

The Snaffle is a mild bit, though not so mild as the plain bar. It has a pincer action on the bars of the mouth due to the joint in the middle of the mouthpiece. Its effect is a direct pressure on the bars though at an upward angle. It should be selected to fit the mouth, without pinching or having much play outside the mouth, and it should be adjusted as high up as possible without drawing up the corners of the mouth. It is the regulation driving bit in our service, and is the proper bit to use in riding, in training remounts, in training recruits to ride, and for nervous or excitable horses.

The Curb is the most powerful bit and is capable of inflicting great pain. It should therefore be used very carefully, and only by riders and drivers who are capable of using it properly. Its great power is obtained through a lever action produced by a chain or strap attached to its upper branches and passing under the jaw. The chain rests and presses against the smooth flat surface of the jaw, just below the junction of the two branches, called the chain groove. When the reins are tightened the upper branches revolving around the mouthpiece as a fulcrum, move forward and draw the curb chain tightly against the chain groove forcing the mouthpiece down against the bars of the mouth. The pressure applied by the reins is thus considerably increased.

Great care should be taken in the selection of the proper type and size of curb bit, its proper adjustment, and proper use. The type selected should be the mildest which will accomplish the purpose. A large mouthpiece with medium sized port and length of branches is desirable. It should be just long enough to fit comfortably in the mouth without pressure from the branches and with but little play

between them and the mouth. It should rest evenly across the bars and about one inch above the tusk, if present, and so that it will not touch or knock against any teeth. The chain should be adjusted so that it rests in the chain groove and so that when the reins are tightened sufficiently to take up all slack in the chain, the lower branches will make an angle of about 45° with the line of the lips.

The chain must always be twisted flat or it will inflict pain. Any pain caused other than by the mouthpiece of the bit acting upon the bars of the mouth is wrong and should be corrected.

The Pelham has a straight curved mouthpiece with branches and rings for the attachment of reins at the ends of the mouthpiece and on the lower branches. Hence it can be used either as a plain bar bit or a curb. It is very commonly used for both riding and driving, and for many reasons is an excellent bit, though not issued to our service.

It is fitted and adjusted similary to the curb.

THE BAR BIT is adjusted to the mouth as the mouthpiece of the curb. It has the mildest action of any bit and is recommended for either driving or riding whenever its use is possible.

THE COMBINATION of curb and snaffle, which is our regulation bitting for riding animals is the best for all round use. When used, the snaffle is above the curb in the mouth so as not to interfere with the curb action.

The bridle should fit the head comfortably and be capable of the adjustments necessary to proper bitting. The throat-latch should never be buckled tightly; there should always be room to thrust the whole hand between it and the throat.

THE BEST NATURAL RIDER IS HE WHO RIDES WITH THE LEAST EFFORT

A primary object of this book is to train the rider in horsemanship, so that he rides as an infantryman walks, by habit. A good rider will always make a good driver.

The Instructor: It is essential that the instructor be a skilled and experienced horseman, properly mounted. He should always supplement the original explanation of a movement by executing it himself, so that the riders may actually see the result that is desired and the means by which it is effected.

NOTES FOR INSTRUCTORS

Riding

Instructor will ride with the same horse equipment as the enlisted men. This is so that they may be able at any time to show the men, through demonstration, just what is wanted of them. Never allow your horses to be treated other than kindly. Impress on your men the fact that 99 out of 100 horses are always willing to do what is wanted

of them if they are made to understand what it is that is wanted. This requires patience and a certain amount of thought and calculation on the part of the rider as to the best way to convey his wishes to his mount. Wherever possible, equitation instructors should work in pairs; one to conduct the ride, that is, give all commands, regulate the gait, check up on distances, etc., and the other occupy himself entirely with riding back and forth along the column, making individual corrections, in an ordinary conversational tone. Where necessary this instructor should demonstrate his point, by himself assuming the desired position and then requiring the rider to do the same. Riding classes should not exceed 30 men.

Particular attention should be paid to suppling the man's waist. To this end, never let him ride at a trot with his body leaning forward of the perpendicular. It is well at the first to require the man to lean back, or rather roll back on the buttocks, even to an exaggerated degree, straightening the entire body, legs in prolongation of the upper body, and then relax all muscles and cave in the stomach in order that the jolt of the horse will be taken up through the flexibility of the waist. This position requires that the knees shall be well down. The rider keeps his seat by balance rather than by a grip of the legs or knees. The flexibility of the waist is absolutely necessary to a good seat—this means relaxed muscles. Where the rider is in the position spoken of above with the body leaning back from the vertical, the waist acts as a hinge, and so long as the hinge is working, the jolt of the horse is **not** transmitted to the spine and upper body, but is taken up by the movement of the hinge, thus permitting the buttocks and thighs to retain their contact with the horse. If the hinge is not working (i. e., the waist muscles are set) the jolt of the horse is transmitted to the rigid spine and the rider is jounted up and down; he is unable to retain contact with the horse and is made very uncomfortable by the successive blows to the spine, which blows are transmitted at once to the head and brain.

As the man's waist limbers up, he may be permitted to sit more erect until finally after some days of riding he should be able to sit the trot with his body practically erect.

Much time should be spent principally in giving the rider a seat. Enough of the rein aids (Par. 290, F. A. D. R.) should be taught to enable the man to guide his horse and where the classes make sufficient progress to warrant it, the leg aids (Pars. 295 and 289, F. A. D. R.) may also be taken up. The object of this particular part of the course must not be lost sight of however: **To supple the rider and give a seat**. With this will come an increase of confidence to the rider which will aid him in all later mounted work.

Riding cannot be learned from lectures or demonstrations, it must be learned by practice. Instructors must see that the time allotted to equitation is all spent in actual riding and largely at a trot, preferably a slow trot. Corrections should be individual and made while the ride is in progress rather than stopping the ride to give general instructions. Each man is interested to know just how to solve his own particular

troubles but rarely pays much attention to those of others, or to instructions given in a general way as he is inclined to assume that the remarks are of course in no way aimed at him.

Equitation instructors can increase the efficiency of their work by getting their classes out on the drill field promptly. Remember that, given good instructions, a man's ability to ride is pretty nearly in direct proportion to the amount of time spent on the horse—and the time we have with these men is very short. Don't keep a whole class waiting at the stables while you show some late arrival how to fold his blanket and bridle his horse; leave an N. C. O. to do that and let them join you later.

One of the best means of getting the "limber waist" is the use of suppling exercises (Pars. 261 to 283, F. A. D. R.). These exercises should be given just as well without the saddle as with it. These exercises should last only a few minutes, and be given several times during the ride. They will bring excellent results in limbering up the rider and giving him confidence and also serve to break the monotony of the ride.

Teach the man to keep the movement of his body entirely independent of any movement of his hands. As an aid to this, the men may be required for a time to keep their hands in light contact with the horses withers, each trying to keep at all times, and regardless of the movements of the horse, the same light feel of the withers.

Don't shout at your men or "bawl them out." Most of your men are anxious to learn and simply need help here and there. Take an interest in each man's case, especially the more backward ones; make a point of remembering Smith's tendency to lean forward and Jones' inability to relax his muscles and the next day tell them that you are expecting considerable improvement today from them and you will probably get it. Your own interest will arouse theirs. An interested man makes fast progress. And right there—in speeding up that progress by your own energy and ingenuity—is where your part in this game comes in. Don't mistake the route—real progress will not come by hurrying the instruction but by making it doubly thorough

The correct seat is a very natural one and is not forced in any way, except that the lower leg is prevented from swinging and is kept in light but firm contact with the horse's side at all times. The rider should take in the saddle a sitting position with the thighs inclined downward, not forced, but stretched only by their own weight, the buttocks being as far forward and as deep in the saddle as possible. In the average horse and rider the slope of the horse's shoulder and the inclination of the rider's thigh should be approximately parallel. The stirrup straps should hang vertically and never inclined forward by thrusting the feet forward "on the dashboard." The ball of the foot maintains a light, firm, constant pressure on the tread of the stirrup which pressure is secured, not by transmitting some of the weight of the body to the stirrup, but by flexibility of the ankle. Next to the supple waist, the flexibility of the ankle is most desirable. The heels are always lower than the toes, which are not permitted to turn out

excessively. The stirrup straps are of the proper length when, the rider being properly seated, the legs falling naturally and the stirrup straps vertical, the tread of the stirrup comes to the ankle bone. The foot is then placed in the stirrup by simply elevating the toe, the leg not being moved. The leg position is correct when, being properly seated and body erect, a line from the rider's shoulder dropped vertically would just touch the heels, or when the rider, glancing over his knees finds his toes just hidden from view, or when the line bisecting the angle made by the thigh and lower leg is approximately horizontal.

The back is never arched but is slightly bowed to the rear and the stomach caved in to insure a supple waist. Care must be taken that breaking over the belt and bowing the back does not degenerate into a hump backed slouch in the saddle. Head and shoulders are held erect.

Elbows hang naturally and close in to the body. Hands are held low over the withers and about eight inches apart, backs of hands are out and vertical, upper and lower arms making with each other an angle of about 90 degrees. When reins are in one hand, the other hand falls naturally at the side, behind the thigh. Additional pressure is exerted on the reins by moving the elbows to the rear or by turning the hands in, flexing the wrists, never by raising the hands.

Cautions to Instructors: The instructor must first develop the confidence of the rider, give him a proper seat, and make him supple on the horse. Progress should be suited to his capacity and exempt him as far as practicable from falls or other accidents. In case of a fall recruit should double up, relax and roll away from horse. First instruct the soldier in the use of the aids. Men should be taught then the means employed to train the horse to obey them.

Instruction is given individually; every new movement is made the object of a particular lesson given to each driver in turn.

During the exercises the instructor AVOIDS GENERAL REMARKS and (in so far as possible) unfamiliar terms; in the correction of faults he addresses by name those committing them.

He passes frequently from one rider to another repeating advice and endeavoring to impress upon the riders the principles embodied in the regulations. In doing this he need not use the language of the text.

The instructor may be on foot or mounted. For the first lesson it is advantageous to remain on foot so as better to explain movements and correct faults. Mounted commands should be in a long drawn steady quiet tone of voice.

Steady, well-trained horses are selected for the first lessons. The riders exchange horses from time to time during the lesson on indication from the instructor.

There should be frequent rests, especially with recruits. During these rests advantage may be taken of the opportunity to question the riders respecting the instruction they have received.

In all exercises the instructor varies the gait so as not to weary the riders or the horses. The instruction is conducted without hurry. The daily work begins and ends at the walk.

The standard required of riders.— To be a good military horseman each rider should—

(a) Have a strong seat.

(b) Be able to apply correctly the aids by which a horse is controlled.

(c) Be capable of covering long distances on horseback with the least possible fatigue to his horse and to himself.

(d) Be capable of riding across country.

(e) Under proper directions, be able to train an unbroken horse in garrison and in the field, understand how to detect and treat the minor ailments to which the horse is liable, and be a good groom.

All officers, in addition to being good military horsemen and instructors in riding, must be able to train remounts and to direct their training.

TO FOLD THE SADDLE BLANKET

The blanket, after being well shaken, will be folded into six thicknesses, as follows; Hold it well up by the two corners, the long way up and down; double it lengthwise (so the fold will come between the "U" and "S"), the folded corner (middle of blanket) in the left hand; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket between them extended; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds and seize the double folded corners; turn the left (disengaged) corner in and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds grasp the corners and shake the blanket well in order to smooth the folds; raise the blanket and place it between the chin and breast; slip the hands down half way, the first two fingers outside, the other fingers and thumb of each hand inside, seize the blanket with the thumbs and first two fingers and let the part under the chin fall forward; hold the blanket up, arms extended, even the lower edges, seize the middle points between the thumbs and forefingers, and flirt the outside part over the right arm; the blanket is thus held before placing it on the horse.

While retaining the general method of folding the blanket as above indicated, riders will be required to refold the blanket frequently with a view to equalizing the wear on the different sections of the blanket.

TO PUT ON THE BLANKET

The instructor commands: BLANKET.

Approach the horse on the near (left) side, with the blanket folded and held just described; place it well forward on his back by tossing the part of the blanket over the right arm to the off (right) side of the horse, still keeping hold of the middle points, slide the blanket once or

twice from front to rear to smooth the hair, being careful to raise the blanket in bringing it forward, place the blanket with the forefinger of the left hand on the withers and the forefinger of the right hand on the backbone, the blanket smooth; it should then be well forward with the edges on the left side; remove the locks of the mane that maybe under it.

TO PUT ON AND TAKE OFF THE WATERING BRIDLE

The instructor 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 the neck; reach under and engage the snap in the right halter ring; insert the left thumb in the side of the horse's mouth above the tush and press open the lower jaw; insert the bit and engage the snap in the left halter ring. The bit should hang so as to touch, but not draw up, the corners of the mouth. At the command unbridle, pass the reins over the horse's head and disengage the snaps.

TO SADDLE

(a) (McClellan saddle.) For instruction the saddle may be placed four yards in the rear or front of the horse. The stirrups are crossed over the seat, the right one uppermost; then the cincha and cincha strap are crossed above the stirrups, the strap uppermost. The blanket having been placed as previously explained, the instructor commands SADDLE.

Seize the pommel of the saddle with the left hand and the cantle with the right, approach the horse on the near side from the direction of the croup and place the center of the saddle on the middle of the horse's back, the end of the side bar about three-fingers width behind the point of the shoulder blade; let down the cincha strap and cincha, pass to the off side, adjust the cincha and straps, and see that the blanket is smooth; return to the near side, raise the blanket slightly under the pommel arch so that the withers may not be compressed; take the cincha strap in the right hand, reach under the horse and seize the cincha ring with the left hand, pass the end of the strap through the ring from underneath (from inside to outside), then up and through the upper ring from the outside; if necessary, make another fold in the same manner.

The strap is fastened as follows: Pass the end through the upper ring to the front; seize it with the left hand, place the fingers of the right between the outside folds of the strap, pull from the horse with the right hand and take up the slack with the left; cross the strap over the folds, pass the end of it with the right hand underneath and through the upper ring back of the folds, then down and under the loop that crosses the folds and draw it tightly; weave the ends of the strap into the strands of the cincha.

Another method of fastening the cincha strap is as follows: Pass the end through the upper ring to the rear; seize it with the right hand; place the fingers of the left hand between the outer folds of the strap; pull from the horse with the left hand and take up slack with the right; pass the end of the strap underneath and draw it through the upper ring until a loop is formed; double the loose end of the strap and push it through the loop and draw the loop taut. The free end should be long enough to be seized conveniently with the hand.

Having fastened the cincha strap, let down the right stirrup and then the left.

The surcingle is then buckled over the saddle, and should be a little looser than the cincha.

The cincha when first tied should admit a finger between it and the belly. After exercising for a while the cincha will be found too loose and should be tightened.

To approximate the length of the stirrup straps before mounting, they are adjusted so that the length of the stirrup strap, including the stirrup, is about 1 inch less than the length of the arm, fingers extended. To obtain RIGHT LENGTH OF STIRRUP LEATHER let the legs hang freely at the side of the saddle; let the stirrup touch the inside of the boot; arrange length of leather so that the bottom of the stirrup just hits against the bottom of the ankle joint. To obtain proper twist of stirrup straps, stand opposite flank facing croup and twist leather towards horse. The foot which should be inserted from outside of stirrup will easily and naturally be inserted properly.

TO UNSADDLE

The instructor commands: UNSADDLE.

(a) (McClellan saddle.) Stand on the near side of the horse; unbuckle, then remove the surcingle; cross the left stirrup over the saddle; loosen the cincha strap and let down the cincha; pass to the off side, cross the right stirrup, then the cincha; pass to the near side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, and remove the saddle over the croup and place it in front or rear of the horse as may be directed, pommel to the front; grasp the blanket at the withers with the left hand and at the loin with the right remove it in the direction of the croup, the edges falling together, wet side in, and place it on the saddle, folded edge on the pommel.

If in the stable, place the saddle on its peg when taken off the horse.

The Service saddle, model 1912, should be hung on a bracket sufficiently wide for the saddle to rest on its side bars. If a narrower support is used, the saddle will rest on the low point in the leather seat and become misshapen.

TO PUT ON AND TAKE OFF THE BIT AND CURB BRIDLE

Before bridling, the curb chain is unhooked on the near side. The instructor commands: BRIDLE.

Take the reins in the right, the crownpiece in the left hand; approach the horse on the near side, passing the right hand along his neck; slip both reins over his ears and let them rest on his neck; take the crownpiece in the right hand and the lower left branch of the curb bit in the left hand, the forefinger against the mouthpiece, the snaffle bit above and resting on the mouthpiece of the curb bit; bring the crownpiece in front of and slightly below its proper position; insert the thumb into the side of the mouth above the tush; press open the lower jaw and insert the bits by raising the crownpiece; with the left hand draw the ears gently under the crownpiece, beginning with the left ear; arrange the forelock, secure the throat-latch, and hook up the curb chain on the near side below the snaffle bit. The throat-latch should admit four fingers between it and the throat.

Reins and Bridle

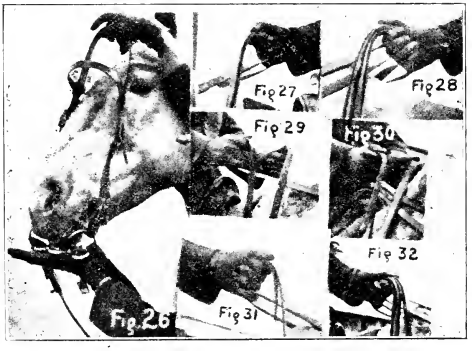


Figure 26. Method of supporting the bit in bridling and unbridling. This will prevent the bit from striking against the tushes.

Figures 27-32. Methods of holding reins of single and double bridle in either or both hands.

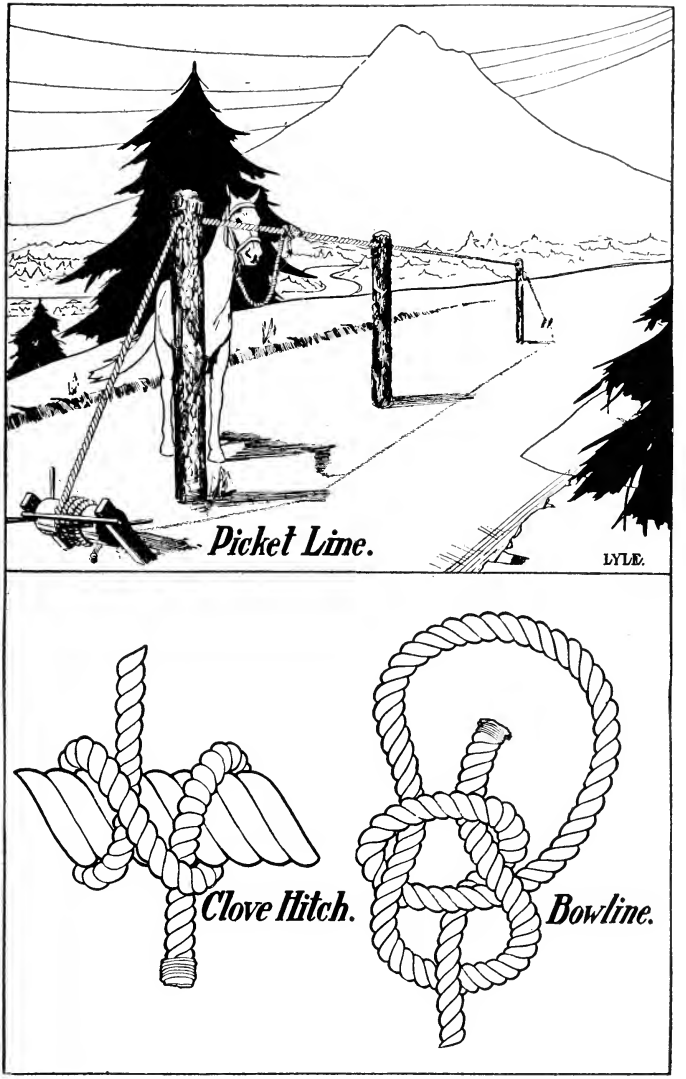
Fig. 27. Single reins held in right hand. Off rein enters beneath little finger, near rein, between little finger and third finger. Both reins leave the hand between the thumb and forefinger. Bight falls to near side.

Figure 29. Single reins held in both hands. Each rein enters the hand beneath little finger and comes out between the thumb and forefinger. Bight falls to the off side.

Figure 31. Single reins held in left hand. Near rein enters the hand beneath little finger, off rein between the little finger and third finger. Both reins leave the hand between the thumb and forefinger. Bight falls to the off side.

Figure 28. Double reins held in right hand. The reins enter the hand as follows: Off snaffle beneath little finger; off curb between little finger and third finger; near curb between second and third fingers; near snaffle between forefinger and second finger. All reins leave the hand between the thumb and forefinger, bight falling to the near side.

Figure 30. Double reins held in both hands. The reins enter the hands as follows: curb beneath the little finger; snaffle between the little finger and third finger, both reins leave the hands between the thumb and forefinger, bight falling to the off side.



Tying to Picket Line

Figure 32. Double rein held in left hand. The reins enter the hand as follows: near snaffle beneath the little finger; near curb between little finger and third finger; off curb between second and third fingers; off snaffle between forefinger and second finger. All reins leave the hand between the thumb and forefinger, bight falling to the off side.

IN THE STABLES

Before taking your horses out, carefully examine them to make sure that they are fit for work.

1. Note whether their droppings are normal.
2. See if their breathing is normal; that is, quiet and without distended nostrils.
3. Look them over especially on the back and shoulders, to see that there are no sores, lumps, or injuries to be rubbed and irritated by harness or saddlery.
4. See that they are not resting a fore leg, a sure indication that something is wrong with it.
5. See if they have eaten their food, especially their grain.
6. Clean out their feet; see that there are no stones or nails in them; and see that their shoes are tight. A loose shoe greatly increases the concussion on the foot.
7. See if your horses go lame on leading them out. Give your horses an opportunity to drink before leaving the picket line or stable and before putting the bit in their mouth.

TO PUT ON AND TAKE OFF THE BIT AND CURB BRIDLE

Simple Hints: A simple way to learn to put the CURB CHAIN on correctly is: Take hold of the end link with the forefinger and thumb of right hand and twist it round, from left to right, as if driving in a screw, until it is flat; then place the end link on the hook THUMB NAIL UP; slide the thumb down the chain, and after shaking free, say, three links, place the fourth link on the hook THUMB NAIL DOWN. You will never go wrong if you accustom yourself to this simple hint.

If the BIT touches the corner of the horse's mouth it is about right. Great care should be taken that the THROAT-LATCH is not too tight; it is common to find it too tight (because it is generally tighter when the horse is tied up than when in draft); the proper fitting is laid down above. A horse can't work properly with a tight strap round his throat any more than a driver can work with a tight collar.

Don't have the curb chain tight; horses dislike it and often will not start because the curb chain is too tight. Very few horses really need a curb chain; it upsets them and many are not used to it at all. Should allow two fingers breadth-palm down.

At the discretion of the instructor, the halter may be taken off before bridling, the reins being first passed over the neck; the hitching strap, if not left at the manger or picket line, is tied around the horse's neck; if the horse be saddled, in the near pommel ring.

The instructor commands: UNBRIDLE.

Stand on the near side of the horse; pass the reins over the horse's head, placing them on the bend of the left arm; unhook the curb chain on the near side; unbuckle the throat-latch, grasp the crownpiece with the right hand and, assisting with the left hand, gently disengage the ears; gently disengage the bits from the horse's mouth with the left hand by lowering the crownpiece; place the crownpiece in the palm of the left hand, take the reins in the right hand, pass them together over the crownpiece, make two or three turns around the bridle, then pass the bit between the browband and crownpiece and draw it snug.

The bridle is hung up by the reins or placed across the saddle on the blanket.

If the horse has no halter on, unbridle and push the bridle back so that the crownpiece will rest on the neck behind the poll until the halter is replaced.

Stand to Horse: At this command each rider places himself, facing to the front, on the near side of the horse, opposite his head, and takes the position of attention, except that the right hand, nails down, grasps the reins, the forefinger separating them, about 6 inches from the bit. The bights of the reins rest on the neck near the pommel of the saddle.

To Lead Out: The riders being at stand to horse, to leave the stable or picket line, the instructor commands: LEAD OUT.

Each rider, holding his right hand well up and firm, leads his horse, without looking at him, to the place designated by the instructor.

Upon entering the riding hall or inclosure the instructor disposes the riders upon a line at intervals of 3 yards, the riders at stand to horse, the horses correctly disposed and perpendicular to the line of riders.

A horse is correctly disposed when he stands squarely on all four feet, having his head, neck and body in line.

Stirrups: The stirrups are properly adjusted when the rider being properly seated with the feet removed from the stirrups and the legs falling naturally, the tread of the stirrups is about 1 inch above the top of the heel of the shoe.

The stirrups should bear only the weight of the lower leg: about one-third of the foot should be inserted in the stirrup so that the ball of the foot rests on the tread, the heel lower than the toe.

The flat of the stirrup strap should rest against the leg of the mounted rider. To accomplish this the rider's toe should be so inserted in the stirrup as to place the front branch of the latter on the outside. By the front branch of the stirrup is meant the forward branch as the stirrup hangs before the rider mounts.

Placing too much weight on the stirrup disturbs the seat and contracts the leg, hindering its freedom of action.

If the toe is not inserted far enough the rider risks losing his stirrups; if inserted too far suppleness is diminished.

The heel is carried naturally lower than the toe if the ankle joint is not rigid.

To Mount: Being at stand to horse, Mount.

(a) Face to the right, drop the right rein, grasp the left rein in the right hand, take two steps to the right, sliding the hand along the left rein, make a half face to the left when opposite the girth; with the aid of the left hand take both reins in the right, forefinger between the reins, the right hand on the pommel, the reins coming into the hand on the side of the forefinger, and held so as to feel lightly the horse's mouth, the bight falling on the off side. Place the left foot in the stirrup, assisted by the left hand if necessary, and bring the left knee against the saddle; grasp a lock of the mane with the left hand, lock coming out between the thumb and forefinger.

(b) Spring from the right foot, keeping the hands firmly in place, the left knee bent and pressed against the saddle, bring the right foot by the side of the left, pausing a moment, body inclining slightly forward; pass the right leg, knee bent, over the croup without touching it, sit down lightly in the saddle; let go of the mane; insert the right foot in the stirrup, assisted by the right hand if necessary; take a rein in each hand, the rein coming into the hand under the little finger and passing out over the second joint of the forefinger, the thumbs closed on the reins, the bight of the reins falling to the right.

The reins should be so held that the rider feels lightly the horse's mouth, the fingers closed until the nails lightly touch the palms of the hands; the reins well up in the crotch of the fingers; the backs of the hands vertical and in prolongation of the reins; the hands about 9 inches apart.

The instructor takes care that the recruit in adjusting the reins provokes no movement of the horse and deranges in no manner the position of the horse's head.

The instructor cautions the rider to avoid touching the horse with the left toe in mounting; this fault begets nearly all the resistance of horses to standing quietly while being mounted.

To Dismount: Being halted, Dismount.

(a) Seize the reins with the right hand in front of and near the left, forefinger between the reins, the reins entering the hand from the side of the forefinger, drop the reins with the left hand; place the right hand on the pommel; grasp a lock of the mane with the left hand, the lock coming out between the thumb and forefinger; take the right foot out of the stirrup.

(b) Rise upon the left stirrup, pass the right leg, knee bent over the croup without touching the horse, and bring the right foot by the side of the left, pausing a moment, the left knee against the saddle, the upper part of the body inclined slightly forward; descend lightly to the ground and take the position of stand to horse.

The riders are also trained to dismount on the right side. Commanding officers may authorize the following alternative method of mounting and dismounting by officers and enlisted men on all occasions except those when it is required that mounting and dismounting be executed in unison at the corresponding command. Instruction in the methods authorized in this paragraph is optional.

Being at stand to horse, at the command MOUNT, face to the right, drop the right rein, take a step to the right to be opposite the shoulder of the horse; at the same time seize the bights of the reins in the right hand and pull them taut enough to give a gentle, even bearing on the horse's mouth; grasp the reins with the left hand, with the little finger between them, and the bight coming out between the thumb and forefinger, which also hold a lock of the mane. Place the left foot in the stirrup, assisted by the right hand if necessary, and bring the left knee against the saddle. The riders are also trained to dismount on the right side.

Place the right hand upon the cantle, rise by an effort of the right leg, aided by the arms, the left knee bent and pressed against the saddle, the upper part of the body inclined slightly forward to keep the saddle from turning; bring the right foot by the side of the left; change the right hand to the pommel, pass the right leg, knee bent, over the croup without touching it, and sit down lightly in the saddle. Put the right foot in the stirrup, assisted by the right hand if necessary.

At the command DISMOUNT, pass the right rein into the left hand and grasp with this hand a lock of the mane, place the right hand on the pommel, and remove the right foot from the stirrup; pass the right leg, knee bent, over the croup without touching the horse and bring the right foot by the side of the left, the left knee against the saddle, the upper part of the body inclined slightly forward, right hand on the cantle. Descend lightly to the ground and take the position of stand to horse.

TO MOUNT WITHOUT SADDLE

Being at stand to Horse, at command MOUNT, face to the right, drop right rein, grasp the left rein in the right hand, take two steps to the right, sliding hand along left rein. Make a half face to left when opposite girth, and with the aid of the left hand take both reins in right hand, forefingers between reins. Right hand well back on withers, reins coming into hand on the side of the forefinger, held so as to feel lightly the horse's mouth. Bight falling on the off side. Grasp a lock of mane with the left hand, springing up to the position of "Leaning Rest" arms extended, body inclined slightly forward, resting weight on right hand, pass right leg, knee bent over horse's croup. Sit down lightly on horse's back.

TO DISMOUNT WITHOUT THE SADDLE

Grasp the reins with the right hand in front of and near the left hand, forefinger between the reins, the reins entering the hand from the side of forefinger. Drop the rein with the left hand. Place the right hand well back on withers. Grasp lock of the mane with left hand, raise the right leg, knee bent over the croup. Take position of Leaning Rest; arms extended, body bent slightly forward, legs and body on near side of horse. Lower body lightly to ground. Stand to horse.

To take the reins in one hand and to separate them; at the command IN LEFT HAND TAKE REINS, place the left hand opposite the middle of the body, pass the right rein into the left hand, separating it from the left rein by the little finger; let the right hand fall by the side.

At the command IN BOTH HANDS TAKE REINS, grasp the right rein with the right hand and replace the hands 9 inches apart.

The reins are taken in the right hand and again separated in a similar manner.

To adjust the reins the driver brings the wrists together and grasps with one hand, above and near the opposite thumb, the rein that he desires to shorten.

The instructor causes the reins to be dropped and retaken by the commands DROP REINS and REINS.

At the first command, the rider drops the reins behind the pommel and lets the hands fall by the side.

The reins are dropped as an exceptional measure, and always with precaution against accident.

POSITION OF THE RIDER, OR ATTENTION (MOUNTED)

The position described below should be considered a standard toward which all riders should gradually approximate.

The buttocks bearing equally upon and well forward in the middle of the saddle.

The thighs turned without constraint upon their flat side, clasping the horse evenly and stretched only by their own weight and that of the lower legs.

The knee bent and flexible.

The lower legs falling naturally, the calves in contact with the horse without pressure, the toes dropping naturally when the driver is without stirrups.

The back supple and never hollowed.

The upper part of the body easy, free, and erect.

The shoulders thrown back evenly.

The arms free, the elbows falling naturally.

The head erect and turned to the front, but without stiffness.

Eyes alert, well up, and directed to the trooper's front.

The reins in left hand opposite the middle of the body, separated by the little finger, the bight coming out between thumb and forefinger, back of hand vertical, thumb up. The hand low over withers; let the right hand fall by the side.

This position may be modified by the instructor to suit varying conditions and unusual conformations. When not at attention, the head and eyes are directed so as best to favor alertness and observation. In other respects the position should be practically unchanged.

The body and lower legs are movable and should be under the control of the rider, either acting intermittently as aids for guiding the horse or as a means for binding the rider to the horse while following his movements.

The thighs, on the other hand, should remain fixed immovably to the saddle, except while posting at the trot. This fixity should be obtained not by the pressure of the knees but by the clinging of the buttocks, which are secured by the suppleness of the loins, and the relaxation of the thights. It is acquired very rapidly by daily "rotation of thighs," which gradually presses the large thigh muscles to the rear and permits the femur to rest solidly against the saddle.

The rider should sit with his buttocks well under the upper part of his body, and especially avoid bowing the back by thrusting the buttocks to the rear and the lower part of the spine to the front. Sitting well forward in the middle of the saddle will tend to assist the rider in avoiding the defect just referred to. If the buttocks are thrust back too much, the rider can not conform to the movements of the horse and carries forward the upper part of his body.

If the thigh is too nearly horizontal, the rider is doubled up and his power of action diminished; if the thigh is too nearly vertical, the rider is on the crotch and lacks ease.

To sum up: The rider should take a relaxed sitting position, squarely on his buttocks, with the thighs inclined downward.

The various defects of positions are overcome by suitable suppling exercises.

The aids: The legs, the reins, and the weight are the means of controlling the horse in riding. They are called aids.

The legs: The legs serve to urge the horse forward to increase his pace or gait, and to engage the hind quarters or move them laterally. The legs act by the pressure of the calves. If pressure alone is insufficient the rider increases the action by blows with his calves.

It is essential to obtain from the horse perfect obedience to the action of the legs. He should respond to the simultaneous and equal action of both legs by engaging his hindquarters and moving forward; to the predominant action of one leg by moving his haunches to the opposite side.

The reins: The reins serve to prepare the horse to move, to decrease or increase his pace, to change the gait, or to change direction.

Contact is a light bearing of the mouth of the horse on the hand of the rider. It should be constantly maintained.

The reins are held in the full hand, the thumb pressing them lightly upon the second joint of the forefinger. By means of closing and relaxing the finger and flexing the wrist, arm, and shoulder the rider while maintaining contact and keeping the reins taut, follows easily the movements of the head of the horse without anticipating or interfering with these movements. The hand is then said to be passive. It is kept so as long as the rider is not required to change the pace, gait or direction.

The direct rein: When the rider, with the hands separated and the reins adjusted, closes his fingers upon the reins without raising the hands he exercises an action from front to rear, called the effect of the

direct reins. This effect, when on one rein only, is called that of the right (or left) direct rein.

The leading rein: When the rider carries the right hand to the right and forward in a manner to preserve contact but not to increase pressure on the bit the effect is called that of the right leading rein.

The back of the hand should remain vertical, the wrist in prolongation of the forearm, the elbow remaining near the body.

The horse's head and neck are drawn to the right, the shoulders follow, and he turns to the right.

The bearing rein: When the rider carries the right hand forward, upward, and to the left in a manner to preserve contact, but not to increase pressure on the bit, the effect is said to be that of the right bearing rein.

The back of the hand should remain vertical, the wrists in prolongation of the forearm.

The horse's head is turned slightly to the right, but the effect is to the left. The neck bends and is convex to the left and is followed by the shoulders. The horse turns to the left.

The action of the bearing rein is much more powerful than that of the leading rein, and is used to the exclusion of the latter to turn the horse when riding with the reins in one hand.

The indirect rein of opposition: Its effect may be produced in front of the withers if the hand be slightly raised; in rear of the wither if the hand be slightly lowered. It is frequently used by the driver when riding and its effect should be studied and practiced from the beginning.

Manner of applying the aids: The action of the reins and legs and weight should not be continuous. The rider alternately closes and relaxes the fingers, the hands preserving contact in the intervals between the actions. In the same manner he uses the legs, neither gripping nor releasing altogether, but preserving light contact in the intervals between the gripping with the calves. The weight likewise is used in a similar manner, being quickly applied to the front, to the rear, or to a side, alternating with returns to the normal position.

If an action of the aids is prolonged the horse has opportunity to establish the corresponding resistance, but if produced by repeated applications the effect is very marked.

All action of the aids should diminish in intensity when obedience begins and cease entirely as soon as the desired result is secured.

Riders must be thoroughly trained in riding with the reins in one hand.

The instructor, in teaching riders to avail themselves of their legs and reins, is governed by the preceding considerations, and from the first watches vigilantly the action of the aids.

The hand should always be kept low. The most thoughtful care should be exercised in the combined application of the aids, so that they may not be opposed to each other in their action; that is, one favoring the intended movement, the other opposing it.

The instructor impresses upon the riders that their hands must be kept still; that is, free from bobbing up and down, and pulling, and from giving and taking when there is no reason therefore.

Likewise their legs should remain in light contact with the horse's sides and the heels not be used to kick the horse constantly in a nervous manner.

Moreover, that the effects of the aids may be perfectly clear, and that there may be no contradiction between them, there should never be simultaneous action of the direct reins demanding slowing up or halting and of the legs provoking a forward movement. This condition is essential for preserving the composure indispensable to the horses of the Battery.

Suppling exercises: Before the suppling exercises are given at the various gaits they should be thoroughly explained and practiced at the halt.

These exercises, if understood and intelligently applied, produce rapid results.

They are given daily throughout the entire course of instruction of the rider with a view to—

(a) Strengthening the muscles used in riding.

(b) Assuring the correct seat.

(c) Giving the rider balance and inspiring him with confidence in his ability to maintain his seat while inducing general suppleness and relaxation of the body.

(d) Accustoming him to keep the thighs constantly pressed against the horse.

(e) Leading him to acquire independence in the use of the aids.

The exercises herein indicated are recommended as the most useful, but they are not the only ones in which the riders may be exercised. They should first be taught dismounted.

Instructors may add other suitable exercises for the purpose of varying the work and adding to its interest.

To execute the suppling exercises a movement is announced and begun without further command. The movement is then continued and repeated until the command: AS YOU WERE.

The riders take the reins in one or both hands, drop and retake them, as necessary, without command.

Flexion of the loins: At the command BEND TO THE RIGHT AND LEFT, the rider, without deranging the position of the hands or of the part of the body below the waist, slowly declines the upper part of the body to the right; then, returning slowly through the initial position, makes a corresponding movement to the left.

At the command STROKE YOUR HORSE ON THE RIGHT FLANK, sit down in the saddle by pushing the buttocks forward, turn the body at the hips, without deranging the position of the legs and, leaning backward but not to the side, place the right hand as low as possible on the horse's flank.

Rotation of the loins: At the command STROKE YOUR HORSE ON THE LEFT HAUNCH WITH THE RIGHT HAND, turn in the

saddle without deranging the seat or the position of the thighs and stroke the horse on the left haunch with the right hand, taking care to avoid opening out the left elbow or pulling on the reins.

Rotation of the arm: At the command ROTATE THE RIGHT ARM VERTICALLY, extend the arm upward, palm to the front; then drop the arm to the rear and describe slowly and with uniform movement a vertical circle, keeping the head erect and high while the arm is descending.

Rotation of the thigh: At the command ROTATE THE RIGHT THIGH, remove the knee from the saddle and carry it back, straightening the leg; turn the knee in as much as possible and then, replacing the thigh flat upon the saddle, draw it forward to its normal position with much friction in order to press the thick muscles to the rear and to permit the femur to rest solidly against the saddle.

Raising the thighs: At the command RAISE THIGHS, raise the knee only so much as is necessary to detach the thighs and lower legs from the saddle, and incline the upper part of the body slightly backward. If the rider is sitting too far back in the saddle, the instructor directs him to draw himself forward by grasping the pommel.

This position compels the rider to supple his body in order to keep his seat.

When his equilibrium is well established the rider gently replaces his thighs upon the saddle, being careful to keep his loins in the same position as during the movement.

This exercise fixes the loins in place and puts them in proper position to maintain the balanced seat. It is executed only at a walk, slow trot or canter.

Flexion of the leg: At the command FLEX THE RIGHT LEG, bend the leg slowly without deranging the position of the knee or that of the body.

Flexion of the ankle: At the command CIRCLE THE RIGHT FOOT, trace with the toe of the designated foot, by a slow and uniform movement, a vertical circle from outward inwardly, and from below upward, without disturbing the position of the leg. The circle with the right foot is made clockwise; with the left foot contraclockwise.

To vault into the saddle and to the ground: At the command VAULT INTO THE SADDLE, take position (Prepare to Mount), except that the left foot is not inserted in the stirrup; spring upward and forward, bearing the weight upon the extended arms; remain a moment in this position then throw the right leg, knee bent, over the croup without touching it and sit down lightly in the saddle. Take a rein in each hand.

To vault to the ground: At the command VAULT TO THE GROUND, take position (Prepare to Dismount). Rise upon the extended arms; pass the right leg, knee bent, over the croup without touching it, carry it to the side of the left; remain a moment in this position and come lightly to the ground, the heels joined, the knees bent. Take the position of stand to horse.

To vault to the ground and into the saddle without pause the instructor commands: VAULT TO THE GROUND AND INTO THE SADDLE.

The drivers are frequently exercised in vaulting into the saddle and to the ground, and to the ground and into the saddle from both sides.

During the early lessons these movements are to be executed only at the halt.

When the instruction is well advanced the riders will be trained to vault into the saddle and to the ground while the horse is in motion, worked on the longe by the instructor. During the exercises at the trot and gallop, the rider when dismounted keeps pace with the horse at the shoulder by means of the galloping step, which he executes (keeping one hand on the withers) by a succession of leaps, rising and alighting with the rise and fall of the forehand of the horse, keeping the left or right foot in advance, according as he is on the left or right side of the horse, and supporting his weight on the balls of the feet. Frequent short rests should be given in order not to strain or unduly fatigue men who are not accustomed to the exercises.

The vault into the saddle while the horse is in motion is executed as prescribed from the halt, except that the rider is at the galloping step; that he springs forward faced to the front, and that as he drops into his seat he catches against the side with his legs to avoid passing over the horse.

Vaulting to the ground is executed as prescribed from the halt, except that when the legs are joined the rider presses the leg against the side of the horse to push his body clear and alights on the ground faced to the front and takes the galloping step.

To rest: Being at stand to horse, the command rest is executed as in the school of the rider dismounted, except that the riders hold the reins and keep their horses in place.

Being mounted, at the halt, at the command REST, or being in march, at the command ROUTE ORDER, the men are permitted to turn their heads, to talk, and to make slight changes of position, but not to lounge on their horses or to lose their relative places.

Being at stand to horse, the command AT EASE is executed as in the school of the rider dismounted.

Being mounted, at the command AT EASE the men are permitted to turn their heads or to make slight changes of position, but preserve silence.

To resume the attention: 1 SQUAD. 2 ATTENTION.

Each rider if dismounted takes the position of stand to horse; if mounted, he takes the position of the rider mounted.

To dismiss: The riders being dismounted, in column of riders, at the command FALL OUT the leading rider leads his horse directly to the stable or picket line. The other riders follow in their existing order at 4 feet distance until near their places in the stable or on the line, when they leave the column and move directly to their respective places.

The riders being dismounted, in line with intervals at the commands: 1. BY THE RIGHT (LEFT). 2. FALL OUT, the right rider leads directly to the stable or picket line. The other riders follow and complete the execution of the command as indicated above. If the riders are facing their respective positions on the picket line, the command FALL OUT may be given. Each rider then moves directly to his place. Under the directions of the instructor each rider removes his equipment, cares for and secures his horse, cleans his equipment, and places the latter as prescribed.

The instructor satisfies himself by inspection that the horses and equipments are properly cared for and that the precautions required on the return from exercise have been observed. The men are then ordered to fall in, marched to the rider parade, and are there dismissed as prescribed in the school of the rider dismounted.

To gather the horse: Having a light pressure of the bit against the horse's mouth and a light feel of the lower legs against the sides, increase the pressure of the lower legs, heels well down, and slightly increase the pressure of the bit against the bars by squeezing the fingers on the reins.

This is called gathering the horse. It serves as a signal to attract the attention of the horse and to prepare him to respond promptly to the subsequent application of the aids. The gather should be employed at the preparatory command whenever the corresponding command of execution is to involve response on the part of the horse to the application of the aids. This preparatory signal to the horse should always be the same whatever may be the movement that is to be executed, and whatever the gait at which the horse may be moving.

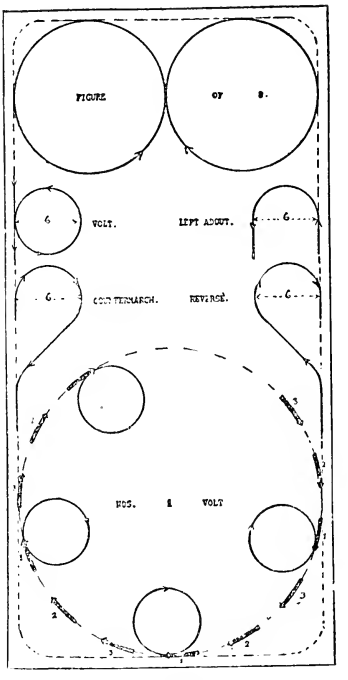
To move forward: Being at a halt, at the command: 1. FORWARD, gather the horse by slight pressure of rein and leg aids sufficient to bring horse to collected "attention." At command: 2. MARCH, close the legs (already in contact with the horse) with a quick, sharp pressure, the hand remaining passive. If the horse does not respond at once by moving forward continue until the horse moves forward at a walk. A succession of similar leg pressures each quick, distinct and should be given with a degree of force graduated to the sensitiveness of the horse. A long continued squeezing effect with the legs is particularly to be avoided.

To halt: Being at the walk, at the command: 1. SQUAD gather the horse. At the command: 2. HALT, sit well down in the saddle and carry the weight of the body backward and alternating act by the direct reins until the horse stops.

By the right flank: 1. BY THE RIGHT FLANK, 2. MARCH. At the first command gather the horse. At the second command carry both hands to the right until the horse has turned through an arc of 90 degrees, and then replace the hands and move straight in the new direction. During the movement the legs maintain impulsion and hold the horse's body so that it follows the curve on which he is turning; that is, if the horse tends to carry his haunches to the inside of the curve, the

action of the inside leg should predominate; if he tends to carry his haunches to the outside of the curve, then the action of the outside leg should predominate.

When the driver holds the reins in both hands he makes use simultaneously of the leading reins and the bearing rein. With the reins in one hand he makes use of the bearing rein only.



The action of the reins in turning is governed by the principles explained in the preceding paragraph. The rider carries the hands in the direction toward which he wishes to turn and displaces them only to the extent necessary. Eventually the turn should be made on the arc of a circle whose radius is 2 yards at the walk, 4 yards at the trot and 6 yards at the gallop.

The oblique by driver involves a change of direction of 45 degrees to the right or left, executed by each rider. The commands are: 1. RIDERS RIGHT (LEFT) OBLIQUE, 2. MARCH.

The movement is executed as in preceding paragraph except that each rider turns his horse through an arc of only 45°. To resume the original direction of march by similar means: 1. FORWARD, 2. MARCH.

Provision regarding work on the track: The rider is said to march to the right hand or to the left hand according as he has the right side toward the inner side of the track.

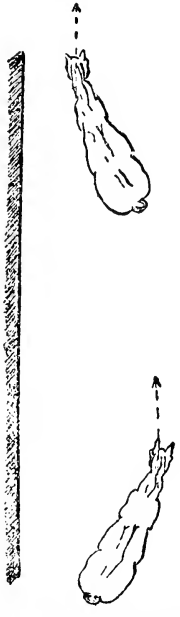
At the command TAKE THE TRACK TO THE RIGHT HAND, each rider directs his horse straight toward the track, and arriving there turns toward the right.

The riders are distributed over the whole circumference of the track. They endeavor to keep their horses collected and moving straight to the front, and to preserve a free and even gait.

The instructor observes that the riders maintain the gait ordered while turning at the corners and that they approach the corners closely at the walk and trot; he permits a larger radius at the gallop.

To give oral instruction to all the riders at the same time the instructor may command: RIDE IN. The riders moving at the gait at which they were riding, or at the designated gait, and by the shortest line, group themselves about the instructor. To resume the ride, the instructor commands: CLOSE ON (SUCH RIDER). The rider designated (by name) takes the track and a gait as indicated by the instructor. The other riders move by the shortest line and place themselves on the track one behind the other, with 4 feet distance from head to croup.

As soon as the collective instruction is sufficiently advanced the commands and methods indicated in the school of the squad may be employed to group the riders near the instructor and to cause them to take the track again.



A. HAUNCHES-IN, UNIFORM BEND FROM POLL TO CROUP.
B. HAUNCHES-OUT, UNIFORM BEND FROM POLL TO CROUP.

As soon as the riders understand the principles of controlling their horses the instructor frequently commands: RIDE AT WILL. The riders scatter out in the interior of the riding hall or rectangle or over a larger designated area out of doors, and riding at the gait ordered execute the exercises on their own initiative.

When riders meet each keeps to the right.

There should be much work on the track without regard to distance between riders in which the riders are absolutely independent of each other, the only obligation being to maintain the gait and to march to the hand directed when on the track. If the column becomes crowded individual riders are permitted to turn out at will and take the track at a convenient place on the opposite side. They should move straight across the hall, maintaining the gait.

The commands do not involve immediate compliance. Each rider conforms to them when his place on the track and the state of preparation of his horse puts him in proper position to execute steadily the

movement directed. Each should choose his ground so as to avoid interfering with his neighbors.

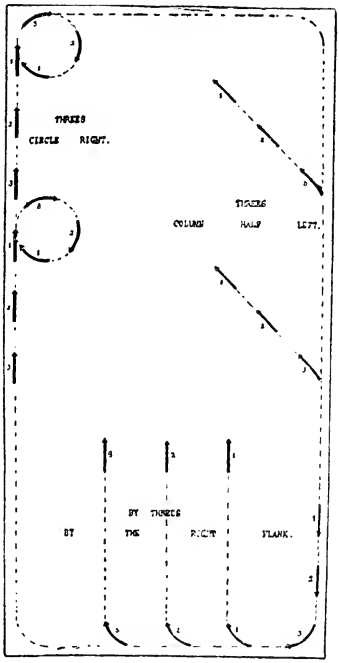
Marching upon fixed points and upon a designated objective: The instructor also exercises the riders in riding horses at a designated gait upon a distant object. This exercise is begun as soon as possible and is continued during the whole course of instruction and combined progressively with the jumping of obstacles and the use of arms. To assist in the earlier phrases of this instruction distinctive marks are placed on the walls of the riding hall or outside the rectangle to serve as points of direction. Proficiency in this exercise is essential to the satisfactory execution of collective movements, and instruction in it must be correspondingly thorough.

Circling: The riders being on the track at the command IN CIRCLE the leader, followed by the other drivers rides on a circle between two tracks, radius 6 yards.

At the command TAKE THE TRACK, the leader takes the track to the hand toward which he is marching, and is followed by the other riders.

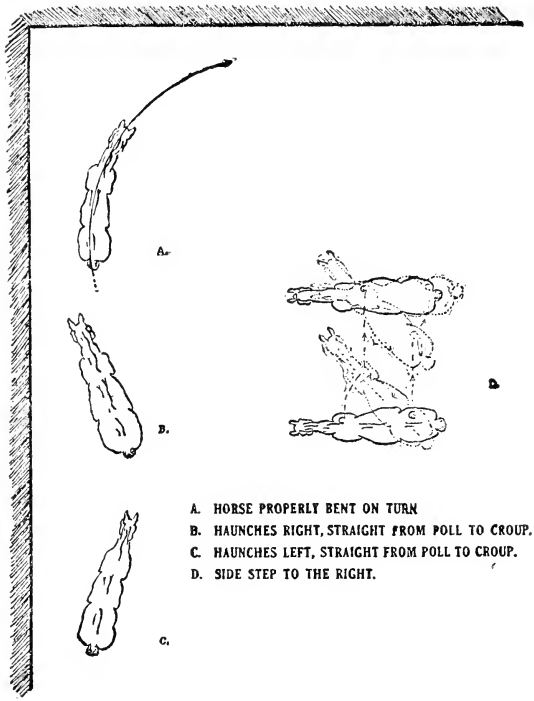
BY THREES—BY THE RIGHT (LEFT) FLANK

The riders being in column on the track, on the right hand. At the command of execution (March), the three riders at the head of the column each make an individual turn to the right of ninety degrees; they then march on a straight line across the hall; succeeding threes continue the march and turn to the right on the same ground traversed by the corresponding numbers of the leading three. Upon reaching the individually turn to the right. far side of the hall the threes marching in column on the track to the right hand. In marching across the hall the riders exercise care to keep their alignment and to preserve the distances and intervals, number two of each three being the guide. While thus formed the instructor may cause all gaits. Satisfactory execution of this work requires that each rider shall keep his place exactly with reference to the others, and that the movements shall be executed with precision and unison.



Changes of gait are habitually made progressively, the walk being taken from the halt, the trot from the walk, the gallop from the trot, and vice versa. For instruction purposes and when necessary in service an increase or decrease of gait may be made more abruptly.

A change from the halt to the walk, from the walk to the trot, from the trot to the gallop, or vice versa, is to be understood when reference is made in these regulations to a change of gait of one degree.



A. HORSE PROPERLY BENT ON TURN
B. HAUNCHES RIGHT, STRAIGHT FROM POLL TO CROUP.
C. HAUNCHES LEFT, STRAIGHT FROM POLL TO CROUP.
D. SIDE STEP TO THE RIGHT.

To change hands: At the command CHANGE HANDS, each rider after having passed the corner and marched a horse length on the long side directs himself toward the diagonal corner so as to take the track to the opposite hand and at about two horse lengths from the corner. Pass those going in an opposite direction by keeping to the right.

Suppling exercises with the horse in motion: The exercises which have been haught at the halt are repeated at the different gaits, except as indicated.

To put the squad in march the instructor designates a driver to act as leader and causes him to take the track; he then causes the riders to take their places in column of riders behind the leader.

The instructor limits his explanations to the essential principles for putting the horse in motion and stopping him.

The riders are restricted to letting their horses follow those in front.

The instructor is especially careful that the movement of one part of the body does not react on any other part; for example, that an exercise of the right arm does not disturb the left arm nor the position of loins or legs.

Any movement is proper which engages the driver's attention and leads him to forget that he is on horseback and thereby brings about relaxation.

The end desired is attained by the frequency and variety of the exercises; the instructor must carefully avoid prolonging a movement to weariness, which inevitably brings on rigidity.

He must likewise avoid any movement that would result in lifting the buttocks from the saddle or in sinking the loins and hollowing the back.

At first the gait should be the walk or the slow trot. The 8 mile trot should not be used. The gallop should be employed very early in the instruction; it is the most favorable gait for suppling the loins.

As soon as the riders have acquired a fair security of seat at the trot and have grown accustomed to a fast gait the instructor begins to train them at the first gallop. The first lessons are given on a large circle so that the horses will have less tendency to pull. The riders retain their stirrups until they have gained confidence. The instructor causes them to abandon the stirrups when he believes that sufficient progress has been made.

As soon as the instructor causes the rider to take the reins he teaches him to keep touch with the mouth of the horse, while leaving the horse the free use of his neck. To do this it is necessary for the rider to follow with his hands the movements of the horse's neck.

The cadence at the increased gaits is easy to follow with the reins lightly held. In a short time the hand follows instinctively the movement of the neck.

Constant effort should be made to overcome stiffness of the arms and shoulders, which is the usual cause for the heavy hand.

GAITS

Three gaits are recognized in military equitation, drill, and maneuver, as follows: The WALK, TROT and GALLOP. These, however, are subject to different rates of speed. Those usually considered are as follows:

Slow walk: 2½ to 3 miles per hour, 66 to 88 yards per minute.

Walk (regulation): 4 miles per hour, 118 yards per minute.

Walk out: 4 to 5 miles per hour, 118 to 147 yards per minute.

Slow trot (a jog trot): 6 to 6½ miles per hour, 176 to 190 yards per minute.

Trot (regulation): 8 miles per hour, 235 yards per minute.

Trot out: 10 miles per hour, 295 yards per minute.

Extended trot: 12 miles per hour, 352 yards per minute.

Slow gallop: 9 to 10 miles per hour, 265 to 295 yards per minute.

Gallop (regulation): 12 miles per hour, 352 yards per minute.

Extended gallop: 16 miles per hour, 470 yards per minute.

The Slow Trot and Slow Gallop are the gaits most used in the early training for riders. They are especially valuable for riding without reins or stirrups and for the suppling exercises. The Slow Walk is used when marching with dismounted troops; it is used but little in training the rider.

INCREASING AND DECREASING THE PACE

To increase or decrease the speed of the gait, the rider employs the means prescribed for passing from the halt to the walk or from the walk to the halt to the extent necessary to obtain the desired result.

The horse, in extending the walk, increases the amplitude of the movement of the head and neck as he increases the cadence of his step.

The rider aids these movements by yielding the hand and giving the horse greater freedom of movement. He maintains contact with the bit so that he can exercise a gradual restraining influence with the direct reins when he feels the horse is about to spring into the trot.

To decrease the pace at a walk the rider makes use of the same aids as in coming to the halt. The step is shortened and the cadence decreased.

To increase or decrease the pace at the trot the same means are used. The exercises in increasing and decreasing the pace afford excellent practice for the rider in the use of the aids and good training for the horse in obeying them: but the rider out of ranks should use only the regulation gaits.

Changes of pace are executed at the cautions:
1. **Slow Walk**; 1. **Slow Trot**; 1. **Slow Gallop**; 1. **Walk Out**; 1. **Trot Out**; 1. **Extended Gallop**. 2. **March.** The normal pace is taken at the commands: 1. **Walk,** 1. **Trot,** 1. **Gallop.** 2. **March.**

At the regulation or maneuver gaits experience has shown that the speed is such as, on the average, to render the horse capable of longer sustained action without waste of energy, and that his endurance and useful work are accordingly greater than at the other speeds. Extended speed at any gait rapidly exhausts a horse and should therefore be avoided, while a slow speed at any gait does not work the horse to his limit of greatest efficiency. The regulation gaits are therefore used habitually when riding out of doors. The work in the extended area during the third period must be such as thoroughly to impress the cadence or tempo of these gaits on the minds of the men.

THE WALK

The walk is a gait in which the feet are lifted in succession and put down in the order of their lifting. If the right front foot begins the gait, the other feet are lifted in the following order: Left hind, left front, right hind. The walk should be free, easy, and elastic.

THE TROT

The trot is a gait at which the horse springs from one diagonally disposed pair of feet to the other: between the beats all the feet are in the air. The right front and hind left are called the right diagonal, the left front and the right hind are the left diagonal.

THE GALLOP

The gallop is the most rapid of gaits. It must not be used unnecessarily over long distances, particulary on hard roads, where the concussion on the feet is severe, nor when the saddle is packed. However, when the rapidity of the normal trot is not sufficient, the rider, when out alone, should take the gallop preference to increasing the speed of the trot.

The horse is said to lead right when the feet on the right side are more advanced than the corresponding feet on the left side. When feet are advanced in the inverse order the horse is said to lead left.

The gallop is marked by three beats and a period of suspension. If the horse be leading right, the first beat is marked by the left hind foot, and the third by the placing of the right front foot. The horse then leaps into the air from, and advances, the right front foot. In leading left the beats are right hind, left hind, and right front, left front.

A horse gallops true when he leads right in turning to the right, and leads left turning to the left.

He gallops false when he leads left in turning to the right, or conversely. The gallop should be begun on the circles, because the feet are then favorably placed for taking and maintaining the proper lead. The horses thus start off more calmly and the rider is enabled to regulate the pace by describing a circle of greater or less circumference.

As soon as the horse breaks into the gallop the rider should move in cadence with his horse. The back and legs unite in the rhythm of the gait, the hands accompany gently and without exaggeration the movements of the head and back.

During the gallop the command at ease is frequently given. The riders execute the suppling exercises which have been indicated as necessary in each case: they abandon themselves completely to the motion of the horse and thus acquire ease and flexibility. Prolonged periods at the gallop on calm and free moving horses are most favorable for easily obtaining this result.

The gallop should be begun on a circle because the horse thus starts off more calmly and the driver is enabled to regulate the pace by describing a circle of greater or less radius.

THE FALSE GALLOP

This exercise, of so much value in training remounts, and so constantly used in drill and service, should be practiced from the beginning on wide turns at first, and at last on serpentines, large circles and figures of eight of small dimensions. The false gallop is maintained by the same aids as produce the gallop with that lead.

If the gallop becomes disunited the rider must return to the trot and then again to the gallop true.

WORK ON VARIED GROUND

The work on varied ground has for its object the training of the men in riding their horses over any terrain, in making them familiar with difficult routes and crossings which they might encounter in campaign, and in regulating their gaits so as to husband the strength of their horses.

The instructor conducts his class across fields, through woods, and in general over the most varied terrain at his disposal.

He may divide the squad into small groups, each under non-commissioned officer, who conducts the group and regulates the gait over a route designated by the instructor.

The instructor inculcates in the drivers the principles which govern them when left to their own devices, such as the following:

On leaving the stable move at a walk for at least a mile in order to get the blood circulating in the horse's legs.

Vary the gait, but in training do not depart from the regulation speed prescribed for each gait.

Choose for the rapid gaits nearly level ground, going uphill; rapidity necessitates great effort on the part of the horse, but it is better than going downhill at a rapid gait which exposes him to injuries from the saddles and equipment, and is hard on the forelegs.

Extend progressively the periods at the faster gaits.

Regulate the periods spent at the intermediate gaits by the degree of rapidity with which the total distance must be covered.

Seek under all circumstances, good and, if possible, soft footing to save the horse's legs, and keep him, therefore, along the edge of metalled roads rather than on them.

Choose hard ground when smooth and level in preference to ground that is heavy, uneven, or sloping to one side, as, for instance, the sides of a high crowned metalled road.

Finish at a walk, more or less prolonged as the journey has been more or less long and trying, so that the horse shall always come in with a dry skin and normal respiration.

To these general principles, which must be practically demonstrated, the instructor adds such counsel as his experience dictates and such remarks as the nature and state of the terrain may render advisable.

The following rules cover the majority of circumstances that will arise:

To check a horse who is running out of hand, never exert steady pressure on bars of mouth, but intermittently "give and take" with leg and rein aids, leaning weight back, and turn horse in circle.

To ascend a steep slope, yield the hand as soon as the horse has been given his direction, carry forward the upper part of the body, and seize a lock of the mane near the middle of the neck under the reins.

To descend a steep slope let the reins slip through the hand sufficiently to give the horse complete liberty of action. If necessary, grasp the cantle of the saddle with the right hand and maintain the body in a position about perpendicular to the horses back.

Riders should be practiced in crossing a V-shaped ditch, about 18 feet wide and 10 feet deep, so that they go down one side and up the other. This is a valuable exercise, as no horse will face the opposite bank unless his head is left free.

Long steep slopes should be ascended slowly and quietly and when the top is reached the rider should dismount and permit his horse to blow.

All slopes should be descended directly; short, steep slopes should be ascended directly; long slopes may be ascended obliquely if the surface is not slippery.

In difficult ground the horse should be allowed to take the initiative; his instincts are a more reliable guide than the aids of the rider.

If marshy ground must be crossed, go slowly and avoid following in trace. If the horse goes down and becomes nervous and begins to plunge, dismount and lead.

The driver must learn to seek every means to spare his horse, especially when carrying a pack. In particularly difficult places dismount and lead.

The instructor gives the men much practice in riding across ditches and ravines, such as might be encountered in draft. He impresses them with the necessity of confirming the horses in crossing such places willingly, quietly, with even gait, and with no tendency to jump.

In riding over broken ground or across country, let your horse have rein so that they can use their head as a counter poise in a natural manner. In jumping never allow reins to jerk bit in horse's mouth.

Advantage is taken of the work during this period to teach the men how to cover the distances at the different rates of speed as employed by couriers and artillery scouts and agents. The rates of speed prescribed for this duty are ordinary, about 5 miles per hour; rapid, 7 to 8 miles per hour; urgent, the highest speed consistent with certainty of arrival at destination. Then men must be taught that the condition of the horse, the weather, and the state of roads may make it necessary to diverge considerably from the speed ordered. The messenger must get his horse through. In peace this must be done without injury to the animal; in war it may be necessary to do it at the cost of fatally exhausting him.

The messenger rides the regulation gaits unless these are manifestly unsuited to his horse, in which case he rides at each gait, the tempo best suited to reserve the animal's strength.

The following variations are suggested as affording guides by which the various rates of speed may be ridden. In each case it is assumed that the horse is in condition, and that he has been warmed up by gentle exercise, and is therefore ready for increased effort.

Ordinary: Alternate 5 minute walk periods, and rest, with 10 minute trot periods, and rest for the last 10 minutes in each hour. This, at the regulation gaits, gives 5 1/3 miles per hour and with alternate walk and trot periods of these lengths, the number of travel (minutes) always closely approximates the number of tenths of miles covered. Thus after riding 18 minutes the messenger has covered 1.8 miles.

Rapid: Alternate 5 minute walks with 10 minute gallop periods, and rest for the last 10 minutes each hour. This at the regulation gaits, gives 7 1/3 miles per hour.

Urgent: Combine walk, trot, gallop, or extended gallop periods as the particular case demands and as seem best adapted to save the horse. The longer the distance to be covered, the less must be the rate in miles per hour. Thus a horse of good breeding and in hard condition may be expected to cover 15 miles in one hour, while if the distance to be traversed is 30 miles, he should be given at least four hours if injury is to be avoided.

Similarly, the horse should not be pushed to his extreme speed unless the distance is very short. Whether the speed be ordinary, rapid, or urgent, the messenger at all halts must dismount and slightly loosen the girth to relieve the pressure from the back and to facilitate easier and deeper breathing. Unless scouring, the animal should be permitted to graze.

Frequently when trot periods and always when gallop periods are used the driver should make it a rule to dismount and lead his horses during the walk periods. Gallop periods or trot periods when the rate is ordinary or rapid, should not, even for a horse in hard condition, be prolonged for more than 25 minutes without alternating with a walk period. When using the posting trot it is of little or no advantage to change diagonals during a trot period. It is easier on the horse to wait until the next trot period, and then to post on the other diagonal. The messenger must endeavor to water his horse with sufficient frequency to preclude his taking at any one time a big heavy drink. Whenever it is possible or practicable to do so, the messenger should leave behind unnecessary articles of clothing or equipment so as to lighten to the utmost the load which his horse will have to carry. In many cases, however, it may be necessary for him to ride with full pack and also to carry food for himself and grain for his horse. The rider himself must be physically fit. A tired rider fatigues his horse very much. Distance rides, which tax to the utmost the endurance of both horse and driver, are the supreme and final tests of horsemanship.

POSTING

Drivers must be taught to post equally on left or right shoulder when at the trot to prevent wear and tear on horse and man.

Posting, or rising to the trot, greatly diminishes the concussion produced by the driver's weight on the back and joints of the horse. It also makes breathing easier and facilitates the impulsion from the engagement of the hind feet. It is also less fatiguing to the driver than sitting down to the trot. Posting is habitually employed by the Field Artillery driver and should be learned during this period of the instruction.

It is executed as follows: The horse moving at a trot, rider inclines the upper part of his body forward, then supporting himself on the stirrups while maintaining the grip of the knees, he rises under the impulsion of the horse, maintaining his position detached from the saddle while the succeeding impulse is produced, again sits down in the saddle shoving his buttocks forward in doing so, and continues in this way, always avoiding every other impulse.

At the beginning the mechanism of posting is made easier to the driver by causing him to stroke the horse's neck or to grasp a lock of the mane or the pommel with either hand, thus determining the forward inclination of the body.

Its proper execution requires that the seat shall be raised moderately; that contact with the saddle shall be resumed gently and without shock; that the full support of the stirrup is obtained, while keeping the lower leg steady; that the ankle joint shall be supple; and that the heel shall be kept lower than the toe. Above all, the driver must be supple in the loins and convex them backward.

CHANGING THE DIAGONAL IN POSTING

In posting the driver is said to post on the right diagonal when after rising he sits down in the saddle at the instant the right fore foot comes to the ground.

It is important to instruct the driver to post for a time on one diagonal and then change to the other, so that the horses legs will each perform the same amount of work and the chance of injury from the equipment will be reduced.

In the riding school the rider should always rise on the inside hind foot, because this foot, in response to the inner leg aid, is the only one that can properly place itself under the mass of the horse and support the weight during the change of direction in the corners: hence to insure automatically that the posting is done as much on one diagonal as on the other, the riders may be required to post on the left diagonal when riding to the left.

The instructor occasionally requires each driver to inform him on which diagonal he is posting.

To teach the driver to change the diagonal the instructor directs him to diminish the weight borne on the stirrups and to retain his seat in the saddle for two successive beats of the horse's feet instead of one, then to rise as before.

The driver will then find himself posting on the diagonal opposite to the one on which he was posting before.

JUMPING OBSTACLES

The jump is made as follows: On arriving near the obstacle grasp the horse with the legs, keeping the body upright, the hands low and passive; at the moment the horse rises bend the upper part of the body forward at the waist, the buttocks remaining in the saddle without displacing the hands.

During this work the suppling exercises may be practiced with excellent results.

In general, the horse should jump at the gait at which he approaches the obstacle.

On approaching the obstacle the rider selects the point at which he wishes to jump and conducts his horse straight toward it, the reins separated, the legs close to maintain the forward movement.

If horse hesitates on approaching the obstacle, anticipate his resistance by stimulating him vigorously with the legs.

Jumping the Trail

If he avoids it, quiet him, and place him directly in front of it, and urge him with the legs.

If he stops, ride back and put him at it again.

The reins should be long but taut before, during, and after the jump.

Among the principle errors in jumping, the following are mentioned:

(a) A strong pull on the reins about ten yards in front of the hurdle.
(b) Lower legs to the front, or not close in to the saddle.
(c) Balk stiff and weight of body on cantle of saddle.
(d) Standing in stirrups.
(e) Legs flying loose at the moment the horse lands.
(f) Bending the body forward at the hips and pivoting at the knees.
(g) Reins too short, and stiffness in shoulders, arms and wrists.

In all riding instruction, watch candidates to see that they keep their knees down, and keep their proper seat. At the slow trot try to make them overcome the tendency most riders have of clinging with their lower legs and not with their thighs. The lower leg, at the slow trot, should be loose, the toes hanging naturally (when without stirrups).

Try above all to get men loose in the waist so they can go with the horse without disturbing their seat. In the early instruction, work constantly towards settling men down in the saddle, get their knees down and their waists loose.

PART III

DRIVING

The Driver.
Principles of Draft.
Mounted Instruction.
Hints to Drivers.

PRELIMINARY FOR THE BATTERY MOUNTED

To prepare recruits for their work with teams it is advantageous during this period frequently to form the section in a number of squads each composed of six or eight men in column of twos simulating six or eight horse teams. Such a formation is favorable for teaching the men the evolutions encountered in the battery mounted and for teaching them to obey signals and bugle calls. It is especially favorable for teaching the relative position of the various horses of a team during a turn such as is involved in an about or a movement by the flank of an Artillery carriage.

THE DRIVER

Section 1.—Object and Sequence of the instruction.

The object of this instruction is the training of the Field Artillery driver:

(a) In harnessing and unharnessing and in the proper fitting cleaning and care of harness.

(b) In managing and maneuvering a single pair.

(c) In managing and maneuvering the different pairs of a team in draft. In the instruction of recruits quiet, well-trained horses will be used.

In order to secure and maintain interest, and in order that the work may completely cover the subject it is of importance that the instructor adhere to a systematic and progressive sequence of instruction.

In all driver instruction, whether it pertains to the training of recruits or to the specialization of men as drivers, work in equitation should be continued as a part of the daily program. This instruction may properly be a review of that outlined under *The Soldier Mounted*, or it may be more advanced, as indicated in paragraph 210, F. A. D. R.

The following subjects arranged in a proper sequence will be covered in the training of the driver.

PRELIMINARY INSTRUCTION

1. Terms.
2. Nomenclature of harness.
3. Disposition of harness.
4. Harnessing and unharnessing.
5. Adjustment and fitting of harness.

TERMS

The horses assigned to a single driver are called a pair; the horse on the left side is called the near horse; the other the off horse. The driver rides the near horse.

The pairs assigned to the traction of a single carriage are termed collectively a team.

SPECIAL DUTY OF DRIVERS

DISPOSITION OF THE HARNESS

In garrison: The harness is arranged on two pegs on the heel posts, as follows:

On the upper peg: Both bridles hung from the peg by their headstalls; the traces of both horses hung over the peg close to the heel post; the off saddle with its attachments over the seat; the blanket across the saddle; both collars over the blanket.

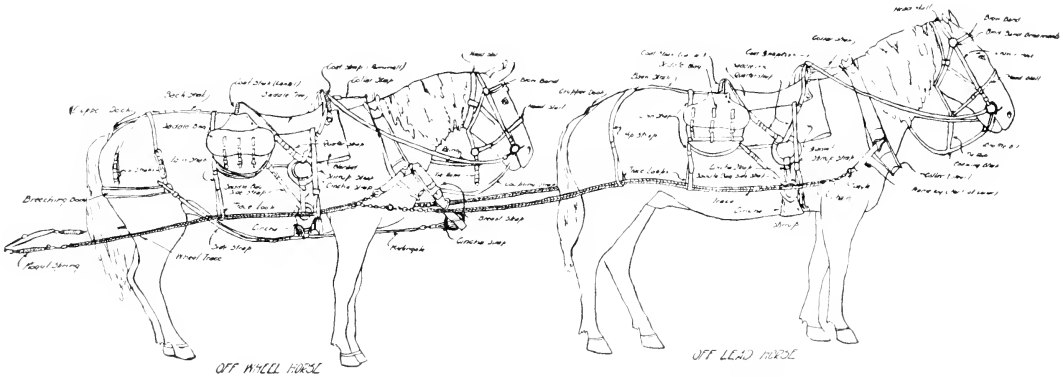
On the lower peg: The near saddle and blanket arranged as prescribed for the off harness.

The neck yoke, with martingales attached, is hung from a spike driven into the side of the heel post.

To prevent injury to the off saddle when the blankets are out drying, the sack is put over the harness and the collars are then placed across the sack.

If the harness pegs are on the left heel post as the driver faces the manger, the saddles are placed with the cantles against the heel post; if the pegs are on the other side of the stall, the pommels are placed against the heel post.

In the field: The pole prop is placed under the end of the pole. The wheel traces are detached from the collars only and laid back on the footboards. The remainder of the harness of the near-wheel horse is placed on the pole next to the double-tree, arranged as follows: The saddle with its attachments over it, the blanket across the saddle, the bridle and collar over the blanket. The remainder of the off wheel harness, is placed next, then the swing, and lead harness in the same order. The traces of the swing and lead harness, folded once, are placed across the saddle. The neck yoke is placed on the footboard.



The Nomenclature of Artillery Harness, Component Part

In entraining: The harness belonging to a single pair is placed in a harness sack in the following order: Neck yoke; collars, one in each end of the sack; bridles, one inside of each collar; traces looped around and outside of the collars; blankets, one on each collar; saddles, one on each blanket. The harness sack is securely tied and is tagged to show (1) the pair in the team, (2) the carriage, (3) the section.

When harness sacks are not taken, each horse's harness may be packed in a grain sack and appropriately tagged.

THE ARTILLERY HARNESS

The component parts of the artillery harness are given in the table below.

Component parts	Wheel		Lead		Property classification	
	Near horse	Off horse	Near horse	Off horse	Class	Section
Backstrap and crupper, complete	.....	.....	1	1	IV	
Consisting of—						
Body and hip straps	.....	.....	1	1		
Crupper dock	.....	.....	1	1		
Loin strap	.....	.....	1	1		
Trace loops	.....	.....	4	4		
Backstrap hook	.....	.....	1	1		
Belly band, complete	1	1	.....	.....		
Consisting of—						
Belly band	1	1	.....	.....		
Holding down strap	2	2	.....	.....		
Holding down strap hook	2	2	.....	.....		
Breast strap, complete	1	1	.....	.....		
Consisting of—						
Breast strap	1	1	.....	.....		
Breast-strap hooks	2	2	.....	.....		
Breeching, complete	1	1	.....	.....		
Consisting of—						
Backstrap (1) and hip straps (4)	1	1	.....	.....		
Body	1	1	.....	.....		
Crupper dock	1	1	.....	.....		
Backstrap hook	1	1	.....	.....		
Side strap hooks	2	2	.....	.....		
Loin strap	1	1	.....	.....		
Side straps	2	2	.....	.....		
Trace loops	2	2	.....	.....		
Bridle complete (old model)	1	1	1	1		
Consisting of—						
Brow band	1	1	1	1		
Brow-band ornaments	2	2	2	2		
Check pieces	2	2	2	2		
Coupling strap	.....	1	.....	1		
Connecting strap	.....	1	.....	1		
Crownpiece	1	1	1	1		
Snaffle bit*	1	1	1	1		
Reins (pairs)	1	1	1	1		
Throat-latch	1	1	1	1		
Bridle, complete (new model	1	1	1	1		
Consisting of—						
Brow band						
Brow-band ornaments	2	2	2	2		
Crown piece	1	1	1	1		
Coupling strap	.....	1	.....	1		
Snaffle bit*	1	1	1	1		
Reins	1	1	1	1		
Crown piece strap	1	1	1	1		
Collar, steel	1	1	1	1		
Hame tug (a part of the collar)	.....	.....	.....	.....		
Collar strap	1	1	1	1		
Halter, complete	1	1	1	1		

* Twenty curb bits with chains are issued for use in place of snaffle bits on fractious draft horses.

Component parts	Wheel		Lead		Property classification	
	Near horse	Off horse	Near horse	Off horse	Class	Section
Consisting of—						
Crown strap	1	1	1	1		
Cheek piece	2	2	2	2		
Crown chape	1	1	1	1		
Nose band	1	1	1	1		
Chin strap	1	1	1	1		
Throat band	1	1	1	1		
Throat strap	1	1	1	1		
Halter square	2	2	2	2		
Tie rope	1	1	1	1		
Martingale, complete	1	1	.....	.....		
Consisting of—						
Martingale	1	1	.....	.....		
Cincha strap	1	1	.....	.....		
Saddle, complete	1	1	1	1		
Consisting of—						
Cinchas, with reinforces and loops	1	1	.....	.....		
Cinchas, without reinforces and loops	.....	.....	1	1		
Lead-rein roller and strap	.....	1	.....	1		
Quarter straps, including rings, safes, and cincha straps (side)	2	2	2	2		
Quarter strap, cantle	1	1	1	1		
Quarter strap, pommel	1	1	1	1		
Cincha strap, a part of the saddle quarter strap	2	2	2	2		
Coat strap, 33-inch (pommel)	3	2	3	2		
Coat strap, 45-inch (cantle)	1	1	1	1		
Coat strap, 60-inch	.....	2	.....	2		
Saddletree leather-covered	1	1	1	1		
Stirrups (nickel steel)	2	2	2	2		
Stirrup straps	2	2	2	2		
Saddlebags, pairs	.....	1	.....	1		
Saddlebag side straps	.....	2	.....	2	IV	8
Traces, lead, model of 1908	.....	.....	2	2		
Consisting of—						
1 trace body	.....	.....	.....	.....		
1 trace cover	.....	.....	.....	.....		
3 links	.....	.....	.....	.....		
1 chain	.....	.....	.....	.....		
1 toggle	.....	.....	.....	.....		
2 sockets	.....	.....	.....	.....		
2 cones	.....	.....	.....	.....		
2 filler pieces	.....	.....	.....	.....		
Traces, wheel, model of 1908	2	2	.....	.....		
Consisting of—						
1 trace body	.....	.....	.....	.....		
1 trace cover	.....	.....	.....	.....		
1 ring	.....	.....	.....	.....		
2 sockets	.....	.....	.....	.....		
2 links	.....	.....	.....	.....		
2 chains	.....	.....	.....	.....		
2 toggles	.....	.....	.....	.....		
2 cones	.....	.....	.....	.....		
2 filler pieces	.....	.....	.....	.....		
Mogul spring, assembled	.....	.....	.....	.....		
1 loop hook	.....	.....	.....	.....		
1 ring	.....	.....	.....	.....		
1 locking strap	.....	.....	.....	.....		
Trace chain, body	.....	.....	2	2		
Whip	1	.....	1	.....		
Sweat leathers	2	.....	2	.....		
Blanket*	1	1	1	1		

* In submitting and in filling requisitions, unless it is specifically stated that saddle blankets are wanted, they will not be included.

HARNESSING AND UNHARNESSING

A good driver should be able to harness and unharness when blindfolded.

TO HARNESS BY DETAIL IN THE FIELD

Note—(Details will be completed on off horse first. The following order will be strictly adhered to in harnessing and unharnessing. After the completion of each detail candidates will stand to heel).

By Detail Harness

1. **Collar:** Breast collar (horse tied to wheels) untie halter rope, slip collar over horse's head. Do not try to unbuckle any of the straps on the collar. If wheel collar, slip both neck yoke, neck strap and body of collar well up under horse's throat. This will allow collar to slide on easily. When collar is on, tie halter rope to wheel.

2. **Bridle:** Take crown piece in left hand, end of reins in right hand, slip reins over horse's head with the right hand and place gently on his neck; shift crown piece to right hand. Place left hand from rear on bit, between the check pieces so as to spread the bit apart, thumb to left, forefinger or middle finger to right, back of hand down. Gently insert bit in horse's mouth. (Do not force it under any circumstances). If horse does not open mouth, insert thumb in his mouth and open it for him. Buckle throat-latch, being sure that it is loose.

3. **Saddle:** Take blanket of the off horse grasping at center of double folded edge with left hand, forefinger between folds, thumb on top pointing to right, right hand at other end of blanket, thumb on top point to left, forefinger underneath, lifting blanket from saddle hold out in front, and examine blanket to see that you have it in middle. Bottom edges should coincide. With fingers in same position toss blanket over right shoulder, one edge falling over shoulder and arm to the rear, other edge remaining to front. Place blanket on horse so that forefinger on left hand is on withers and forefinger of right hand on center of back. This insures that center of blanket is in center of horse's back. Slide to rear several times to smooth out hair, last movement to rear bringing fold of blanket on withers. Smooth out all wrinkles. Grasp pommel of saddle with left hand, cantle with right hand, approach horse from left rear, lift saddle well up and place gently on horse's back, being careful that none of harness remains between the saddle and blanket. Fasten collar straps (this is very important). Pass to rear putting back strap and crupper in place, fasten crupper, being careful to prevent hair getting caught between crupper and dock. Pass to off side and let down cincha and off stirrup. Straighten out saddle and blanket. Pass to near side and pass flat of hand between shoulder blade and sidebar so that there is a distance of three fingers between point of shoulder blade and end of sidebar. Run left hand back up down withers to raise blanket slightly on the pommel arch, to prevent wither pressure. Let down cincha strap. Fasten cincha in manner prescribed in Par. 228, D. & S. R. F. A. Let down the near stirrup.

Unharnessing in the Field

(Figures 3 to 26 inc. from F. A. C. O. T. S. *Black Book*, Camp Taylor, Ky.)

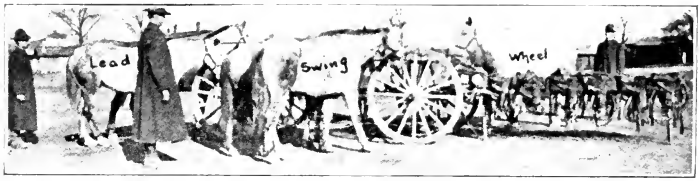


Figure 11. Showing the pairs of a team, unharnessed, tied on the wheels.

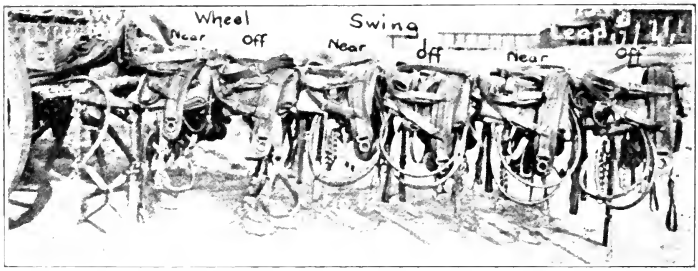


Figure 12. Off side of pole showing arrangement of harness when unharnessing in the field. Breast collars are placed bearing surface down, as shown, after the harness has been cleaned and inspected.

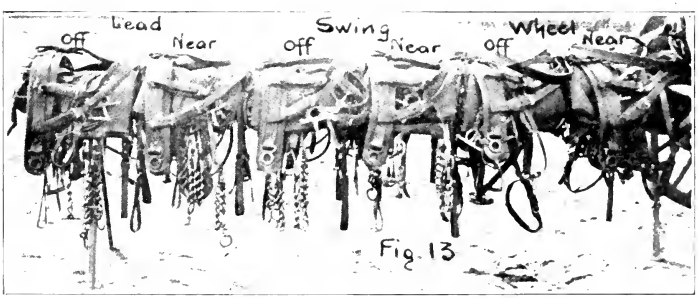


Figure 13. Same as figure 12, showing near side. Note that all trace chains and bits hang on the near side for the sake of uniformity.

4. **Traces:** As prescribed in Par. 411, D. & S. R. F. A., be sure that the toggles are passed through holding up and holding down straps, if any.

5. **Yoke:** This command should follow immediately after TRACES, so that the wheel driver and other drivers can all be working at the same time. Executed as prescribed in Par. 411, D. & S. R. F. A.

6. **Couple:** Executed as prescribed in Par. 411, D. & S. R. F. A.

7. **Teams to Carriages Hitch and Hook:** Pairs are led to their proper place in the team, wheel driver causing his off horse to step over the pole so that he may turn his pair in place and not have to back them. Wheel driver passing around to rear between the pole and his off horse engages pole with neck yoke and hitches as prescribed in Par. 436, D. & S. R. F. A.

Lead and swing drivers, as soon as wheel driver has finished any part of his operations, commence to hook traces and hook as prescribed in Par. 433, D. & S. R. F. A. When finished they all **Stand to Horse.**

Reference Par. 411, 412, 413, 414, 415, D. & S. R. F. A.

UNHARNESSING IN THE FIELD

By Detail Unharness

1. **Drivers Unhook, Unhitch, and Tie on the Wheels:** Lead and swing drivers unhook as prescribed in Par. 434, D. & S. R. F. A.; Wheel drivers unhitch as prescribed in Par. 438, D. & S. R. F. A. All drivers then tie on wheels as prescribed in Par. 415, D. & S. R. F. A.

2. **Uncouple:** Executed as prescribed in Par. 413, D. & S. R. F. A.

3. **Unyoke:** As prescribed in Par. 413, D. & S. R. F. A. Caution men to unhook sidestrap from martingale D. ring; and not to untie martingale cincha strap from neck yoke.

4. **Traces Off:** As prescribed in Par. 414, D. & S. R. F. A., with the exception that traces will be laid aside on some part of carriage temporarily until saddle is placed on pole. Have men carefully lift traces off the horses so as not to hit horse with chain or toggles. This command comes immediately after UNYOKE so that lead, swing and wheel drivers can all be working at same time.

5. **Unsaddle:** Place near stirrup in saddle. Loosen cincha strap and put cincha strap in saddle. Pass to off side, place cincha and off stirrup in saddle, passing around again to near side, unfasten crupper and place backstrap and crupper in the saddle, being sure that all parts of harness are in well enough to keep harness up off ground when saddle is placed on pole. Unhook the collar strap. (It is important to do this last).

Lift saddle well up and place on the pole, saddles being placed on pole from rear to front in the following order: Near wheel, off wheel, near swing, off swing, near lead, off lead. Near wheel is placed well back on double tree so as to allow plenty of room for other saddles. The pommels of all saddles will be towards the front of the pole. It is well to let sidebars overlap so as to keep saddle from falling off the pole. The traces are then placed over saddle, toggles and chains on left or near side. The blanket is next removed with the hands in the same

position as when putting the blankets on. See that you have the blanket in the middle; place blanket over saddle, folded edges to front of pole, double folded edge to the right or off side.

6. **Unbridle:** Unfasten throat-latch, take bight of reins and crown piece in right hand. Slip bridle over horse's head steadying the bit with the left hand, so that it will not hit against the horse's teeth. Fold over bridle reins. Place bridle over blanket, bit on left or near side.

Breast Collar: Slip over horse's head, and place over blanket, bearing surface up.

Harnessing and unharnessing in garrison is done in a similar manner to harnessing and unharnessing in the field except that order is; By Detail Harness. 1. Collar. 2. Saddle. 3. Traces. 4. Yoke. (Given immediately after Traces). 5. Bridle. 6. Couple. In Unharnessing. 1. Uncouple. 2. Unbridle. 3. Unyoke. 4. Traces off, (same time as Unyoke). 5. Unsaddle. 6. Collar off. The Harness is disposed of as prescribed in Par. 407, D. & S. R. F. A.

Harness Fitting Tests

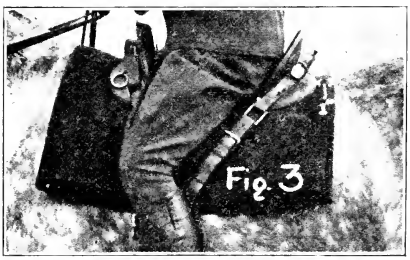


Figure 3. Upon saddling, place the blanket as shown. After a short ride, the blanket will work back to equal distribution in front and in rear of the saddle.

Figure 4. Place the saddle so that the front end of the side bars will be three fingers width in rear of the shoulder blade. This is enough clearance to allow free motion in the shoulder; placing the saddle farther back would put undue weight on the loins.

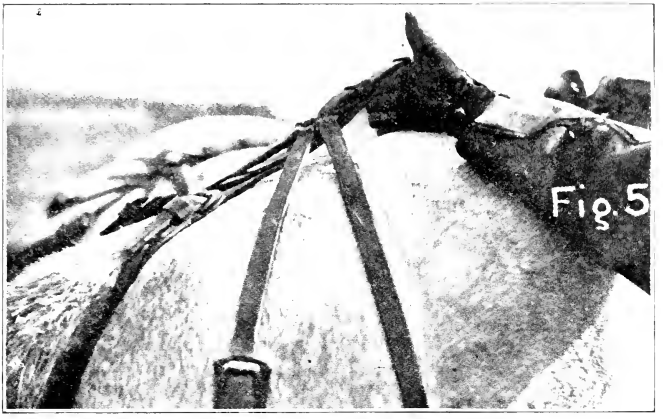


Figure 5. The backstrap should be put under slight tension when the hand is inserted between the croup and backstrap as shown.

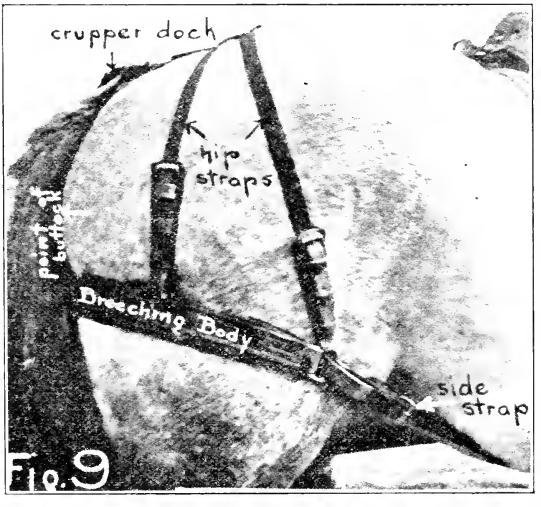


Figure 9. Showing a breeching which is correctly adjusted for height and slope. The back part is four inches below the point of the buttock (indicated by arrow); front ends, where side straps fasten, is at the height of the stifle.

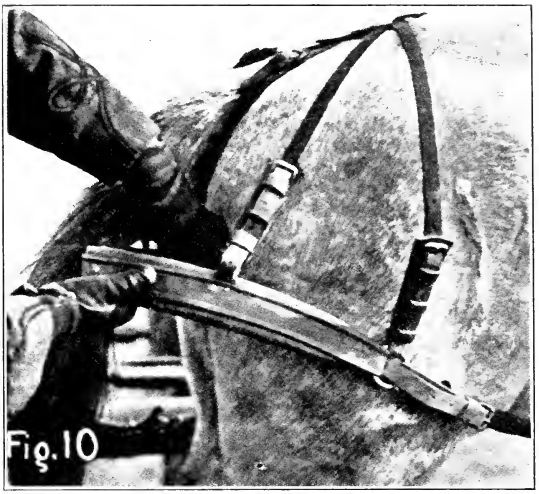


Figure 10. Test for martingale and sidestrap adjustment. Move the horse forward into the collar, pull the breeching body to the rear as far as the sidestraps and martingale will permit. The clearance should just permit the hand spanned to be entered between the breeching body and the buttocks.

ADJUSTMENT AND FITTING OF HARNESS

Drivers will be thoroughly impressed with the importance of bestowing constant and unremitting attention on the adjustment and fitting of harness. They must learn early that a horse can not properly perform his work unless he is made comfortable in well-fitted harness. If the harness pinches, galls, or otherwise causes discomfort, his sole idea will be to escape from the annoyance or pain thereby occasioned him, and he will become fretful, nervous, and unsteady in his work. This will not only add to his own distress through a useless expenditure of strength and nervous energy, but by rendering the draft of the whole team unsteady it will needlessly increase the work and fatigue of the other horses.

ADJUSTING OF HARNESS

The importance of the proper adjustment of the artillery harness cannot be over-estimated. An artillery horse that cannot be used in draft, due to sore shoulders or neck, is of little value to the battery. The service is now receiving breast collars, and it is believed the breast collar will give satisfaction with the large number of inexperienced men

now in the field artillery. It also has the advantage of being able to be adjusted to a horse within a few seconds, while the steel collar required twenty minutes. A badly fitting steel collar could ruin a horse's shoulder in a few hours' hard draft, while the breast collar will probably cause less damage.

In all the adjustment of harness, bear in mind that any improperly adjusted part will worry the horse and thus tend to wear him out and cause loss of flesh.

ADJUSTMENT OF BREAST COLLAR

The breast collar should be adjusted as high as possible on the horse's chest without there being any tendency to choke him by pressing against the wind-pipe. This collar can be lowered or raised within narrow limits to relieve galls and sores that may occur on new horses when put in hard draft before the shoulder and breast have a chance to harden.

Taking it reasonably the BREAST COLLAR cannot be too high; if it is put on high to start with there is a much smaller chance of galling. This is much better than starting with it low and heightening it when you have got a gall.

COLLAR STRAP

No adjustment; should be loose. It is only there to prevent the collar from striking the horse behind the ears when he lowers his head.

BLANKET

The blanket should be carefully folded and examined to see that there are no wrinkles or bunches in it. It should be equally divided on both sides of the horse and placed far enough forward so that when the saddle is in place, about one inch projects in rear of the rear end of the side bars of the saddle. All blankets have a tendency to work to the rear, so that after a short distance is traveled, blankets placed in this position will soon be evenly distributed under the saddle.

It is of great importance to raise it well into the fork of the saddle. When the saddle is on the horse's back be certain that you can see daylight through from back of saddle to front.

Holding Up and Holding Down Straps

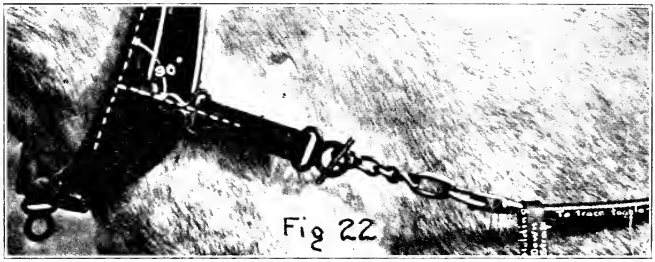


Figure 22. Holding down strap, used on lead and swing steel collar harness, to break the line of trace to the trace toggle of the horse in rear sufficiently to place the line of draft through the hame tug normal to the line of shoulder.

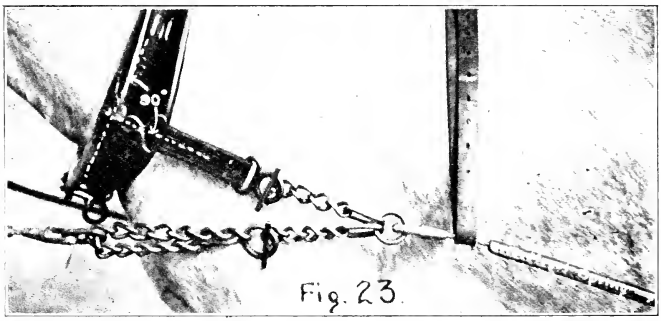


Figure 23. Holding up strap, used on wheel steel collar harness, to break the line of trace from hame tug to mogul spring, thus allowing the line of draft through the hame tug to be normal to the line of shoulder.

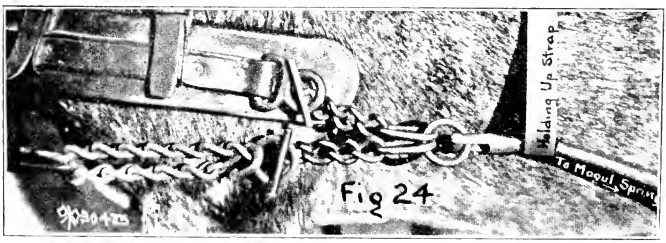


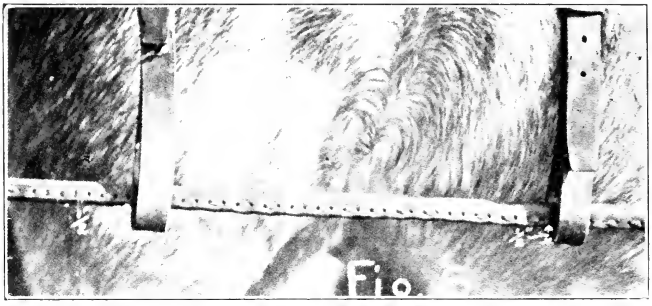
Figure 24. Holding up strap on wheel breast collar harness, the function of which is to make the pull on the collar horizontal.

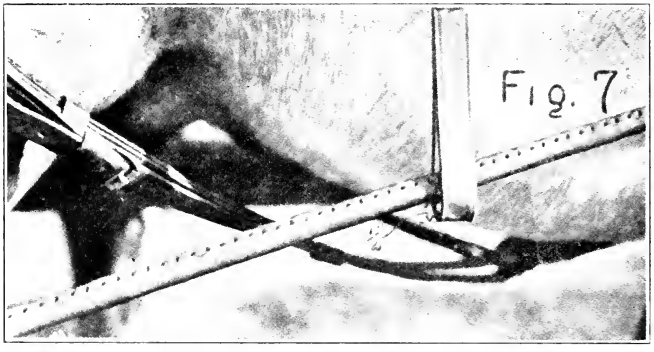
Backstrap: The backstrap should be adjusted so that when the saddle and crupper are in their proper places, the flat of the hand can be held vertically between the backbone and the backstrap.

Hip and Loin Straps for Lead and Swing: The hip and loin straps on the lead and swing horses should be adjusted so that when the horses are in draft the trace loops will hang about ½ inch below the traces. Their function is to support the traces when the animals are not in draft.

Breeching: The body strap of the breeching is adjusted so that the rear part (part below the tail) is about four inches below the point of the buttocks; the front part where the side straps fasten, is adjusted to hang at the height of the stifle. In other words, the body strap of the breeching slants down toward the front. The reason for this adjustment is so as to interfere as little as possible with the movement of the hind legs when the breeching comes in play. If the body strap is too low behind it gives a greater lever arm on the hind legs, and materially interferes with their movement. If too high most of the strain comes on the hip straps and not on the body strap. Also the side straps bear hard against the barrel of the horse and cause sores. If too low, the front hip strap is always slack and the body strap is entirely held up by the rear hip strap which is not strong enough to bear all the strain by itself.

Traces: The traces of the lead and swing allow of small changes of length, but as a general proposition it is believed best to have all traces shortened as much as possible. This is the proper adjustment in all but exceptional cases (horses that are very long) and has the advantage of not having, through carelessness, traces of different lengths placed on the same horse. The average horse in a team can exert a pull on the traces of about 250 pounds. If no holding down straps are used, the force on the traces is in a nearly horizontal direction, while the shoulder of the average horse makes an angle of about 16 degrees, to the vertical, giving an upward component of about 70 pounds which causes the collar to ride upward and the upward component being transferred to his belly through the hold down straps. This pull with properly fitted collar will choke any horse on a long hard pull. The direction of drop of the trace where it fastens to the collar should be perpendicular to the line of the shoulder (not to the front face of the collar). This is accomplished by putting the horse in draft and regulating the length of the "holding down strap" so that this direction is obtained. The wheel traces, due to the downward component of the pull of the swing traces, are pulling on the wheel collar at an angle below the perpendicular. This makes the wheel horses sustain considerable pressure on their necks when the team is in draft, besides the weight of the neck-yoke, collar and pole. The pressure due to the downward component of the pull of the swing and hind traces can be overcome as follows: Place an extra strap through the stirrup strap squares and the traces; put the team in draft and adjust the length of this strap so that the tugs of the wheel collars are pulling in a direction perpendicular to the slope of the





Figures 6 and 7. Traces should clear trace loops by one-half inch when horse is in draft.

Figure 8. The crupper dock is adjusted evenly on either side so that the rounded center part, and not the flat ends, will come under the dock. This will prevent chafing.

horse's shoulder. The extra pressure placed upon the saddle by this strap has never been known to produce sore backs and the pressure is only exerted when the lead and swing pairs are in draft. With breast collars no "holding down straps" are needed, and the direction of the pull of the trace takes care of itself.

Neck Yokes: In the wheel pair holding up straps are needed and should be so adjusted that the chain from the trace to the breast collar pulls in a horizontal direction. This prevents any downward pull on the neck and prevents the breaking down of the breast collar which otherwise will occur.

The breast straps should be so adjusted that the pole is carried horizontally. If too low, the pole has more tendency to thrash, if too high the martingale rubs between the forelegs and produces sores.

Side Straps: The length of the martingale and side straps should be such that when the wheelers are in draft and at an extended trot, the breeching does not interfere with the movement of the hind legs. It should be as tight as possible under these conditions. The position of the safe above the ring in the martingale must be so adjusted that when the horse is holding back, it will not come in contact with the loop on the cincha. This can be accomplished by the combined adjustment of the side straps and the martingale cincha strap. If not adjusted in this manner it will pull the girth forward and will also often catch in the cincha loop and cause constant pressure on the body strap of the breeching.

To test the FITTING OF BREECHING, stand behind the horse and pull the breeching so that the breast collar comes against the horse's shoulders as in draft; if you can get the breadth of your hand JUST round between the breeching and horse you will find the fitting for tightness just right.

Bridle, (Snaffle Bit): The crown piece and brow band should be long enough to prevent chafing of the ears. It is often found that with large headed horses these two pieces are not long enough and in that case new ones should be made. The cheek pieces should be so adjusted that the snaffle bit comes up in the corners of the horse's mouth, but does not wrinkle the lips. The throat-latch should always be loose so that there is no danger of choking the horse. The coupling rein should be long enough so that when turning to the right, when the off horse is ahead of the near horse, there will be no tendency to pull the head sideways. An even bearing on the horse's mouth with the LEADING REIN is important both for driver and for the comfort of the horse; let the off horse's head be straight, it is more comfortable for him and avoid uneven draft.

Traces, Length: There is no adjustment for length of wheel traces. The lead and swing traces allow of adjustment in length, but in order to prevent traces of different lengths being used on the same horse, it is found the best results are obtained by shortening all traces as much as possible, so as to fit length of horse.

TRACES must be horizontal (to allow "even" draft).

Good Draft

PRINCIPLES OF DRAFT

(Acknowledgment is made to Colonel Wm. P. Ennis, F. A.)

In the discussion of the principles of draft as applied to the artillery team, it is necessary to consider: (First) the construction of the Artillery Carriage: (Second) the physical conformation of the horse as a mechanical device.

THE CONSTRUCTION OF THE ARTILLERY CARRIAGE

In the construction of field gun carriages it is considered that seven hundred pounds dead weight is the maximum load each horse can pull under severe conditions, that two hundred and fifty pounds horizontal pull is the greatest average that can be obtained from each horse in a six horse team.

Within limits the higher the wheel the easier the draft. The width of the tire also has an appreciable effect in the resistance offered to different kinds of roadbed.

The length of recoil of the gun and the stability of the carriage during firing are also very important considerations.

After a series of experiments covering all these subjects the Ordnance Department has decided on a fifty-six inch wheel with a 3-inch tire as the most advantageous for the 3-inch field carriage.

In rolling friction the force applied should be parallel to the direction of motion. With the 56-inch wheel, the wheel trace by itself makes an angle of about 8° with the horizontal but the pull of the lead horses ahead decrease this angle to about 6°.

THE PHYSICAL CONFORMATION OF THE HORSE, AS A MECHANICAL DEVICE

The power of the horse to move loads is accomplished by the animal pushing against the collar which is connected to the carriage by the traces. The greater part of the force of propulsion comes from the hind legs, through the back to the shoulders, and a smaller amount from the front legs to the shoulders.

A certain amount of push, depending upon the weight of the animal, acts through the center of gravity by the horse leaning forward against the collar. This last force is that due to the animal's weight and is not muscular force. We thus have three forces acting, the hind legs, the fore legs, and a component of the animal's weight acting through the center of gravity. The center of gravity of the horse is approximately at the intersection of the vertical line passing through the eighth dorsal vertibrae and a horizontal plane passing through the points of the shoulders.

From this we can see that when the horse leans forward in draft the center of gravity is in the front of the mean position of contact of the feet with the ground.

A line from the mean position of the hind legs with the ground to the center of the shoulder blade will represent the direction of the resultant force exerted by the hind legs and a line from the mean position of the fore legs to the center of the horse's shoulder blade, the resultant force exerted by the fore legs. From an inspection of the skeleton of the horse, it will be seen that the resultant direction of these three forces is approximately perpendicular to the line of the shoulder blade.

Considering the horse alone the line of draft should then be perpendicular to the line of the shoulder at its middle point. The shoulder blade rocks back and forth as the horse moves his fore legs. The center of motion of the shoulder blade is about at its center. If the trace is attached above or below this point, whenever that half moves forward there is a heavy pull trying to limit its motion. It is the same principle as if you tried to pull some object with the strap around both knees. When fastened to the center of the shoulder, however, the pressure is still there, but there is nothing tending to limit the forward movement of the lower part of the shoulder.

While we see that the construction of the carriage compels almost horizontal draft, the conformation of the horse and the necessity of protecting the shoulders from injury must control the direction of pull from the shoulder. This is accomplished by the "holding down strap" used on swing and lead teams and by the "holding up strap" on the wheel horse. This applies to steel collar. Due to the manner of making the breast collar and the necessity for preventing interference with movement of shoulders and sore shoulders due to any downward pull, the pull should be horizontal. The lead and swing pairs are usually about the same size, making the pull on these two pair practically horizontal and since this is true, no holding down straps are required on the

lead and swing pair. The holding up strap is necessary to make the pull horizontal on wheel pair.

A team usually consists of not less than three pairs. The leading pair is called the lead pair; the one attached to the carriage the wheel pair; the pair between these two the swing pair. When there are two pairs between the lead and wheel pairs, the pair next behind the lead pair is called the lead swing; the other the wheel swing pair. When there are five pairs the one between the lead swing and the wheel swing is called the middle swing pair.

THE TEAM

The first horses to be hitched should be the two wheel-horses which, up to this point, have shown the quietest disposition. A field wagon with regular driving harness is the best vehicle to hitch to, but if this is not available, any of the carriages can be used, with driving reins of rope. A half-inch rope should run from the wagon, through a ring on the trace about two feet from the collar, to a strap around the fetlock of the outside foreleg of each horse. Each of these ropes should be held by a man on the wagon. If a horse misbehaves, the man holding the rope should pull hard on it, thereby raising the outer foot. Deprived of the use of one leg, the most unruly horse cannot go far. As soon as the horse becomes quiet again, the tension is released and he is allowed to use the leg unless he again misbehaves. When one horse becomes tractable, he should be used under the saddle to break the off horses and the new near horses.

The lead horses should now be broken, the gentlest ones being tried first in the off wheel and then in the near lead. When the near leader works satisfactorily the off leader can be easily broken in the off lead position.

When the wheelers and leaders are working quietly, the swing animals can be hitched in the team, a near leader being used for a near swing until the near swing has been tried out in the off swing position and is working quietly. The most difficult horse should be the last one hitched, and should then be placed in the off swing with five reliable horses in the other positions. If he is a very fractious animal, the leg rope should be used on him and the rope handled by a man on the carriage.

A halter-rope from the halter of the off horse, fastened around the pommel of the near saddle, was found to be advantageous, in that it prevented the breaking of the coupling reins, and avoided injury to the mouths of obstreperous horses.

If some of the horses refuse to move when first hitched, men should be ordered to lead them, getting them to move by gentle handling, and, if necessary, the carriage should be moved by hand until the horses are well started. Whipping or any kind of roughness should not be tolerated. Never forget that, if properly handled, about 99 per cent, of horses will willingly obey as soon as they understand what is desired.

PAIRING AND TEAMING DRAFT HORSES

Your draft horses should be sized in corral, and paired according to weight and color as far as possible.

Good practice is to first work to escort wagon in pairs. Timid or vicious mounts can best be broken alongside steady trained draft horses, and in teams place such animals in the swing pair where they can do least harm.

After pairing, the team can then be matched up according to rules of pairing, placing heaviest and strongest pullers from rear to front. The lead pair should be not necessarily light, but handy, mobile animals.

Special attention must be paid to length of stride, disposition and willingness in draft of animals.

Drivers must be made to appreciate the fact that every sore, every injury, every abrasion of the skin, is due to a certain definite cause which, if removed, can produce no further effect. If ill-fitting harness has escaped the notice of a driver while his horses were at work, any injury caused thereby must not escape his notice at the next stables. FAILURE TO DISCOVER AND REPORT SUCH INJURY AT ONCE TO THE INSTRUCTOR OR TO THE CHIEF OF SECTION IS A NEGLECT CALLING FOR DISCIPLINARY CORRECTION.

Injuries due to the harness must be discovered in their very beginning and at once reported to the officer in charge of the horses. That officer then performs his duty unsatisfactorily if he lacks ingenuity and skill to modify or correct the fit of the harness so as to remove the cause of the injury.

It is only by constant attention on the part of all concerned, drivers, chiefs of section, chiefs of platoon, the officer in charge of the horses, and the captain—that the animals of a battery can be kept up to their work without more or less prolonged periods of enforced idleness due to harness injuries.

MOUNTED INSTRUCTION

GOLDEN RULE: NEVER LET YOUR HORSES KNOW THAT THEY ARE UNABLE TO PULL ANY LOAD ON ANY GRADE.

Never let a horse lunge into a collar, as this bruises his shoulder and will probably make him fear the collar. Do not expect the young horse to pull immediately; if he will walk along quietly, it is all that can be expected. At the end of a week, the average horse will come to the collar nicely, a little encouragement being all that is required. Bear in mind that it is always easy to make a horse pull, but that it is very difficult to prevent a too-free horse from working too hard. Each horse must be required to do his share of the work.

Driver's Reins

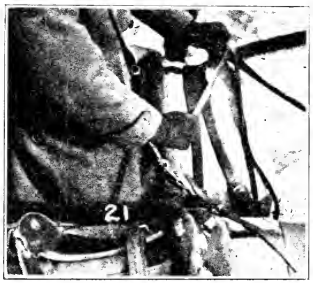


Figure 21. Driver holding the reins. Reins of near horse and the end of the lash on off rein, in left hand. Right hand grasping off rein between left hand and lead rein roller. End of lash falls on the near side; bight of near reins fall on the off side.

DRIVING

In considering driving it is necessary to bear in mind that the horse has but one idea at a time. This fact is a great assistance in making horses do things that they believe they cannot do or do not want to do.

It is also necessary to realize that the horse is not naturally obstinate and that 90% of them are willing to do whatever is required of them as soon as they understand what is wanted. The so-called obstinate or balking animals have been made so by bad treatment or improper training. The horse is also one of the easiest animals to train.

It cannot be too strongly emphasized that kindness and patience will accomplish your object in much shorter time and with infinitely better results than by roughness and brutality.

THE DRIVER

Seat: The driver should sit squarely in the saddle, body erect, buttocks slightly forward, not touching center of saddle, lower extremity of the back slightly curved to the rear, but this does not mean that the backbone is curved to the rear throughout its length and that the driver is slouching in the saddle. Shoulders should be carried back, head up, eyes to the front. The body should be flexible, but this does not mean slouching which one so often sees in riders who fail to appreciate the difference between it and flexibility.

It is a lesser fault to be too stiff than to be slouchy as in this latter case the buttocks are bound to rest against the saddle and thus place undue weight upon the rear end of the saddle bars. This causes sore backs under the rear part of the saddle. The upper leg should hang naturally in the position that is most comfortable and in which you have the best grip upon the horse.

The lower leg should be vertical, heels slightly lower than the ball of the foot, calves pressing against the sides of the horse. In other words the leg should grip the horse from saddle to lower part of the calf.

MANAGEMENT OF PAIR

Do not attempt to guide off horse to left or right with off reins. The driver is responsible for the proper handling of his pair. The near or saddle horse is controlled by the reins, spurs, and legs of the driver, the off horse by the reins, whip and voice. The near horse is made to move to left or right by the neck rein, not direct rein. The off horse will follow near horse. With properly trained horses the whip and spur are not necessary. And with the number of inexperienced men, it is best to forbid their use entirely.

The gait, at which you are traveling, whether at drill or marching, governs to a large extent the handling of your pair. The driver must be alert at all times, ready at any moment to change the gait of the pair.

He must constantly keep his eyes on the pair and column ahead and regulate his gait accordingly. For instance if he sees the column slowing down ahead of him, he must slow down his pair so that he will not jam up on the carriage ahead of him. In the same way if the column in front is extending the driver must increase the gait of his pair before he loses distance.

It is most important that the leading driver of the guiding team keep a uniform gait. The driver, at all times, except when in hard draft, or when on road marches at a walk, should have a slight feel of the mouths of his horses. When in hard draft where the footing is good the horses should be allowed to take their heads, (give them a loose rein) as a horse cannot pull properly unless he can put his nose well to the front. If necessary drop reins entirely.

When at a walk on road marches the horses should be allowed a loose rein in order to rest them. The exception to this rule is when in a hard pull on slippery ground the horse needs slight support from the reins.

The driver should never keep a constant pull on the reins as by doing so he will stop the circulation in the bars of the mouth and the bars then become insensitive to pressure If necessary to keep a horse back, do it by give and take on the reins and not by a constant pull. Pulling steadily on a horse's mouth is a common fault and must always be watched for and corrected.

The off horse, as a general rule, should be handled by the reins held in the right hand, the near horse by the reins held in the left hand. The lash of off horse's rein may be held in left hand.

The drivers should watch the amount of work their animals are doing and require them to do only their just share. By watching the traces ahead of him, the driver can tell whether the pair ahead is pulling. By watching the tug on the collar of his off horse he can tell whether that animal is doing his part. In a short experience a driver can tell from the movement of his saddle horse how much he is pulling. It requires constant supervision and instruction on the part of the officers and non-commissioned officers to teach drivers to drive properly.

If left alone one driver will make his near horse do all the work while another will require his off horse to do all the pulling and his saddle horse will loaf. They must all be required to work equally. If your pair is pulling too much hold them back until the traces in front of you are taut.

The whip and spur should be used with great caution and never violently, the whip by a wrist motion only and on the off side of the off horse and in rear of the blanket. The less the whip and spur are used by the majority of the drivers of field artillery the better pulling battery you will have. Never allow the whip to be used on any horse of a stalled team as it will only make matters worse and make the team much more liable to quit on the next pull. Remember to never use whip, hand or foot on near side of off horse. Any such treatment will cause the off horse to pull away from near horse. The best position for draft is with both horses of a pair working close together. The voice is decidedly the best aid for the off horse; teach horse to move when you speak to him. If whip is used, use voice at same time, so that horse will always associate these two.

Ditches: In driving down all steep slopes—take the slope at right angles, otherwise you will surely turn over caisson or gun carriages. In negotiating a ditch, all drivers hold back until wheel horses are in bottom of ditch, then lead and swing move out at an increased gait to get out of the wheelers way and to get into collar in time to help on the pull up the other side.

The wheel driver is responsible for the movement and guidance of his carriage, for except in hard pulls, he can always increase the gait of his pair and slack the traces ahead thus obtaining control of his carriage. In a hard pull the wheel pair alone is not capable of doing this and in this case the lead driver should be held responsible for the guidance of the carriage.

STARTING THE TEAM

Traces at all times should be stretched when the team is halted. To move forward the pairs should be gathered by their drivers. The near horse is gathered by the reins and legs of the driver, the off horse by the reins and voice. At the command MARCH all pairs should move out together. If a team has been stalled from any cause and the horses are more or less up in the air and will not make a fair effort to pull, they can generally be persuaded to pull again by the following method: Back all horses up until they are as close together as possible, then move the lead team out quietly and at the same time pass them to the right; have the swing driver watch the lead traces and as soon as they start to tighten he should move his pair forward going over the same ground that the lead pair passed over; the wheel driver watches the traces of the swing pair and moves out when they tighten. As soon as all traces tighten the horses must be required to give their maximum effort by use of the aids and voice. In some cases due to

conditions preventing movement to right, the lead pair may be moved to left, and accomplish same purpose.

The above method will work for the following reasons—the lead pair has taken six or eight steps forward before any pressure comes on their shoulders, the swing pair three or four and the wheel pair sees the other horses going to the front. This conveys to the horse the idea that everything is all right and he is willing to try again. As the pole, being turned to the right, gives considerable leverage on the hind wheels, the horses in passing to the right come into the collar more gradually. The reason for going to the right is that it is very much easier to control the off horse and keep him in the collar than it would be in moving to the left. It is impossible to control the off horse in draft unless he is working close to the near horse. If there is any chance that the team cannot pull out immediately, use the cannoneers on the wheels to assist the horses.

In stopping carriages or decreasing their gait the lead and swing drivers must remember that the wheel pair have the carriage to stop and for that reason need a longer distance to the front to change the gait than the lead and swing pairs do. Never allow sudden changes of gait where it is possible to avoid it. The gait in a hard pull should be slow, from one to one and a half miles per hour. Do not allow plunging or rushing any grade. In halting or decreasing gait of a carriage, the wheel driver should slow up before the other drivers so as to tighten traces.

NECK REINING

The horse can be trained to neck-rein by the following method: He should be taught first to turn on the forehand to right and to left, a light tap of a switch being used to augment the pressure of the heel. When the horse will move his haunches by the application of the heel, the neck-reining proper should begin. Turning to the right is accomplished by carrying the left rein against the neck, the right rein being opened wide, the right heel tapping the right flank of the horse. If the horse fails to turn to the right, a slight jerk should be given to the right rein, and the action repeated until the horse obeys. Turning to the left is taught in the reverse manner.

BACKING

In teaching a horse to back, the trainer mounts and takes a rein in each hand, the hands being placed near the withers. While always keeping a light pressure on the bit, the pressure should be varied by rapid oscillations of the hands, the hands moving in unison so that there is no sawing of the mouth. The legs also should be closed on the horse, and light taps of the heel will be necessary if the animal fails to take a step backward by the end of a minute.

As soon as the horse takes a step release the reins and reward him, then try it again. When the horse readily responds to the application of the reins, the oscillations of the reins must be worked in unison

with the movement of the forelegs, the force being applied just as the feet going to the rear touched the ground and the force is released as the front foot leaves the ground on its way to the rear.

When a horse becomes proficient in backing without being hitched, he should be hitched. He will probably refuse to back, due to the pressure of the breeching. Cannoneers should assist in backing the carriage and the horse gradually taught to do it.

TO STOP A CARRIAGE OR REDUCE ITS SPEED

To the same degree that effort is made to avoid abrupt or sudden starts, so also should effort be made to avoid abrupt or sudden stops or reductions of speed. In stopping the carriage the drivers hold their horses out of traction and stop with the gradual stopping of the carriage. The wheel driver may, when desirable, assist in stopping the carriage by holding his horses back in the breeching. The brake, if carefully and gradually applied so as not to jerk the horses, is of great use in stopping the carriage or checking its speed. The lead and swing drivers regulate the movements of their pairs by those of the wheel pair, keeping out of the way, but avoiding any strain on the traces.

TO BACK A CARRIAGE

The wheel driver is responsible for backing the carriage. The other drivers must give him complete liberty of trace. Both horses are reined back together, quietly and steadily according to the principles outlined in *The Soldier Mounted*, Vol. II, F. A. D. R.

THE BRAKE AND ITS USE

The brake, when properly handled, is most useful and a great benefit to the wheel horses. Wheels should never be locked, the brake should be used so that the wheelers will not be required to help hold back the carriage, in fact a very slight pull by the wheeler is a benefit to them in going down hill. Save the wheel horses as much as possible for they have to pull and hold back both, and do considerably more work than the lead and swing. Reason for not locking wheels is that if they are locked, the wheel will be acted upon by sliding friction in one spot, and this will wear out the tire very quickly.

GAITS

The slow walk two and one fourth to three miles per hour. Walk four miles per hour. Slow trot six to six and one-half miles per hour. Trot six miles per hour. Trot out ten miles per hour. Extended trot twelve miles per hour. Gallop twelve miles per hour.

MARCHES

Length of marches depends largely upon the character of the road, the number and slope of hills, the condition of the animals and the

number of hours in harness. Artillery, with animals in good condition, should average twenty miles per day. Six hours in harness should be considered the average time horses should be kept hitched. Standing around in harness is about as tiresome as actual marching. As far as possible marches should be conducted so as to travel fifty minutes and rest ten minutes.

The drill regulations state that under favorable conditions the trot and walk should alternate in the ratio 1 to 3 in regard to time. Large horses should travel at a slower trot than light ones. A 1,300 pound horse, with good road conditions can travel at a slow trot (six miles per hour) for considerable length of time. A slow trot, when the draft is light, does not fatigue an animal when a normal or extended one will have a decided effect. Cannoneers in field batteries should be required to walk on all hills, no matter how slight, and only be allowed to ride going down hill or at a gait faster than a walk. Do not let them hold on to carriages while walking as this will increase the pull as much if not more when riding in the carriages.

Field batteries in good condition should be able to make one hundred miles in two days in forced marches with average road conditions. They should be rested two days or only required to make very short marches for the next two days. In the recent Mexican trouble two batteries of the Sixth Florida Field Artillery marched one hundred and twenty-six miles in two days but lost quite a few horses in doing so. This was probably due to the fact that the horses were not hardened. It is a good illustration of the necessity for Battery Commanders to keep their animals in condition at all times.

It is always an advantage, conditions permitting, to finish the march as soon as possible. This is less fatiguing for both men and animals. The drivers should be required to walk for certain periods of the march, as this rests both men and animals. The time of departure or start when other conditions permit, should be regulated by climatic conditions. If the weather is cool reveille should be at daylight and the march start one hour later. In hot weather when the temperature or sun have detrimental effect on both men and animals the march should be completed before 9:30 A. M. This will necessitate a start in the dark but a battery that cannot break camp without confusion in the dark should not be rated as a battery.

In the southern states in mid summer and in the Philippines the sun effects animals greatly. But the same animals travel rapidly after sun set and from then on to about 9:30 the next morning, while in the Philippines when permitted to do so troops that commenced their marches at 4 A. M. had no difficulty in traveling a distance of twenty miles by 8 A. M. They would always make camp between 9 and 10 A. M. Troops that did not start until 7 A. M. or later, caused considerable suffering among their animals in making a twenty mile march. They could not travel at a gait faster than a walk.

Photo by Watson, Columbia, S. C.

Rest. Incorrect

Photo by Watson, Columbia, S. C.

Rest. Correct

Photo by Watson, Columbia, S. C.

The Halt. All Wrong

HINTS ON MARCH DISCIPLINE

1. Do you realize that a good discipline or the reverse shows up more on the march than at any other time?

2. Do you and your drivers dismount as a matter of course when halted? Do you realize the importance of getting the weight off the horse's back on every possible opportunity? All mounted men, officers included, should walk and lead at intervals. Do you see that drivers do not quit their teams, but remain near heads of their horses? Do you allow drivers to smoke when at a halt of not over 10 minutes duration?

3. Do you see that your men never slouch in the saddle?

4. When on the march, do you supervise your command and not always ride at the head? See that your chiefs of section do the same. You should see that the horses are being properly kept up in draft, that harness is properly fitted (this often becomes apparent, only when on the march), carriages not overloaded, the proper balance of the pole maintained (this can not be done if the men are allowed to ride except in their places).

5. Do you see that your horses are watered and fed whenever possible on the march and that girths are slackened?

6. Do you realize that a horse can not drink its fill or even drink comfortably with a man sitting on its back, or with a bit in its mouth?

7. Do you take severe action in all cases of ill treatment of horses?

RESTS

Drivers are required:

1. To raise the collars and examine the shoulders for injuries, reporting any discovered. The collars may be unsnapped and laid back on the saddle.

2. To rub the hand over the bearing surface of the collar to see that it is clean and smooth.

3. With a cloth to wipe the perspiration, if any, from the bearing surface of the collar and from the shoulders.

4. On marches, or when the draft has been such as to cause steady and constant pressure against the shoulders, to restore and stimulate the circulation in them by hand rubbing, being careful on finishing to leave the hair lying smooth and flat.

5. To look over and adjust such parts of the harness as need it.

6. In addition, if a wheel driver, to relieve the weight on the necks of his horses by properly placing the limber or pole prop; on muddy roads to wipe the mud off the martingales.

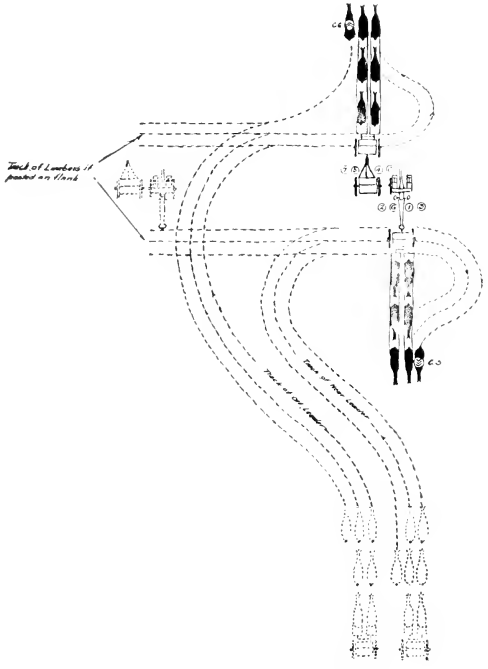
INTERVALS AND DISTANCES

Intervals between—

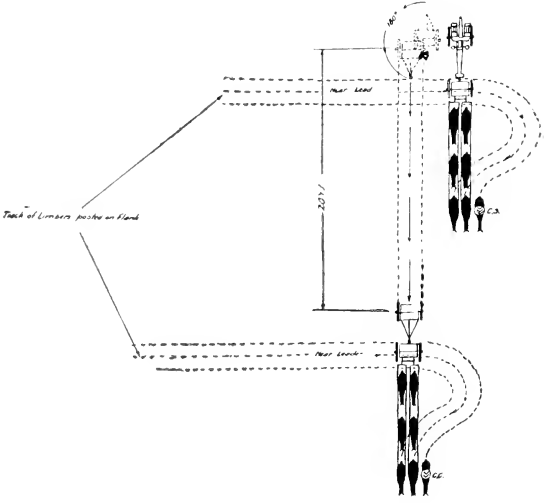
Pairs in line, 1 horse length, 3 yards.

Teams in line, 1 team length, 3 yards for each pair.

Hitched carriages in line, 1 hitched carriage length, 17 yards for a 3 pair team.



LIMBER FRONT AND REAR



LIMBER TURN

Limbering

Distances between—

Pairs in column, 1 yard.

Teams in column, 2 yards.

Hitched carriages, about 2 yards, or such that, when moved by the flank the intervals will be as above.

Other intervals and distances are as prescribed in *The Battery Mounted*, F. A. D. R.

TURNS IN DRAFT

In all turns in draft each horse of the team should be doing his share of the work. Each pair of the team should turn on the same ground. This means that the team is convexed outward during the turn and that each inner horse of a pair is ahead of the outer horse. The traces in all but sharp turns should be taut.

Each driver has to keep his pair outward on the turn and especially the wheel driver. In order to keep the pole outward the driver must make his inner horse do most of the work for the wheel pair during the turn, as it is comparatively easy to pull the pole around but very hard to push it over. In making sharp turns to the right where it is necessary to keep the teams bowed outward, it is often necessary to use the coupling rein of the off horse in order to lead the off horse forward and to the left. The off horse, when very far behind, may also be led forward by the coupling rein, but as soon as he is up in place the coupling rein should be dropped and the reins taken. These are the only two instances in which the coupling rein should be used. Do not drive with the coupling rein.

Following teams must make the turn on the same ground as the team ahead. This means that the lead driver goes outside the track of the carriage ahead as the rear wheels of this carriage turn on an arc of much smaller radius than the team. This also means that the inner horse of each pair moves on an arc about one yard outside of the track of the outside rear wheel of the carriage ahead.

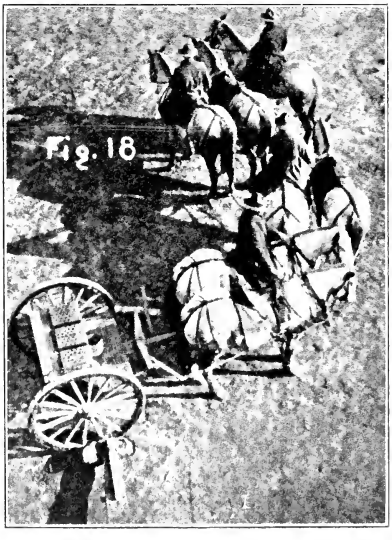
In making sharp turns where there is little room and the pull is severe the pairs will be unable to move on the same ground and the turn must be made as follows: The lead driver moves straight to the front until the wheel driver arrives at the place to turn; the lead driver then turns in the proper direction at an increased gait in order to keep the traces taut, the swing driver follows the lead driver and must keep his traces in draft. The necessity for the increased gait of the lead horses in making the turn is that the lead animals turn on an arc of greater radius than the wheel horses and therefore must cover greater distances than the wheel horses and in the same interval of time. This applies to sharp right angled turns where it is necessary to go through a very narrow place.

THE LIMBER TURN

The limber turn should be made as follows: As the lead driver comes across the trail he should look back and as soon as the heads of the wheel horses come opposite the end of the lunette, he swings his

THE LIMBER TURN

Figure 17 shows the team crossing the trail at right angles, having advanced until the withers of the wheel pair are abreast the lunette. At this time the lead and swing pairs begin their turn to the left rear, the wheel pair advancing until the hub cap is abreast the lunette, as shown in Figure 18. The wheel pair is then passed to the left and the team straightened out, which places the limber and team in the position shown in Figure 19, the pintle being directly above the lunette.



team sharply (more than 90°) away from the carriage and when opposite the prolongation of the trail, straightens his team to the rear and halts. The swing driver turns on the same ground as the lead driver. The wheel driver halts his team at the command LIMBER HALT given by the gunner or No. 4. He then passes his team in the direction in which the trail points turning the limber on an imaginary fixed pivot at the center of the limber axle. This method is easy to execute, the horses, except the wheelers, walk to their positions and there is no lost time in the movement.

RECRUITS

Recruits can be taught to ride by mounting them on the gentle horses, and fastening the reins in the halter squares instead of the bits. In this way, the horse's mouth will not be injured, and the animals will not resent so much having the recruits on their backs. The riding should take place in a corral, which may be improvised with carriages. I believe that with a few experienced men to form a nucleus for the enlisted force, the horse part of a battery can be put in shape to travel on the ordinary road in a month.

TO CONFIRM IN HORSES A WILLINGNESS TO PULL

Almost any horse can be trained to be an honest and willing puller. Through ignorance, lack of judgment, bad management, or laziness on the part of the driver he can far more easily be trained to be a shirker and a quitter. A horse will not pull freely or willingly if to do so causes him pain. It is essential, therefore, that his harness, especially his collar, fit him with absolute comfort; that his shoulders be hardened through careful conditioning and rational work and are therefore not tender or sore; and that he apply his weight on the collar slowly and gradually, without sudden starts or jerks that would pound and bruise his shoulders. Even though all of the above conditions are favorable, a horse will not pull unless he is confirmed in the belief that when he applies his strength the load behind him will yield. Thus a willing horse may be hitched to an immovable object and within a few minutes, especially if he be yelled at or whipped, be transformed into a sulker and a balker that only long, patient and careful handling will cure. To allow repeated trials and failures in pulling is the quickest and most effective method of ruining the draft efficiency of any team. It must be borne in mind that there is a limit to the draft power of any Artillery team and that this power, due to the tandem method of hitching is even with perfect driving, from 20 to 50 per cent less than the sum of the powers of the individual horses. A team should never be given deliberately a task that is clearly beyond its strength. It is right and proper in order to train a team and to develop its draft power to a maximum, to give it from day to day or week to week tasks that gradually increase in difficulty. Such tasks will occasionally stop the team. No evil results will follow if the animals, when so stopped, are permitted to rest

quietly for a few minutes and recover their wind. The first tendency of the inexperienced noncommissioned officer or driver when a team stops is to urge it forward immediately. This is exceedingly wrong. The horses are either taking an absolutely needed rest or are showing by their action that they need assistance. While the horses are resting a sufficient number of cannoneers with drag rope should be brought up so that when the signal to move is given the carriage will certainly move. Such a practice trains the horses that there is no such thing as failure or defeat in a pull and therefore confirms a willingness to pull whenever they are called upon to do so. A team so trained may, when it has become hardened to its work, may be called on to make the attempt to pull out of a difficulty unaided unless such a task is clearly beyond its strength. However, if the attempt fails it must be appreciated that the team to a certain extent has been injured and that for some time to come it must not again be subjected to the risk of failure. A team, trained and managed in accordance with these principles, can always be counted on to occasion a minimum of delay to a battery which encounters difficulties in transport.

DRIVING UP STEEP SLOPES AND OVER DIFFICULT GROUND

In order to exert his maximum strength when in a difficult pull, the draft horse must get the greatest possible weight forward and into the collar. By maintaining a low, extended, and advanced carriage of the head and neck he is able to add considerably to his power of traction. He should, therefore, be allowed full freedom of rein when in a heavy pull and not be forced to fight the driver's hand. Because a horse can exert a greater power of traction when ridden, it is often advantageous when in a difficult pull to mount cannoneers on the off horse. When pulling up a hill the drivers should lean well forward and should encourage their horses by the low and quiet use of the voice.

The most favorable gait for heavy pulling is a steady, uniform walk, with every horse straight in his collar and the team straight from lead to wheel. The tendency to rush a hill or other difficult pull must be avoided. Any increase of speed for such a purpose can not be taken up with perfect uniformity by all the horses of a team and the footing for each horse is rendered more uncertain and difficult. This causes undue weight to come upon the shoulders of some while none at all may be borne by others. Uneven draft quickly results, often to the point of stalling a team. In going over a V-shaped ditch unusual effort should be made to keep the horses at a steady walk. In such a place the brake must be used with great care, so that the traces will be tight and the horses in draft during the entire crossing. The brake should be released a little too late rather than too soon, for, in the latter case, the carriage rushes forward into the bottom of the ditch, where it stops, and the horses on again coming into the draft are given a violent jerk.

When maneuvering off the road, steep ascents should be taken in line, to avoid checks. When on a road or track, if circumstances per-

mit, the battery should be halted at the foot of the hill and carriages or sections sent up at about one minute intervals. This gives opportunity for the teams to be halted to rest and blow at the top, or, if the hill be a long one, to be halted a number of times during the ascent. Each carriage or section, after such a halt, moves out in time for the carriage or section which follows to halt on the same ground. Cannoneers instructed to follow and watch a carriage in difficult draft, may, by applying their strength at the moment a stop seems imminent, prevent the carriage from stalling.

When a carriage has been stalled it may, in some cases, be found best to have cannoneers first back it for a few feet, in order to put both horses and carriage on more advantageous ground from which to make a start.

Cannoneers should be instructed and regularly practiced in assisting the horses by working at the wheel and along ropes attached to the carriages. Much delay and confusion on the march may be avoided by such training. To avoid interference and to insure teamwork, attention should be given to the spacing of the men along the rope. Ropes may be attached in the following ways:

(a) For ordinary pulls by running a bowline or a clove hitch around the trail of the carriage, well back near the breech of the gun.

(b) For a short, hard pull, as in lifting a carriage out of a ditch, by a wheel purchase. To use a rope as a wheel purchase: With one end a turn is taken around the felloe as near as possible to the ground; the rope is placed over the short end so as to hold it against the tire, and is then laid on the tire and passed over the wheel to the front. The rope should be so placed around the felloe that it may be pulled clear of the wheel when the short end is released by the turning of the wheel. Should the wheel slip, a rope may be wound around the felloe and tire, with turns about a foot apart to enable the wheel to get a grip.

(c) For use without teams or when it is desired to use the team in advance of its regular place, by passing the hook end of one rope and the ring end of another under the doubletree on opposite sides of the pole and hooking together above the pole in rear of the doubletree. With each rope a half hitch is taken around the pole near its end. These ropes may be extended to any desired length by others, and either attached to a limber, in case it is desired to use a team, or used with cannoneers. This method is useful in crossing dangerous bridges and on steep slopes where horses can not get good footing or can not maintain uniform draft.

When a carriage is mired it may be pulled out by attaching it with ropes to the middle point of a log or balk. Each end of this balk is attached to the pintle of a limber. A full or extended team is hitched to each limber. The balk acts as a giant doubletree between two limbers, and with careful driving the draft will be very even.

The start of a stalled carriage may at time be facilitated by turning the pole either to one side or the other as far as it will go and straightening the team in that direction. In this way the first effort of draft serves only to turn the mass of the weight about a vertical axis,

with the trail as the lower arm. The yielding obtained in this way encourages the horses and brings the total weight into their collars more gradually.

In a heavy pull a driver should always watch the traces in front. Should they become loose, he very gradually holds his own pair back until they tighten up and the horses to the front again come to draft. The whole team may then, if necessary, be urged forward a little faster. This method insures all the horses coming into draft without the jerk, so disconcerting to the whole team, that frequently results when a pair is brought to draft by being urged forward at increased speed.

Carriages should be driven squarely across sunken roads, ruts, narrow ditches, etc., so as to avoid whipping the pole.

Starting a Stalled Team

Figure 20. Starting a stalled team. The pole is broken to the right and the team telescoped preparatory to getting the pairs into draft successively. Cannoneers assist at the wheels.

STALLED TEAMS

To make a stalled team pull, back up all the horses until the traces are as slack as possible, and pass the pairs well to the right or left. Start the leaders quietly, gradually moving them to the front at the same time. The swing driver should watch the lead traces, and when they begin to tighten he should move his team forward as the lead driver did. The wheel driver should move his team so that it will get in draft when the swing traces tighten. The instant the traces tighten, the horses should be required to give their maximum effort.

The advantages of this method can be briefly summarized:

Every horse moves one or more steps to the front before the traces tighten, thus giving him the idea that everything is all right. By moving sidewise at the same time, the tension in the traces is taken up gradually, without shock to the shoulders. It is much easier of accomplishment than is the moving of the whole team at once. The horse or horses of a stalled team should never be whipped.

Whips, Spurs: Do not allow whips or spurs to be used on new horses. Ignorant application of either will ruin more good horses than any other cause. If punishment is necessary, give it or supervise it yourself. About 99 per cent of all horses will do their best for you if properly handled.

Drivers: On a long, hard pull, if you are careful not to make your horses walk fast, they will not be winded or exhausted when they reach the top. Let them have their heads, as they know, better than you do, the most comfortable position for them. Never allow a team horse's head to be held to the side as so many drivers do hold them through careless handling of the reins.

On Turns: Emphasize in sharp and difficult turns on level ground that the wheel driver controls carriage and that lead and swing give him slack traces, but keep moving to get out of Wheelers way. Wheeler can also get control of carriage by moving his horses forward to slacken the traces in front of him. Wheeler controls pole by urging near horse ahead if he wishes the pole to go to right, off horse if to left. This is the easiest way to control pole because of the chains attached to the doubletrees and to the carriage. If carriage is caught on an object, move pole toward object and back the carriage, then without moving carriage, bring pole over to opposite side far enough to clear, then move carriage out. This will clear easily any object you may get caught on. Learn to guide the near horse. Off horse will follow; neck rein near horse in all cases. Use coupling rein to lead off horse forward and to left.

On Hills drivers all lean well forward in saddles, apply legs in the rear of girth. If the horse is a sluggish one take feet out of stirrups and apply legs in rear of cincha on horse's sides. Speak sharply to off horse. Drivers must work and see that both horses are in collar at all times. Be sure to give both horses their heads—this applies especially to off horses. Never pull on reins of off horse. Let his reins go entirely if necessary. Any pull in any direction on reins of off horse gives a direct pull to the rear on his mouth. If horses are pulling well and fully doing their share, do not try to urge them to extra efforts by continually applying the aids.

Going Down Hills driver leans back, grips horse with his legs, pulls straight to rear on reins, never allowing horse's head to be pulled to one side or other. Have short reins so as to be able to control horse. Wheel driver controls carriage. Lead and swing move out steadily but with slack traces. When carriage starts, lead and swing drivers look back to see that their traces are slack allowing wheel driver to get control of carriage. Brakes will be applied in going down hills, but not so hard as to lock the wheels. Watch particularly position of driver's legs. Watch for heels sticking in horse's sides. See that they keep heels well down, and out of horse's sides.

Drills: Instructors will watch particularly that distances are maintained at all times. No closing up or lengthening out of column. Caution all drivers to keep head and eyes up at all times and look ahead and

anticipate movements. Watch for proper seat of all drivers, position of legs and see that they keep off cantle of the saddle. Watch handling of reins (neck rein); near horse and off horse will follow. See that the traces are taut when starting. Watch the use of the aids. See that in all turns drivers keep to outside of turns, inner horse ahead of outer horse. See that carriages turn on same ground, radius of six yards, traces taut. In all alignments, watch to see if all drivers dress properly. Insist upon exact performance in all movements. In moving from column into line, when line is to halt, watch to see that all drivers execute right dress. Watch particularly that men at no time slouch in saddle. If halting for any length of time,—four (4) minutes even, have drivers dismount and put up limber prop promptly. Watch distances at all times. If halted, on road near grass, or on grass, allow horses to graze, without however having them get out of column.

In controlling the horse remember the cardinal principle, release an aid as soon as it is sufficiently obeyed.

HINTS TO DRIVERS

A good draft horse can be ruined in five minutes by an inexperienced driver. A team that pulls together can accomplish wonders under most difficult draft, provided the drivers never let their pairs know that they cannot pull any load.

The most successful draft is that which obtains the maximum pull with the least lost energy and wear and tear on the team. To accomplish its object, the draft team, consisting of lead, swing, wheel drivers and the brake must be thoroughly impressed with a sense of team play, just as in an efficient gun squad.

The individuals of the draft team are mutually dependent one on the other and must work together as one. To accomplish this end, each driver must fully understand not only his own duties, but those of the other members of the draft team. However skillfully trained in their individual duties, drivers of a team will not obtain that smooth pulling, equally distributed draft unless there is that mutual understanding or liaison between each other and with the brake. Independent individual effort, unless bent towards the same direction at the same time, will result in neutralization of efforts of pairs in team, one pull counteracting the other.

Without complete unity maximum draft can never be attained.

Drivers: The lead driver must quickly learn that in all turns he must allow the wheel driver a turning arc that will in no case cramp or lock the wheels of the limber. The lead must move forward well to the front before the turn and avoid "cutting in." The above is equally true of the swing driver, who takes his cue from the lead.

The lead driver must glance back at the wheel to measure the turn, avoid running on obstacles, and see that the traction is following the least lines of resistance. He should seldom make use of the coupling rein, though occasion may necessitate his grasping the coupling rein in turns to the flank to urge or restrain or "place" his off horse.

In descending slopes the lead and swing drivers must keep their pairs well reined back, assisting the wheel and brake to slow up the carriage. The gait must never be accelerated, or the pairs allowed to get out of hand.

In ascending inclines, the gait must be kept slow and steady, avoiding rush and excitement. The off horses must be urged quietly with the voice and tap of the reins to do their full share, the drivers leaning well forward in their saddles, and keeping all traces tight.

Ditches or broken ground should not be rushed, but crossed slowly and quietly, avoiding jerks on the traces and consequent bruising of shoulders by collar.

The wheel driver is responsible for the direction of the carriage. He is also responsible for backing the carriage. In case of necessity a good wheel driver can take the draft away from the lead and swing by urging forward his pair, slackening the forward traces, and swing the pole as desired. This should only be employed in close quarters.

In the turns, pressure of all pairs must be exerted towards the outside of the circle, which will place the pairs tangent to the turning arc, the heads of horses on inside of turn between interval of pair in front. In turning avoid two tracking, which will only be necessary in the limber turn, or in a sharp ninety degree turn, such as at a narrow cross road where the lead and swing move as far forward as possible and then quickly swing both pairs in traces to right or left.

In starting carriage in motion, drivers, after gathering their pairs, must take up slack in traces before moving out. When the traces are straight throughout and the horses are up against their collars, jerking and beating of the shoulders will be avoided, and the team will move out smoothly in unison.

The cannoneer on brake must always be on the alert, sizing up the road ahead, and watching the traces. The wheel driver can assist him by calling "Brakes" at the proper time. Over difficult ground it requires a skilful, experienced man on the brake to apply and release brake just at the right moment. Clever use of the brake smooths out the draft.

On the road is the place to correct errors in draft and adjustment of harness. Until proper adjustment of harness is obtained, it is well for the caisson corporals to carry a piece of chalk to mark on collars and harness any places of defect and places for readjustment that are noted on halts along road. In this way the harness can be sized to horse as a tailor fits his cloth measurement to a man.

A close fitting collar, that is snug, with equal bearing surface and no vacant air spaces, is to be desired. The breast strap should be well up above points of shoulders.

There is a 70-lb. upward component pressure in draft which is lost energy, which can be partially overcome by strapping traces at cincha ring with a "holding down strap."

The pull against shoulders should, in all cases, be as perpendicular as possible against bearing surface of shoulders.

The traces in draft should be fairly horizontal.

It is absolutely important that the load is distributed evenly between the six horses. Some draft horses will try to pull the whole load, others are laggards. The lead and swing must always remember that their pairs must by steady pulling keep the wheel team and carriage from stalling.

The use of the whip, and spurs, or the "twitch," is not recommended for use except for most exceptional cases.

YOU CAN DO ANYTHING WITH YOUR HORSES ONCE YOU HAVE THEIR CONFIDENCE IN YOU

1. Impress thoroughly upon the men that the secret of success in handling horses is patience and kindness, which gains their confidence. Explain that a horse is an animal with very little brains but an excellent memory, and is extremely nervous. Harsh treatment or a kind act are never forgotten. From the very beginning instil a pride in the men in the appearance and care of their horses and their equipment.

2. The object of horsemanship in the army is to enable the driver to so condition and ride his horse that the animal will be able to carry both rider and load the required distance in the required time, with the least injury to both driver and horse.

3. Horses require gentle treatment. Docile but bold horses are apt to retaliate upon those who abuse them, while persistent kindness often reclaims vicious animals. Train your horses by reward and punishment; in 99 cases out of 100, punishment does more harm than good.

4. Before entering a horse's stall and when coming up behind him, speak to him gently, then approach quietly. Noise and confusion excite a horse just as much as surprise. A good driver should take infinite interest in his horses and study their wants and peculiarities.

5. Never kick, strike about the head, or otherwise abuse a horse. Severe disciplinary measures will be used to eliminate any abuse of this kind. A horse has a good memory and remembers ill treatment.

6. Never punish a horse except at the time he commits an offense, and then only in a proper manner. A cross angry voice will stop a horse kicking on the picket line, while an encouraging voice will help send a willing horse forward. A driver's reprimand to his horses should be sharp and firm, but never harsh.

7. Give the horse an opportunity to drink before leaving the picket line or stable, and before putting the bit in his mouth. In cold weather, warm the bit before putting it in the horse's mouth. A horse cannot drink his fill with someone on his back. All the horses must go up to the trough together and stay until the last horse has drunk his fill. Orderly watering is a sure indication of a well disciplined organization.

8. Never take a rapid gait until the horse has been warmed by gentle exercise. A horse should always walk the first mile from stables and the last mile in.

9. When a horse is brought to the stable or picket line in a heated condition, never allow him to stand uncovered; put a blanket on him and rub his legs, or walk him until he is cool; if he is wet, put him under

shelter, not in a draft, and rub him with a wisp until dry. Hand rubbing is invaluable. The horse is a trained athlete, treat him as such. Apply the same general rules of health and hygiene to your horse as you would to yourself.

10. Never water a horse when heated, unless the exercise or march is to be immediately resumed. Sponging out the mouth and nostrils is refreshing to the heated horse and will not hurt him. If the water has the chill taken off, the horse may be given a small drink. On a long, dusty march, a wet sponge is invaluable to refresh your horses by sponging muzzles. For this purpose each section should carry on a caisson a canvas bucket filled with water on a dry march.

11. Never allow a horse's back to be cooled suddenly. To cool the back gradually, remove the pack and equipment from the saddle, loosen the girth, remove the blanket and replace it with the dry side next the horse, replace the saddle, girthing it loosely. Never allow the hot sun-rays on a wet back; it is the quickest way to blister it.

12. Never feed grain to a horse when heated. Hay will not hurt a horse however heated he may be. A horse that has been without feed should be fed hay first so as to take the edge off his appetite.

13. Never throw cold water on any part of a horse when heated.

14. On leaving the stable move at a walk for a short time in order to get the horse's legs under him, and circulation started.

15. Vary the gaits but do not depart from the regulation pace prescribed for each. A fast walk, a fast trot, and a fast gallop are very tiring. It is better for animals to take the next higher gait than increase the regulation gait.

16. Choose for the rapid gaits nearly level ground. Going up hill rapidly necessitates great effort on the part of the horse, and going down hill at a rapid gait exposes him to injuries from the saddle and equipment, and is hard on his forelegs.

17. Extend progressively the periods at the faster gaits. Be sure your horse is "hard" before you use the faster gaits.

18. Regulate the periods spent at the intermediate gaits by the degree of rapidity with which the total distance must be covered.

19. Seek under all circumstances soft footing to save the horse's legs, and keep him therefore, on the edge of metalled roads rather than in the middle. Never trot on macadamized or paved roads.

20. Choose hard ground when smooth and level in preference to ground that is heavy or uneven.

21. Finish at a walk, more or less prolonged as the journey has been more or less long and trying, so that the horse shall always come in with a dry skin and normal respiration.

22. The rule is to walk at least ten minutes before reaching the stables. Stable sergeant to be responsible for condition of all mounts that come in. Men riding on pass must groom their horses and have them inspected by the stable sergeant before they can be put up. This rule must be carried out. All horses that are allowed to go out must be kept on record, so that any injury or abuse can be eliminated and the offender denied the privilege of further pass.

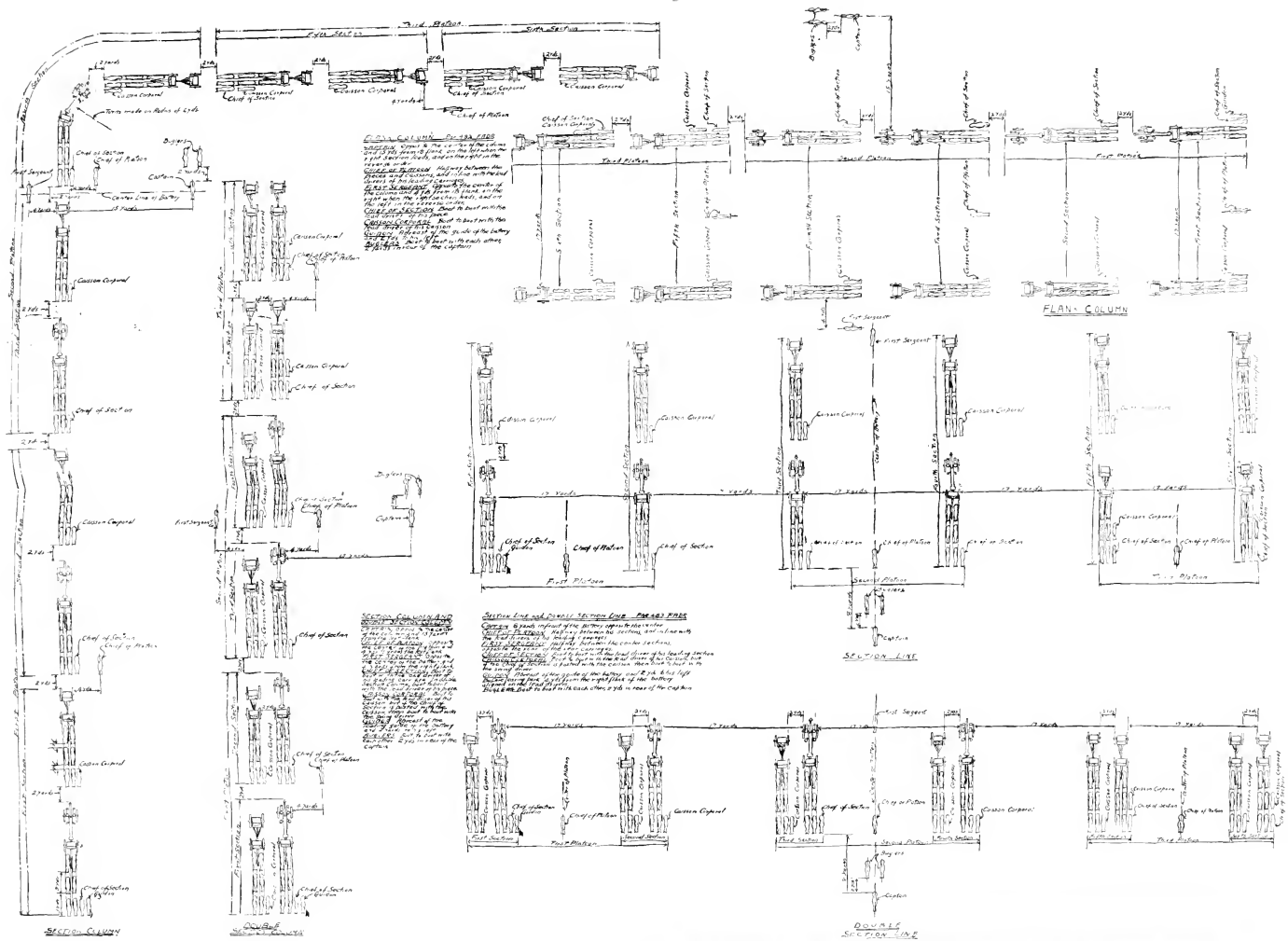
FIELD MANAGEMENT

1. Save your horse as much as possible in the field. Dismount whenever the opportunity offers. Never loll in the saddle, even though it happens to be easier than resting on the ground. When possible lead the horse up an down steep hills. If opportunity offers, while resting loosen the girth, so that the horse may rest as well as yourself. Do not girth your horse too tightly. This is a very common fault and a very cruel thing to do. It makes sore backs and sore sides. This destroys the usefulness of your horse. Remember that your harness, well fitted in garrison, will be too large once your horses begin to lose flesh, as they will, in the field. Have harness always fitted as for field service.

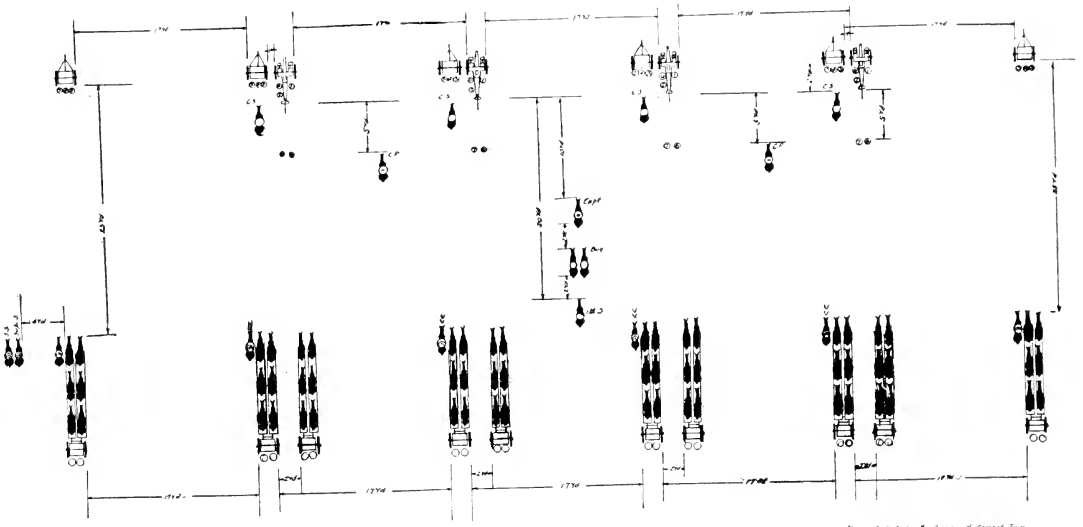
2. When riding do not slouch in your saddle; sit straight. Slouching makes sore backs and causes the horse to interfere. Do not ride too closely on the heels of the horse in front of you. Failure to observe this rule may inflict painful wounds on your horse and the one in front of you; these take a long time to heal.

3. In driving, keep a steady gait with your animals. Do not drive them with your whip; use your reins and voice. A man who is always using his whip soon drives thin and balky animals. Select your road as carefully as you can for guns and wagons. Cavalry should march at the rate of four miles perhour, including halts, artillery at four miles per hour, and wagons at three miles per hour. Keep out of the dust as much as possible when on the march. On a long march carry enough feed for the animals and then be sure to feed them. If your saddle slides out of its place while on the march, dismount and straighten it. Always try to water before feeding if your horses are not overheated. A ten gallon keg should be carried on each wagon for watering the animals attached to it. Grease your wagon every night.

4. On reaching camp, the saddle should not be removed at once unless there is a chance to wash off the back with water and dry the hair. If the back cannot be washed or rubbed dry, the girth should be loosened and the saddle or blanket left on until the horse is cool. Sponge or with a clean white rag, wipe the eyes, nostrils, dock, and underneath the hind legs. Feed a little as early as possible upon arrival.

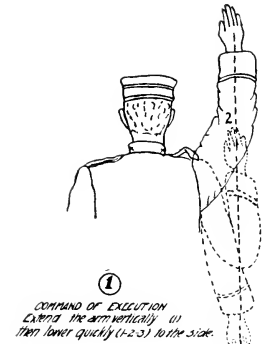


Mounted Evolutions



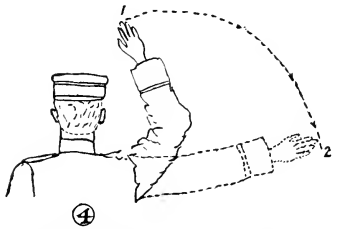
ORDER IN BATTERY

ARM SIGNALS



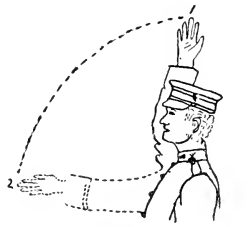
① COMMAND OF EXECUTION
Extend the arm vertically (1) then lower quickly (1-2-3) to the side.

② ATTENTION
Extend the arm vertically and move it slowly back and forth from right to left (1-to-2

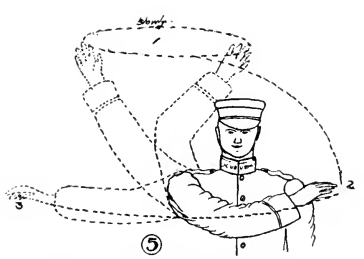


④ BY THE RIGHT FLANK
Extend the arm vertically (1) and lower it to the right (2) until horizontal

BY THE LEFT FLANK- Same to the left



③ FORWARD
Extend the arm vertically (1) and lower it to the front (2) until horizontal



⑤

RIGHT ABOUT

Extend the arm vertically and describe slowly a large horizontal circle (1) with the hand; then extend the arm to the left (2) and describe a horizontal arc to the front and right (3)

LEFT ABOUT – Same to the left.

⑥

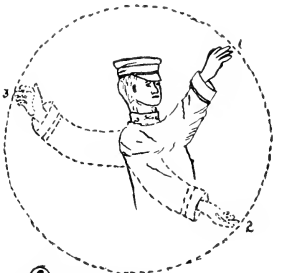
COUNTER MARCH

Extend the arm vertically and describe quickly several horizontal circles with the hand.

⑦

RIGHT SECTIONS FORWARD

Extend the arm vertically (1) and back, thrust several times to the front (2-3)



⑧

RIGHT OBLIQUE

Extend the arm obliquely upward to the right and front (1) and then lower the arm (2) and describe a vertical circle (2-3) on the right side of the horse.

LEFT OBLIQUE – Same to the left.

(9)

TO INCREASE THE GAIT.
Carry the hand to the shoulder, forearm vertical (1); extend the arm vertically (2) from this position and repeat several times.

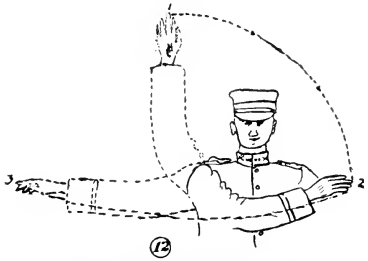
(10)

TO DECREASE THE GAIT.
Hold the arm horizontally above and in front of the forehead.

To indicate an increase or decrease gait for maneuvers, the appropriate signal is made just after the preparatory signal for the maneuver.

(11)

HALT.
Extend the arm vertically and hold it there until signal is obeyed.



(12)

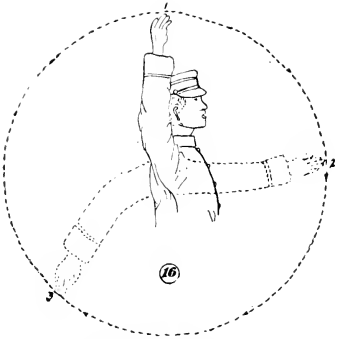
TO CHANGE DIRECTION TO THE RIGHT.
Extend the arm vertically, lower it to the left (2) until horizontal and describe a horizontal arc to the front and right (3).

TO CHANGE DIRECTION TO THE LEFT.- Same to the left

(15) TO CLOSE INTERVALS. Point to the section on which the intervals are to be closed and then signal right (left) oblique 8, or left and right oblique according as the intervals are to be closed on the right (left) section or on an interior section

(14) TO EXTEND INTERVALS. Point to the section on which intervals are to be taken, and then signal left (right) oblique 8, or right and left oblique according as the intervals are to be extended on the right (left) section or on an interior section

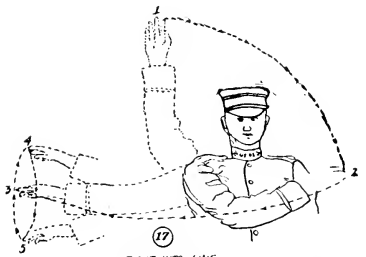
(13) RIGHT (LEFT) BY SECTION. Point at the right (left) section and signal forward-3.



RIGHT FRONT INTO LINE

Extend the arm vertically (1) and describe several large vertical circles (1 2 3) on the right side of the horse

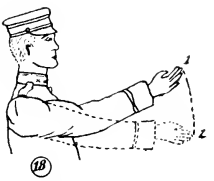
LEFT FRONT INTO LINE Same to the left



RIGHT INTO LINE

Signal a change of direction to the right (1 2 3) followed by describing small circles with the hand while the arm is extended to the right (4)

LEFT INTO LINE. Same to the left.



PIECES FRONT

Extend the arm horizontally to the front, and then move it several times thru a small vertical arc (1-2)

(22) ACTION FRONT

Extend the arm vertically to the front, lower quickly to the front (1-2) and repeat several times (1-2).

(21) DOUBLE SECTION RIGHT OBLIQUE

Extend arm horizontally to the right and then move it several times into a small vertical arc (1-2).

DOUBLE SECTION, LEFT OBLIQUE. Same to the left.

(20) FLANK COLUMN, RIGHT OBLIQUE

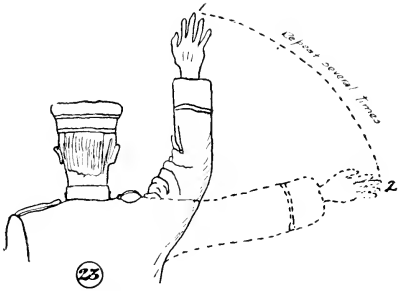
Extend arm horizontally to the right and then move it several times into a small horizontal arc (1-2).

FLANK COLUMN, LEFT OBLIQUE. Same to the left.

(19) CASSONS FRONT

Extend arm horizontally to the front and then move it several times into a small horizontal arc (1-2).

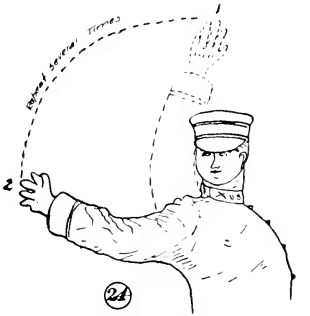
The signals FLANK COLUMN, or DOUBLE SECTION, RIGHT (LEFT) OBLIQUE, apply also for the formations of Open Column or Double Section, to the right (left) after marching.



ACTION RIGHT

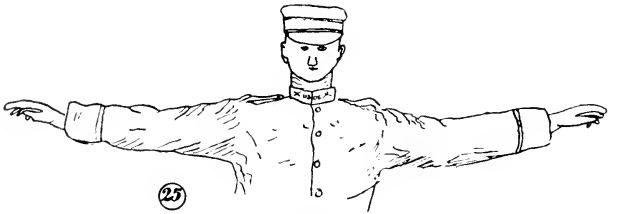
Extend the arm vertically (1); then lower quickly to the right (2), and repeat several times. (1-2)

ACTION LEFT. Same to the left.



ACTION REAR

Extend arm vertically (1); then lower quickly to the rear (2) and repeat several times (1-2)



LIMBER

Extend both arms laterly.

PART IV

MISCELLANEOUS

Restraint and Control of Animals.
Entraining and Detraining.
Drivers' Rolls.
Knots.
Types of Stable and Picket Lines and Corrals.

APPENDIX

(a) Bugle Calls.
(b) Quiz for Drivers.
(c) Hints to Instructors—Schedules.

RESTRAINT AND CONTROL OF ANIMALS

(Acknowledgment is made to Colonel Wm. P. Ennis, F. A.)

In the management of animals both in field and in garrison restraint is sometimes necessary. The methods are varied and the one to be used depends largely on the disposition of the individual animal and what is to be accomplished. Animals are restrained by the use of the twitch, war bridle, blind, muzzle, cradle, side-rod, cross-tie, knee strap, casting rope, slings, hobbles, stocks and operating table.

Always select the mildest and least dangerous method that will accomplish the end.

The twitch perhaps is the handiest and most common method of restraint, and is the most effective in the majority of cases as a simple measure but should always be used with great caution and only when necessary. It is a very powerful instrument, capable of inflicting great pain, disfiguring animals' faces, and causing even lasting injury. As it shuts off circulation in the lip it should never be used for any considerable length of time continuously, and never with greater force than is absolutely necessary. It is easily made by running a piece of small rope or rawhide through a hole in the end of a round piece of wood, 2 to 5 feet long, such as a pitch fork or axe handle, and tying it into a short loop.

The War Bridle is perhaps the one method of restraint which is the least likely to do harm to the animal or make him afraid of its future use. When properly used its effects are lasting and beneficial, making the animal quieter, more tractable, and more amenable to discipline. It is made and applied as follows: Take about 20 feet of 5/16 inch three strand hemp rope and make a four inch loop at one end. To apply, stand on the near side of the horse, place the loop in the mouth inclosing the tongue and lower jaw, carry the rope up on the off side, over the poll and down the near cheek to about opposite the eye, then double back on the poll leaving a bight hanging, pass the running end of the rope through the mouth between the upper lip and the gum, and up through the bight on near cheek, then down through the lower part of the loop. Draw the end snug without changing position of the bight. A moderate pull on the rope tightens the bridle, producing pressure on the poll and to a lesser degree on the mouth. This has a strong moral effect, inducing the animal to stand quietly.

The attendant should not pull the rope unduly tight but always use moderate tension and with a little twitching to attract the animals attention. Its use is especially adapted to the training of young animals to be shod and in handling the heads of very nervous animals.

The Blind is often of value as a means of restraint for nervous or vicious animals. It may be made in the form of a hood or a piece of leather broad enough to cover the eyes, and provided with leather strings for fastening to the halter.

The Neck Cradle is useful in case of a wound to prevent further injury by the animal chewing or tearing the injured part. It is made of from eight to twelve pieces of hard wood about 1 1/3 inches in diameter and about eighteen inches long, pierced at each end by a hole through which is passed a cord or small rope. The rods are kept three or four inches apart by knots in the rope. The ends of the rope are tied on the upper border of the neck and so adjusted that the upper ends of the rods are just back of the lower jaw, the lower end resting on the shoulder at the seat of the collar.

The Muzzle as a means of restraint is useful to prevent an animal eating bedding or chewing or tearing the dressing from a wound. They are best made out of leather and attached to the halter rings, or fastened by straps, attached to the muzzle and passing over the poll.

The Side Rod is used for vicious animals while grooming or to prevent an animal doing injury to a wound. It is made from a round wooden rod from 3½ to 4 feet in length, with a small cord or strap at each end, one for attaching to the noseband of the halter, the other to the surcingle.

The Cross Tie is useful to prevent an animal from chewing a wound or dressing, and from laying down when it is desired to keep him standing. It consists of tying the head in an elevated position, with two tie ropes, one from either side, and both tied on opposite sides of the stall.

Knee Straps are useful when it is necessary to fix a foreleg for an operation or for shoeing. A strap or rope is used to secure the pastern to the forearm. The leg is well bent at the knee and the rope or strap, with a loop at one end, is passed over the pastern, the free end passed around the forearm and back to the pastern, drawn tight and tied or buckled.

The Side Line is a means of restraint commonly used in securing a hind leg. It is made of ¾ inch rope about 20 feet long and a leather hobble provided with a ring. One end of the rope is secured around the animal's neck by a loop or non-slip tie, the free end passed through the hobble ring or around the pastern, and carried back through the loop around the neck, then the leg is brought forward and held in the position desired by the attendant. If desired the leg may be brought backward and securely held by fastening the free end of the rope to the hobble, and pulling the leg backward, one attendant grasping the leg and holding it in the desired position and another keeping the rope taut.

The Casting Rope is perhaps the most useful means of restraint, considering the various uses to which it may be put. Often in the field it may be necessary to secure an animal for an operation or in rare cases for shoeing, and no other suitable means of restraint is available. It is made of ¾ inch rope about 30 feet long. This is doubled and from 3 to 4 feet of the doubled end tied in a non-slip loop, which is passed over the horse's head and adjusted about the neck. The free ends are passed backwards between the forelegs and around the rear pasterns or through the rings or hobbles if used, thence upward and back through the loop at the neck. A strong man should hold the horse by the head, and one or two assistants grasp the free ends of the rope and take the

animal off his feet. Casting can be done with the least effort if one foreleg is fixed off the ground with a knee strap. If it is desired to cast on a particular side, it can be done by the attendant pulling in a forward direction on that side, the others pulling in the opposite direction. When down the man at the head should grasp and hold the head firmly against the ground, while another should draw the legs up tightly at the side and secure them by a double half hitch made of the free ends of rope. When one side is secured the animal may be rolled over, and the other tied in a similar manner.

There are various forms of casting harness made from ropes and leather, but the principles of all are similar to the one described above.

The English Hobble is sometimes used for casting. It consists of four leather hobbles with rings. A chain or rope is attached to one front hobble, then passed through the rings of the others and back through the first ring. The animal is cast by pulling the rope and drawing all four legs together. When down the rope is secured. This is not a popular method of casting if work is to be done upon the feet and limbs, as it does not place them in a suitable position.

Stocks are built for operating upon animals, for restraint in applying dressings, and shoeing. Their use for the latter purpose should be discouraged, as once an animal is confirmed to their use he cannot be shod any other way, and there is always danger of injuries. The War Bridle, if used properly, will take the place of the stocks.

The Sling is a useful means of restraint and often a necessary one in the case of severe injury and inability to support his weight on all four legs, and when it is desired to keep the animal in a standing position. It is made of broad, strong canvas fitted about the animal's chest and abdomen and attached to which are straps from both a breast collar and a breeching. Ropes attached to the free ends of the canvas run to blocks and tackles and support the weight of the animal. The raising must be effected so as not to take the feet from the ground, but just enough to ease the weight from them. When this is accomplished the pulleys should be locked or the free end of the rope securely tied.

TRANSPORT BY RAIL

The transport of animals by rail in the military service is an important subject to be considered in the care of animals. Experience has demonstrated that considerable losses of animals have been due to improper methods employed in transit, such as: long periods without water, feed or rest; and lack of proper supervision of feeding en route, or on arrival at destination. Animals to be shipped must be given a careful physical inspection by a Veterinary officer for communicable or other diseases, and tested with mallein to insure against glanders.

If animals are to be worked immediately upon arrival at destination, they should be newly shod without calks. Remounts or other animals not for immediate use should have the shoes removed and feet trimmed to prevent breaking. The grain ration should be reduced one half on the day before loading.

Before loading, cars must be carefully inspected; all loose and projecting nails removed; broken slats, doors and floors repaired; and thoroughly disinfected with some reliable agent such as creosol solution, creolin 3% or chloride of lime 4 ounces to a gallon of water. Floors should be bedded down with sand, cinders or straw, depending upon the available material and kind of cars to be used. The type of car to be used depends upon various conditions. Those most commonly used for troop shipment are stock cars. Occasionally Arms Palace stock cars or Express horse cars are provided. The latter are by far the most satisfactory considering the comfort of the animals. For shipping in small lots (4 to 8), an excellent method is to utilize a box car, partitioning off spaces for the animals.

Loading animals is an art only perfected by practice, and instruction in it should be given at every opportunity. In loading stock cars horses should be led in one at a time, alternately to each end, placed alternately head and tail in each end, and held there by an attendant until the capacity of the car is reached.

Mules are loaded by leading the first one and herding the others closely following one another. The tighter animals are loaded in stock cars, the better and safer they are conveyed.

Cattle cars will hold 18 to 24 animals, depending on their size and dimensions. As a guide the following is the usual number to be placed in 36 and 40 foot cars:

36 foot cars:		40 foot cars:	
Heavy draft	18	Heavy draft	20
Light draft	20	Light draft	23
Riding horses	22	Riding horses	24
Draft mules	21	Draft mules	23
Pack mules	22	Pack mules	24

The above may be varied according to the size of the animals, and if the weather is very warm it is better to reduce the number in each case by two.

Halters should be left on and shanks removed and carried in sacks. If the weather is severe one side, and the ends of the car, if open, should be protected by the use of old canvas or heavy paper. The use of blankets is permissable only in exceptional cases, as they invariably become displaced or torn, and are liable to get under the feet of the animals.

Loading and unloading should always be from a suitable platform. If these are unobtainable it will be necessary to construct portable ramps for that purpose.

ENTRAINING AND DETRAINING

Reference for study, Pars. 380-390, 392, 393, 396, 398, 399, 401-402, 407, 409, 410, *Field Service Regulations* 1914; 287-309 inclusive, *United States Transport Regulations* 1914; Pars. 811-817, *Cavalry Service Regulations* 1914, *General*; Pars. 1728-1808, D. & S. R. F. A.

THE ORDER IN WHICH TRAINS ARE MADE UP

1. Flat cars containing Guns, Carriages, Wagons, Pontoons, etc.
2. Box cars containing property.
3. Stock cars containing animals.
4. Box cars containing forage.
5. Baggage cars, last one containing travel rations with open end to rear.
6. Passenger coaches and tourist sleeping cars.
7. Standard sleepers for officers.
8. Kitchen cars. In case kitchen cars are used it would be found advantageous to place them in the central part of the train used by the men, rations being stored in a baggage car adjoining.

The stock cars furnished which may be used are:

1. The Palace stock car, length 36 feet to 40 feet, capacity 16 to 20 animals, each animal in a separate stall with a compartment for attendants.
2. The improved stock car, length 36 feet, capacity 20 to 24 animals, with facilities for feeding and watering in the car.
3. The ordinary stock car, length 30 feet to 34 feet, capacity 16 to 20 animals, with no appliances of any kind.

The capacity of both the ordinary and the Palace stock car averages about 18 Artillery horses per car. The ordinary stock car will carry about 20 mules.

Harness, kitchen supplies, officers' baggage, and such of the personal equipment of the men as are not necessary on the journey are carried in a baggage car provided for the purpose.

Box cars are provided for forage, ammunition, and other property according to the necessities. Box cars are usually at least 36 feet in length. The interior cross section is about 8 by 8 feet. The load capacity varies from 40,000 to 100,000 pounds. It is inadvisable, however to load a car to its capacity, and 40,000 pounds may be assumed as the load and 1,800 to 2,000 cubic feet as the cubical capacity of the average box car.

The weight limits the amount of ammunition and of grain which can be carried in a single box car. Cubical capacity limits the amount of military stores of other kinds, especially hay.

Twelve hundred pounds, or 100 rations, of oats occupy a space of about 40 cubic feet. Fourteen hundred pounds, or 100 rations, of baled hay occupy a space of about 120 cubic feet. When access must be had to forage during the journey, 1,200 rations is a suitable load for a forage car.

Animals are carried in stock cars or Palace stock cars. If Palace stock cars are not available, a box or stock car should be provided for each six privately owned officers' mounts.

The amount of baggage, forage, and rations to be taken depends upon circumstances, and should be definitely prescribed in the order directing the movement. Ordinarily rations and forage sufficient for three days after the completion of the journey is ample. More than this is generally unnecessary and causes delay and congestion in entraining and detraining.

Horse Artillery organizations require the same number of cars as corresponding organizations of Light Artillery, with the exception of stock cars for the animals of the batteries. A horse battery on a peace footing requires 9, on a war footing 14 stock cars.

When Battery Train must be divided into two sections, the first section contains the forage car, all the stock cars and one sleeping car and the second section all the remaining cars. The first section should be under the command of one of the Lieutenants and he should have with him the Stable Sergeant, the horseshoer, one of the mechanics and a number of other men that can be accommodated.

INSPECTION

Each Train Commander should detail an officer to accompany the Quartermaster during the inspection of the cars made after the train is turned over to the troops for loading. The stock cars must be inspected to see that they are in good condition throughout, examine the cars to see that there are no broken boards, loose boards, rotten flooring, loose fixtures, protruding nails, loose sides, splinters on the inside, and see that the floors and stalls are clean. Before accepting cars in time of peace, commanding officers should see that these conditions are fulfilled.

In time of war when cars are found unsuitable it is often necessary to make such repairs as possible and proceed with the loading. A report should be forwarded setting forth the condition of the car.

The cars should be cleaned and floors covered with sand or sawdust, hay and straw should never be allowed in the cars on account of fire.

Before loading an officer detailed to load the horses accompanied by the Stable Sergeant and one or more of the mechanics, makes a detailed inspection of the stock cars examining the cars for all things mentioned above, being careful to note whether any of these defects are on breast bars or doorways themselves. The necessary repairs are made and breast bars are put in place and doors firmly fastened.

PREPARATION FOR LOADING

So far as practicable all forage and animals should be at the loading place before the train arrives. The animals should arrive in time so that the horses may be unharnessed and the harness placed convenient to the loading places. As soon as the battery has been unhitched the teams should be taken to the vicinity of the place where they are to be loaded and there unhitched. Each two pair should be held by one cannoneer detailed by the chief of section and the remaining cannoneers

assist the drivers in unharnessing and securing the harness. When harness sacks are available the harness of each pair is packed in a sack and plainly marked. Horse equipment of officers and individually mounted men are placed in sacks and plainly marked. The horse equipment of officers is placed in the baggage car and in the separate cars provided for the private mounts. When no harness sacks are available use paulins. The following method is convenient:

In the description north, south, east and west refer to the sides of the paulin, as it lies on the ground, and are used merely for convenience any particular side being designated as north.

Spread paulin on the ground, marks down, place near swing collar in center paulin, bearing surfaces up, top north, near wheel and lead collars on right and left of it, bearing surfaces up, tops south. Place saddle blanket of each horse on his collar, folded as when placed on harness peg. Place off collars on blankets, bearing surfaces up, tops in a direction opposite to those of near collars. Place blankets on collars. Place near saddles on blankets, north and south, attachments folded across seats. Place off saddles upside down across near saddles, attachments underneath. Lay bridles between bars of off saddles. Fold near and swing traces and lay them on the pile, lengthwise. Place the neck yoke on the ends of the off blankets on one side of the pile. Fold wheel traces once and place on the other side of pile.

Fold east and west sides of paulin over ends of pile then north and south sides. Pass a picket rope around center of bundle, turn it once on itself, then take a turn around each end of the bundle with the free ends; cross these ends over ends of bundles, roll the bundle over, pass the ends of the rope along the other side of the bundle taking a turn around the binding parts of the rope in passing and engage the hook in the ring. Or, lay the picket rope on the ground, its center forming a U, the sides of which are about 2 feet apart. Spread the paulin over this and proceed as before. After the bundle is folded, the binding is somewhat simpler than in the first case, but the bundle will be secured by only two turns instead of three and there will be an excess of rope. Tying a knot in such a heavy rope is difficult.

The harness having been secured in bundles the cannoneers place them convenient to the loading place. In carrying the bundles care must be taken to hold them clear of the ground.

If stables or permanent picket lines are available near loading place the horses should be secured there and left under charge of two drivers detailed as guards, otherwise horses of each section should be formed in a circle the halter tie rope of each horse being tied securely to the halter of the horse next to him. Each chief of section details a driver to remain with him, in which case the horses are given a feed of hay which should have been withheld from them for some hours before and should be watered about one hour before.

If the horses will probably be unloaded during the journey, each chief of section collects the feed bags belonging to his section and turns them over to the Stable Sergeant, who makes a memorandum thereof. The grain bags are retained by the men, who pack them with their saddles.

The Stable Sergeant sees that the feed bags, necessary grain measures, a few bandages and disinfectants and stable tools are placed in the center of the forage car, so as to be readily accessible.

Procure loading pens and chutes if possible. If none are available get railroad platforms or ramps. Make a ramp well supported with strong sides and provide it with cleats to prevent slipping. Lanyards should be attached to each side of the floor near the middle and made fast to truss rods in the middle of the car, to prevent the ramp from sliding off the car near the door sill. Boards and brush may be used to make a bridge. As a last resort use a bridge of earth to reach as near as possible to the side of the car and bridge the gap with the car door.

If loading with improvised facilities, always try to get the car in a shallow cut.

For each car being loaded four selected noncommissioned officers, a mechanic, and a gun squad should be detailed. Two of the noncommissioned officers are detailed to work inside of the car. The remaining noncommissioned officers are detailed to work at the door of the car. Two of the members of the gun squad are detailed to collect the halter tie ropes and see that they are turned over to the Stable Sergeant at the forage car. The remaining cannoneers assist the noncommissioned officers at the doors. When chutes are available all these men except the noncommissioned officers should remain outside the runways until they are needed. When pens and chutes are available the horses are penned by carload lots. A noncommissioned officer and a driver squad are assigned to work in each loading pen. The horses should not be loaded until the loading of all carriages and stores has been completed.

When the journey is to exceed 24 hours suitable arrangements should be made with the railroad authorities for the stop for feeding, rest, and exercise. It is desirable that the place for unloading should be selected several hours beforehand so that proper notice may be given to the station agent and other railroad officials. In order to avoid reloading the animals at night a station should be selected that will be reached about noon.

The necessary requirements for a suitable feeding station are water and a platform, or preferably, a chute for taking the animals out of the cars.

Ample stock pens, dry footing facilities for renewing the bedding in the cars, etc., are also desirable.

In the United States the state laws for shipping stock should be consulted and complied with.

LOADING

The remaining drivers bring the horses from the loading pens and place a new carload lot in the loading pen as soon as the preceding lot has been loaded. As the horses arrive the drivers in the loading pen remove the halter tie ropes and pass them to the cannoneers detailed to collect them. The gate to the runway is kept close until the gangplank is in place, the side gates closed against the gangway, and the

noncommissioned officers in place. Everything being in order, the gate is opened and one of the drivers leads a docile horse up the runway; the remaining drivers cause the horses to follow as closely as possible. This is accomplished without shouting or otherwise exciting the animals. Horses that hold back are slapped or gently struck across the rump with a tie rope. The noncommissioned officers inside the car place themselves near the door and keep the horses quiet by speaking to them. When the first horse arrives, one of the noncommissioned officers takes him from the driver and leads him to one end of the car. After this the noncommissioned officers confine themselves to keeping the horses quiet and preventing them from leaving the car. Trained horses are thus allowed to pack themselves in the car. It is desirable that as many horses as practicable be placed in each car not provided with separate stalls.

With horses not trained in loading each noncommissioned officer may be assisted in the car by two men whose duty it is to hold the last horse received in place across the car. In leading horses be careful to face the front and do not turn around and look at the horse.

The car having been filled, the noncommissioned officers inside the car first put up the breast bar and leave the car. The gangplank is swung back, the side gates slipped back, and the car door closed. The mechanic fastens the door securely.

When loading pens are not available and the horses must be loaded from a platform similar methods are used except that all the horses are led by drivers into the car. The halter tie ropes are taken off after entering the car and turned over to the cannoneers collecting them as the drivers pass out. In leaving the car the drivers must be careful to avoid interfering with horses just entering.

If shy of the ramp a little hay thrown on the ramp will make them less shy. Do the loading quietly and have the animals follow one another promptly. Before loading the car see that the door on the far side is closed and fastened.

In some cases it may be necessary to blindfold an animal before he can be led into the car. An obstinate animal can sometimes be made to enter by holding his head up, twisting his tail and pushing him into the car by main force. Another method which can be used is to drop a loop over the horse's croup, pass the end of the rope through the halter to the nose piece and pull on the rope, this will make him move forward a step or two; if he does not continue to move up the ramp get enough men on the ramp to pull him in. Another method which can be used, is to tie a blanket over his head or otherwise blindfold the animal, turn him around several times and lead him up the ramp.

The first animal is led to one end of the car, the second to the other end, leaving the center of the car for the last animals loaded, the animals are arranged so that the alternate ones face in the same direction. Each one led in must be held until the next one is in place.

Load quietly and avoid exciting the animals by too much haste or too much delay.

The man in charge should be equipped with a saw and hatchet to cut an animal loose if the hoofs get fastened between the sides of the car.

Except in hot weather the animals should be packed snugly together. If an animal falls down and he cannot get up without assistance, the man in charge should crawl along side of the car and take the animal by the halter; with this assistance he will probably get up.

DETRAINING

The train conductor should be requested to notify the train Commander immediately before any halt of 10 minutes or longer is to occur. During that time the stock cars are to be inspected by an officer, the Stable Sergeant and mechanics and any necessary repairs are to be made at this time.

Before reaching the feeding station the senior noncommissioned officer in each car details a cannoneer to remain in the car as a guard, causes the drivers to get out their grooming kits and cautions the men that their remaining equipment, except pistols, is to be left in the car.

Upon reaching the feeding station the men, except the Mess Sergeant, the cooks and guards, are notified to leave the cars and fall in at a designated place. Roll having been called, the drivers are formed separately from the cannoneers.

Two gun squads are detailed to assist the Stable Sergeant in preparing the forage. These men are at once marched to the forage car. The Stable Sergeant, upon reaching the forage car, gives the halter tie ropes to one of the gunners who, assisted by a cannoneer, takes them to the stock cars and distributes them as they are needed. These men are responsible for collecting the tie ropes and turning them over to the Stable Sergeant when the horses are reloaded.

The Stable Sergeant causes the remaining men of his detail to put one feed of oats in each feed bag and to distribute one feed of hay at the feeding places.

The feed bags are not taken to the feeding places until the animals have been watered, when all the cannoneers assist in this distribution. No attempt is made to give the horses their own feed bags.

As soon as the stock cars have been unloaded, the mechanics begin the repairs. An officer should be detailed to inspect the cars and have the floors resanded. Before any car is unloaded sufficient drivers to provide one for each two horses, are sent to join the detail of four selected noncommissioned officers, a gun squad and one mechanic detailed to each car to be unloaded. The drivers each secure two halter tie ropes. An officer should be in charge of this unloading.

Two of the noncommissioned officers of the above detail are assigned to work inside the car, the others working outside at the door. The cannoneers assist the latter noncommissioned officers and also assist the drivers in catching up the horses. The mechanic removes the fastenings and assists in opening the door.

The principle difficulty in unloading is in preventing the horses from leaving the car before the gangway, gates, or side rails, etc., are in place and in avoiding overcrowding in the doorway.

As soon as the car is in place the door is opened enough to permit the noncommissioned officers who work inside to enter. These men at once enter, leaving the breast bar in place, and quiet the horses nearest the door by speaking to and caressing them. Everything being in readiness the door is completely opened and the gangway, gates, etc., put in position as quickly as possible.

If a loading pen is available the drivers and cannoneers assigned to the car go into the pen to catch the horses up after they enter it. If no pen is available the drivers and cannoneers line themselves up on either side of door, each one taking an animal in turn as he leaves the doorway. All men being in their places the noncommissioned officers inside the car remove the breast bar, and every endeavor is made to make the horses leave the car quietly and in single file.

The cannoneers assist the drivers in catching up the horses. As soon as all the animals of the first lot have been caught up the pairs are formed in column and the drivers lead the horses around at a slow walk. A noncommissioned officer should be designated to lead the column of this first lot. As each succeeding car is unloaded and the horses caught up, the drivers join the rear of the column.

If ample feeding lots are available a separate lot should be assigned each separate car. In any case no attempt is made to separate the horses by sections, but effort is made to keep together the horses that have been in the same car and to reload them together. Drivers remain with the pairs which they catch up and do not attempt to find their own horses unless the latter are with the same carload to which the driver is assigned. In this case a driver may be allowed to take his own horses after they are tied up for grooming and feeding.

The object of walking the horses and of the subsequent grooming is to remove the stiffness and swelling of the legs induced by the long standing in the cars. For this reason the exercise of the horses should be continued for 10 or 15 minutes after the unloading of the last car has been completed.

Hay having been distributed and the exercising completed, the horses are properly secured and then groomed while they are eating hay. During the grooming particular attention is paid to cleaning and hand rubbing the legs thoroughly. All kicks, cuts, and abrasions are reported to the Stable Sergeant, who visits all the horses at this time.

During the grooming the cannoneers proceed to the stock cars and renew the sanding if material is available. Tools for this purpose may frequently be had from the railroad or stockyard authorities or they may be taken from the carriages. Sometimes it may be necessary to detail a number of cannoneers to draw water for the animals.

The grooming is continued until the animals must be watered, which should be in time to allow them to eat their grain before it is necessary to begin reloading.

At the proper time the officer in charge of renewing the sand causes the cannoneers to take the filled feed bags and to distribute them after all the horses have been watered. He then details a gun squad to

collect the feed bags and turn them over to the Stable Sergeant at the forage car after they have been removed from the horses.

At least two hours should be allowed for unloading, feeding, and reloading.

In all loading and unloading particular care must be exercised to avoid any shouting or excitement on the part of the men; these are the principle causes of excitement on the part of the horses, which, in turn, is the source of most difficulties in handling the animals.

The horses after being unloaded are arranged by sections and are secured at once, care being taken that they are not tied to a flimsy or movable object. The feed bags are not filled but a feed of hay is fed at once. Two or more cannoneers are set to work to sort the feed bags out by sections and later when the horses are being harnessed, to turn them over to chiefs of sections.

In unloading the harness it is arranged by sections so as to give ample room for harnessing. Ordinarily the battery should harness, hitch in and clear the vicinity as soon as the horses, carriages and harness have been unloaded.

The first essential in loading and unloading is a definite plan, comfortable to existing conditions so that it may be methodically executed without undue haste.

If the trip is to be for a great length of time the horse's shoes should be removed. (This applies more especially to a sea voyage.)

PACKING DRIVERS' ROLLS

(Taken from D. & S. R. F. A. Chap. XIII)

FIELD AND SURPLUS KITS

The field kit consists of the arms, personal and horse equipments and clothing, additional to that worn on the person, required by and prescribed for the soldier in the field.

The articles comprising the kit vary with the duties of the men and are furnished by the Ordnance Department, the Quartermaster Corps, and Medical Department.

The field kit consists of the arms, personal and horse equipments as shown below.

ORDNANCE PROPERTY

(a) Personal Equipment

Articles	Where carried
1 can, bacon	Near saddle pocket.
1 canteen	Near cantle ring.
1 canteen cover	On canteen.

1 cup	On canteen, under cover.
1 fork	Near saddle pocket.
1 knife	Near saddle pocket.
1 spoon	Near saddle pocket.
1 meat can	Near saddle pocket.
1 pistol, belt, holster, magazine pockets, 2 extra magazines, 21 cartridges	On person, belt outside all clothing, pistol on right hip, first aid packet on left of and toward front of belt, magazine pocket in front of first aid packet.
1 pouch for first aid packet	
1 spurs, pair	On person, buckles outside.
1 spur straps, pair	

(Mess Kit)

(b) Horse Equipment

1 bridle	On horse.
1 halter headstall	On horse.
1 halter tie rope	On halter, free end secured in rear pommel ring.
1 link	On bridle, free end snapped up.
1 saddle blanket	On horse.
1 saddle	On horse.
1 saddlebags, pair	On saddle, the saddlebag straps passed through the cincha rings and drawn tight before fastening.
1 surcingle	Over saddle, buckled on near side.
1 currycomb	Off saddle pocket.
1 horse brush	Off saddle pocket.
1 feed bag	On saddle.
1 grain bag	In feed bag.

(Grooming kit)

QUARTERMASTER PROPERTY

(c) Equipment

Articles	
1 identification tag	Slung around neck by tape.
5 pins, tent, shelter	In blanket roll.
1 pole, tent, shelter	
1 tent, shelter, half, mounted	Around and forming part of blanket roll.

(d) Clothing Component

1 blanket	In blanket roll.
1 slicker	Rolled and strapped to pommel of saddle.
1 towel	Off saddle pocket, outside canvas lining.

1 comb	Wrapped in towel.
1 soap, cake	
1 toothbrush	
1 drawers, pair	In blanket roll.
2 stockings, pairs	
1 undershirt	

(e) Rations

2 reserve rations, each consisting of:—

12 ounces bacon	In bacon can.
16 ounces hard bread	Divided between saddle pockets.
1.12 ounces coffee, R. & G.	In coffee bag of saddlebags, in near pocket.
2.4 ounces sugar	In sugar bag of saddlebags, in near pocket.
0.16 ounces salt	In salt bags of saddlebags, in near pocket.

(f) Forage

1 feed, 4 pounds of grain..... In grain bag.

(g) Medical Property

1 first aid packet..... In pouch on belt.

When the sweater is carried and is not worn on the person it is placed in the blanket roll. When the overcoat is carried and is not worn it is rolled and strapped on the pommel of the saddle.

To roll the Overcoat or Slicker: Spread the overcoat on the ground, inside down, skirt buttoned throughout, sleeves parallel to the middle seam, collar turned over on the shoulders.

Turn the tails of the coat under about 9 inches, the folded edge perpendicular to the back seam. Fold over the sides to form a rectangle not more than 34 inches across, according to the size of the coat. Roll tightly from the collar with the hands and knees, and bring over the whole roll that part of the skirt which was turned under, thus binding the roll.

The slicker is rolled in a similar manner.

To make the Blanket Roll for Mounted Men: Spread the shelter half (model 1904) on the ground, roll straps underneath, and fold over the triangular part of the rectangular part. Turn under the roll strap edge of the shelter half so that the width of the fold will be 8 inches. Fold the blanket once across the longer edges and lay the blanket on the shelter half, folded edge within 1 inch of the roll strap edge of the shelter half. Fold the sides of the blanket and of the shelter half inward, width of folds about 11 inches. The shelter tent pole and pins are now laid on the blanket at the edge farthest from the roll strap edge, pole on one side of the center line, pins on the other, so as to allow the roll when completed to bend at the center. Place the underclothing on

the blanket. If the sweater is to go in the roll, spread smoothly over the blanket.

Roll tightly toward the roll strap edge, using hands and knees, and bring over the entire roll the part of the shelter half which was turned under, thus binding the roll. Buckle the two available roll straps about the roll, passing them around twice. The roll thus formed should be about 44 inches long.

To pack the Feed Bag for Individually Mounted Men: The grain is placed in the grain sack and equally divided between the two halves. The elongated grain sack is then placed inside the feed bag and the whole lashed tightly to the blanket roll by the web straps at each end of the feed bag, so that the open part of the feed bag is closed against the blanket roll. If empty, the feed bag, with grain sack enclosed and all web straps buried in the bag, is lashed to the blanket roll by the coat straps.

To pack the blanket roll with the attached feed bag, three coat straps are used, one to fasten the middle of the roll to the middle of the cantle of the saddle, and one at each end to fasten the end of the roll to the saddlebag strap ring. The blanket roll is placed on the cantle so that the feed bag will be uppermost. The coat straps are passed twice around the roll and buckled.

The equipment of each driver is the same as for individually mounted men with the exception of horse equipment and grain.

The driver's horse equipment consists of 1 horse brush, 1 curry comb, 2 feed bags, 2 grain bags, and 2 surcingles. Each driver carries a feed of grain for each horse. Halters, saddlebags, saddle blankets, etc., are included in the harness.

The driver's canteen is snapped in the near pommel ring of the off saddle. His saddlebags, blanket roll, feed bags, slicker, etc., are likewise packed on the off saddle. After attaching his slicker the driver turns the top of the roll over the pommel down into the saddle so as to avoid any interference with the rein roller on the off saddle. When old model canteen and cup are issued the cup is carried in near saddle pocket.

To pack the Driver's Blanket Roll and Feed Bags: The grain is placed in the grain sacks and each sack placed in its feed bag. The two feed bags are tied securely together at their open ends, using the "nose and head" web straps, the two bags being tied as closely as possible to prevent the lower ends chafing against the traces. The two feed bags are then suspended across the seat of the saddle of the off horse and lashed in place by the 60 inch coat straps on each side, as follows:

Pass the coat strap under the rear quarter strap and take one turn around the nose bag, if necessary punching a "throat" into the bag near the lower end to prevent the coat strap slipping. The blanket roll being lashed to the center of the cantle, bring the free end of the roll forward so as to bind over the feed bag and take two turns with the coat strap; then pass the free end of this strap over the straps thus in place and buckle tightly. Do the same on the other side.

If more than one feed is to be carried, place the grain for the first feed in the closed end of the feed bag and lash the feed bag tightly with the rawhide thong. Put the remainder of the grain in the grain sack, and place the grain sack in the feed bag; secure two feed bags to the off saddle as above.

The surcingles are carried one on each horse, buckled over the saddle.

With the exceptions noted, all articles of the driver's equipment are packed and carried in a manner similar to that described for individually mounted men. Blanket rolls will be placed well up on cantle of saddle; in the saddle when possible so as to prevent any possibility of having weight on horses loins.

In addition to the kits above prescribed, each corporal is provided with a housewife which he will carry in his haversack or off saddle pocket.

The members of the special details and of the headquarters company are provided with various equipment which they carry on their persons. The field glasses will be carried on the right side, the flag kit on the back, the strap in each case passing over the left shoulder.

For fastening the poncho and slicker, two straps are necessary. These are passed through the staples on each side of the pommel.

Individually mounted men will place nose bags on, with near side of blanket roll inserted in nose bag and both firmly strapped together. If nose bags are empty, a nose bag is placed over each end of blanket roll and strapped together with nose bag straps. The roll is buckled and fastened as described above.

It is well to fasten saddle bag to "D" ring on cincha.

The roll should be of proper length and rolled tightly and there should be no part of the roll touching the horse, being especially careful to keep weight off the loins.

KNOTS

CORDAGE

A cord which is more than one inch in circumference is usually called a **rope.** Ropes are made of hemp, flax, cotton, coir or other vegetable fiber; or of copper, steel, or other flexible metallic wire.

Several vegetable fibers twisted together form a **yarn,** the size of the yarn depending upon the size of the rope. Several yarns are then twisted or spun into a **strand.** Three or four of these strands twisted together form a **rope.** Beginning with the fibers composing the **yarn,** the twists of the different parts always alternate in opposite directions Thus the fibers are twisted right to form the yarn; the yarns are twisted left to form the strand; the strands are twisted right to form the rope; the ropes are laid up left to form the cable. This alternation in the that is, in following the strand away from the observer the rotation will twist serves to keep the rope in its proper form when under tension. Ropes have special names according to the number and arrangement of strands. The **three strand rope** which is laid up (twisted) **right hand,**

be clockwise, is called a **plain laid** or a **right hand rope.** Such rope is said to be laid up "with the sun."

The size of rope is determined by its circumference in inches. Any cord less than an inch in circumference is determined by its diameter.

When **four strands** are laid up (twisted) **right handed,** the rope is called **shroud laid.** Since the four spiral strands would leave a hollow in the center they are usually laid up around a smaller inner rope called the **heart** or **core.** In **splicing,** this **heart** or **core must** be removed in the part of the rope unlaid for splicing.

Cable laid rope is made by laying up three ropes of three strands each. The individual ropes are laid up right handed in themselves and then the three ropes are laid up into one cable left handed.

Ropes and cord are also **braided** by machinery, being made from hemp or cotton yarns; an example is found in sash cord.

Wire rope is made up of wires twisted into strands, six of these strands being usually laid up into a wire rope around a wire or hemp core.

White or untarred rope is more flexible and stronger than tarred rope. Since there is less waste of power due to stiffness of cordage, it is more suitable for tackles.

Tarred rope is more durable, particularly when exposed to moisture The tarring reduces the strength of the rope but prevents it from rotting.

All smaller sized cordage usually called line cord, twine or spun yarn is known as **"seizing stuff."** The different kinds have special names according to the number of strands and manner of laying up.

Coiling: Right handed rope should be coiled clockwise and vice versa for left handed rope. Metal wire ropes of large size should be coiled in **figure of eight** which enables its being uncoiled without kinking.

Uncoiling and stretching: Before using a rope it should be uncoiled against its lay to get the turns out without kinking. All new rope should be stretched before using. Old rope should be frequently tested by stretching. Any rope used in blocks particularly new rope, will have a tendency to twist, and the greater the strain the greater the tendency of the rope to unlay itself and so cause a twist.

To stretch a rope uncoil it by following and unkinking the rope for its full length; attach one end of the rope to a swivel-hook block which is secured to a hold-fast clear of the ground; connect the other end with a capstan or attach it to the pintle of a horsed limber and pull taut, whereupon the rope will begin to unlay and spin the block around, thus taking the twist out of the rope. In order to remove the twist permanently, a rope should be made fast and left taut for an hour or more. In this way a rope may be tested for strength as well as stretched.

CARE OF CORDAGE

(a) Always keep as dry as possible.

(b) When not in actual use, it should be coiled and raised off the ground, keeping large rope on a skid and small rope hung up on pins or hooks.

(c) Never coil rope until it is perfectly dry. If stored in a damp condition or in a damp place it will rapidly deteriorate. Always coil up neatly and label.

(d) Exterior appearances may be **all right** whereas rope may be worm eaten or moldy inside; therefore always test strength of rope before using.

(e) Rope in storage should be uncoiled, dried and stretched every six months.

(f) Picket rope on the carriages should be similary treated at least once a month.

(g) Any part of a rope exposed to chafing should be parceled, that is, protected by narrow strips of well tarred canvas.

(h) Where rope passes over projections, corners or sharp edges, these should be carefully padded with a gunny sack or pieces of wood to avoid damage to the rope.

(i) When a weight is to be raised it should be prevented from swaying or held in position by means of a **guy rope,** thus avoiding damage to the lifting rope.

(j) In adjusting a sling always avoid placing the splice over the lifting hook or a sharp corner. A sling should always be carefully adjusted, jammed down and hauled taut before beginning to lift. This will insure that the strain is gradually equalized throughout the whole rope. Furthermore proper adjustment of a **sling** will prevent contents of sling from falling out.

(k) The breaking weight of an ordinary picket rope (2½ inch to 3 inch rope) is about 3 tons for dead loads. The **safe load** which can be put on a rope is much smaller, usually not exceeding one-third to one-half the breaking weight. With old rope and live loads, a larger factor of safety must be used.

(l) The strength of a new rope varies as the square of the circumference of the rope.

The **bight** of a rope is any part of it not an end. A **bight** or **loop** is formed by bending or doubling the rope. The spaces between the strands of a rope are called the **jaws.** A rope is **long-jawed** when it is loosely twisted or laid up; it is **short-jawed** when it is tightly laid up or twisted.

The free end of the rope is called the **running end.** The rest of the rope is called the **standing end** or **part.**

Stationary ropes such as guys, stays, etc., are called **standing rigging.** Ropes that run through blocks or pulleys are called **running rigging.**

Whipping a rope is winding a piece of twine around the end to prevent it from unlaying or fraying out. Twine or other stuff is issued for whipping. **Worming** is filling up the jaws of the rope by laying spun yarn or other small stuff along them. This is done in order to make the surface smooth for parceling.

Parceling a rope is wrapping narrow strips of well tarred canvas around it in order to protect it from water, or to prevent the rope from being chafed or cut when bearing against a rough surface or sharp edge.

Serving is winding spun yarn or other small stuff around a rope. The turns are laid on close together and drawn tight by means of a **serving mallet.** The **service** is always put on against the lay of the rope.

Splicing a rope is joining two ends together or joining an end of a rope to any part of it by interweaving the strands in a regular manner.

Seizing a rope is to lash two parts of it together or to lash any part of a rope to prevent it from unlaying by means of spun yarn or seizing stuff.

Pointing a rope is to taper an end so that it can enter a hole or block more easily.

Frapping a rope is to draw together two or more leads on a rope for the purpose of taking in slack.

Nippering is binding together two or more ropes to prevent them from slipping over each other. This is usually done by means of a loop twisted taut with a stick.

Mousing: When a hook is closed with cord or yarn so as to prevent it from disengaging or slipping its lead, the hook is said to be **moused.**

KNOTS

It is very important that every man not only learn how to tie the following knots, but also understand for what purpose each knot, lashing and hitch may be used and the different ways in which the same knot, lashing or hitch may be applied, depending upon circumstances. Almost all the knots, lashing and hitches indicated below are described and illustrated in the *Engineers' Field Manual*, Pages 174 to 185, which publication should be in the possession of every instructor.

No man can become expert in the use of ropes without thorough fundamental instruction supplemented by constant practice and manipulation. To enable their men to acquire this manual dexterity, instructors should provide the necessary rope and other equipment for tying knots and making hitches, splices, etc. For practice in tying knots, etc., the shelter tent rope, halter ropes, and later on picket ropes may also be used. For practice in splicing, old and new rope either plain or shroud laid, in five or six lengths, will be found most convenient. Every man should be required to qualify on all the knots, splices, hitches, lashings and use of blocks and tackles comprising this course (See *Engineers' Field Manual*, Page 174).

1. Overhand or Thumb Knot.
2. Figure 8.
3. Square or Reef Knot.
4. Draw Knot.
5. Thief Knot.
6. Granny Knot.
7. Fisherman's Knot.
8. Flemish Loop.
9. Running or Slip Knot.
10. Chain Knot.
11. Bowline.
12. Running Bowline.
13. Bowline on a Bight.
14. Mooring Knot.
15. Greble Knot.
16. Prolonge Knot.
17. Single Sheet Bend. (Weaver's Knot)
18. Double Sheet Bend.
19. Two Half Hitches.

20. Round Turn and Two Half Hitches.
21. Fisherman's Bend or Anchor Knot.
22. Clove Hitch.
23. Timber Hitch.
24. Rolling Hitch.
25. Lever Hitch.
26. Blackwall Hitch.
27. Midshipman's Hitch.
28. Telegraph Hitch.
29. Catspaw.
30. Sheep Shank.
31. Wall Knot.
32. Crown on Wall.

The descriptions of knots, etc., given below are supplementary to those given in the *Engineers' Field Manual*. A few knots not given therein are also described.

A **draw knot** differs from a **square knot** in that one or both ends are not pulled through, permitting it to be readily untied. This is the knot commonly used in tying shoe laces. It is used for joining two ends of a rope when it is required to untie the knot readily or from a distance.

Fisherman's Knot: Used for joining two stiff ropes whether of the same or unequal size. It is by tying an overhand knot on the end of each rope that the knot will bind the other rope. The two knots and ends are then pulled together. When necessary to insure the knot from slipping, two overhand knots instead of one may be made on each rope.

Flemish Loop: A loop on the end of a rope after which an overhand knot is tied with the running end around the standing part and drawn taut. Useful knot whever a standing loop is desired.

Running or Slip Knot is used to form a loop that will tighten up around an object when the rope is pulled. It may be single or double.

Chain Knot: A series of loops on a cord or rope in which each loop successfully locks the one above it and the last loop is secured by passing the end of the cord through it. This knot is used to shorten up a cord and may be ornamental, as on a trumpet cord.

The **Greble Knot** is used in tying a halter rope to the picket line. A half turn is taken around the picket rope and the halter rope doubled back over the standing part of the rope, whereupon another half turn is made around the picket rope in the opposite direction and the halter rope again doubled back around the standing part, the running end being finally passed under the standing part of the rope. This knot will not slip along the picket rope and cannot be easily untied by a horse. Other convenient hitches on the picket line are the rolling hitch and the mooring knot. The rolling hitch is a very hard knot to untie if the rope has become wet.

Prolonge Knot is used to make a loop that will not run up. It is similar to the Carrick bend and would be represented by the Carrick bend, if the two ends on either side were joined to form a loop, which is passed around the trail. Unless the pull is applied to both the ends, this knot is apt to jam so that it cannot be readily untied. It is used to attach the trail of a field gun to the limber.

Lever Hitch consists of an incomplete overhand knot along the bight of a rope held by some pin. It is used to pull up pickets, to secure wooden rounds of a rope ladder or to draw seizing tight.

Midshipman's Hitch is a variation of the Blackwall Hitch. After having made the Blackwall hitch another hitch is made around the outer part of the hook. It is better adapted than the Blackwall Hitch because it does not slip or become undone as readily as the latter.

The **Wall Knot** and the **Crown on Wall** are both used for finishing off ends of ropes to prevent unstranding.

Splices. (Page 181, *Engineers' Field Manual*)

1. Eye Splice,
2. Long Splice,
3. Short Splice.

Slings.

1. Horizontal Barrel Sling,
2. Vertical Barrel Sling,
3. Ordinary Sling,
4. Body Sling.

The ordinary sling is nothing more than a large bowline made into a sling around a box, barrel or package.

If the loops of a bowline on a bight are made large these loops may be used as a body sling, one loop passing under the arm pits, the other loop under the knees.

Lashings. (Page 182, *Engineers' Field Manual*)

1. Shear Lashing.
2. Gin Lashing,
3. Square Lashing,
4. Hold Fasts.

Blocks and Tackles. (See page 185 *Engineers' Field Manual.*)

The following are the principle points to be carefully observed in the arrangement and the use of **tackles.**

(a) That the condition and strength of the straps, blocks and fall are good.

(b) That the fall is free from kinks and runs freely over the sheave.

(c) That the lead and running end of the fall do not rub against the shell.

(d) That the running end goes in the proper direction, otherwise both the fall and the shell will suffer.

(e) That the blocks are well lubricated, and both blocks and fall are at all times kept free from dirt and grit. Blocks not in good working order will "complain," that is, make a noise or squeak.

(f) Tackles should be carried and not dragged along the ground.

(g) See that the pins securing the hook and the sleeves of the blocks are not loose, that the standing end of the fall is properly fastened to the block.

(h) See that the fall is properly stoppered and that the stopper is fully equal to the strain to which it will be subjected.

(i) The position of the men should be such as to insure safety to themselves in case of accident.

(j) Men should be trained to pull together silently. At the caution "fast" the slack is taken in, and at the command "heave" they should pull together and keep what they gain.

(k) To prevent long tackles from twisting it is a good plan to leave them so that the running end comes from the center sheave.

(l) Never trust to hold a suspended weight directly by man power alone. If it is possible, always take a turn around some object and in this way hold securely what has been gained.

(m) Always use blocks that are large enough so that the fall will run freely through the block and not ride upon the edge of the sheaves. The rope should not quite fill the grooves on the sheave.

(n) When the falls are new it will be found that the tackles have a tendency to twist. This can be prevented by placing a smooth picket at right angles between the leads as close to the moving block as possible, the picket being kept in place by a lashing or drag rope at one end while the other end is held by two men or made fast to some fixed object.

(o) Care must be taken that the men can apply their strength in the direction in which it would be most effective. This is done by using a single block made fast at some point so as to lead the fall in the direction desired.

Where the necessary equipment is available the following maneuvers should be practiced with tackles (see Pages 185-186, *Engineers' Field Manual*):

(a) Overhaul, round in and chock-a-block.
(b) Whip tackle.
(c) Gun tackle.
(d) Luff tackle.
(e) Double tackle.
(f) Triple tackle.
(g) Single Burton.
(h) Double Burton.

By the **power** of a tackle we mean its mechanical advantage or the ratio of the force exerted by it to that applied to the fall.

A **whip tackle** doubles the power.

A **whip upon a whip** quadruples the original power or multiplies it by four.

The power of a **gun tackle** is 2.

The power of an **inverted gun tackle** is 3.

The power of a **luff tackle** is 3.

The power of any similar combination of two blocks consisting of two or more pulleys each, over which a continuous rope passes, is equal to the number of parts of the rope that act on the block to which the weight is attached. The force or pull necessary to support a given weight using this kind of a tackle is therefore equal to the weight divided by the power of the tackle.

A single Burton has a power of 3. Inverted, this tackle is a whip upon a whip and has a power of 4.

A double Burton has a power of 7. Inverted it is a whip upon a whip and has a power of 8.

Field Expedients for Field Artillery.

Ropes may be attached in the following way:

For ordinary pulls: By running bowline or a clove hitch around the trail of the carriage, well back near the breech of the gun.

For a short, hard pull, as in lifting a carriage out of a ditch, take a turn with one end of the rope around the felloe as near as possible to the ground. Bring the rope over its short end and up over the tire to the front. The rope should be placed around the felloe so that it will be pulled clear of the wheel when the short end is released by the turning of the wheel.

For use without team or when it is desired to use team in advance of its regular position: By passing the hook end of one rope and the ring end of another under the doubletree on opposite sides of the pole and hooking together above pole in rear of doubletree. (For rope without hooks tie ends above pole.) With each rope a half hitch is taken around the pole near its end. Attach rope to limber in case it is desired to use teams.

When carriage is mired it may be pulled out by attaching it with a rope to the middle of a log or balk. Each end of this balk is then attached to the pintle of a limber. The balk acts as a giant doubletree between the two limbers.

For use to give wheels more traction: The rope is wound around the felloe and tire with turns about a foot apart to enable the wheel to get a grip. The ends should be fastened with a half hitch.

For use as a brake: The ropes are secured around the felloe and tire (bowline) of the rear wheels and then tied as far forward on the same carriage as possible.

To repair spokes: If spoke is split, lash with rope; if almost broken place a splint on each side and lash securely.

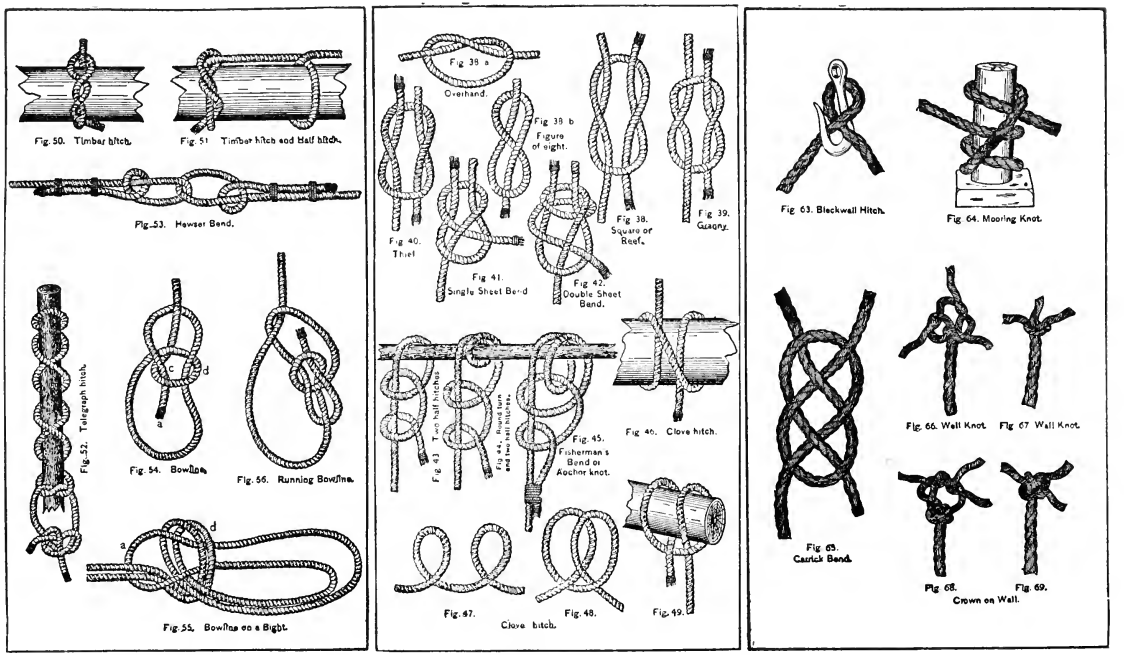
To repair pole (wooden): If pole is split lash with rope with or without splints according to the nature of the split. If pole is broken off and no extra pole is available cut a pole from a tree and fit it into the pole clamp seat and socket.

To repair pole (steel): Straighten broken ends out so as to make socket and insert wooden pole and run pin through to hold in place.

To hold lunette on the pintle, if the pintle is broken off: Place a mast-head or carrick bend over the lunette and draw it taut. Place the lunette on the pintle and bring the double ends of the rope around in back beneath the pintle. Take two or three turns back of the pintle in opposite directions with each double end and secure with a square knot.

If lunette is broken: Place the trail of the caisson in a sling (carrick bend) and bring the ends up inside the handles and through pintle and secure with a square knot.

If pintle is broken: Place a mast head over end of the lunette and run the double ends up through the lunette. Take two or three turns around back of the one turn passing through the opening above the rails.



Simple Knots

TYPES OF STABLES AND CORRALS

Stables are built in two general types, closed and open.

Closed stables are the normal type in the United States Army and in practically all other armies. They are found in all garrisons except those located in very warm climates. They afford the best shelter for animals and are necessary wherever extremely cold weather is experienced.

Open stables are common along the Mexican Border and in other warm climates, in remount depots and wherever hasty or temporary shelter is required. It was the type used overseas by the Allies both for troops and in remount depots and veterinary hospitals. While not affording as much shelter from the elements as the closed type, they are perfectly ventilated and of much simpler construction hence are to be preferred wherever the climate permits.

There are certain essential features of construction which are common to both types, i.e., site, arrangement, drainage, ventilation, light, floors and fitting.

The Site should provide pure air, a dry foundation and surroundings, good water supply, good drainage, protection from storms, sunlight, and good roads.

The Arrangements of Stables should be in echelons, or in parallel lines. They should not be built too closely together nor so as to form small inclosures on account of the lack of ventilation and sun light, and danger of spreading communicable diseases.

The Interior of Stables should be well drained as well as the exterior. Stalls should have a slight slope from head to heel. There should be a shallow open drain just outside the line of heel posts, running the length of the stable, with a small slope to sub-drain in the center or at the ends. In open stables the roof should be drained by a gutter running along under the eaves which carries the water to a sub-drain at one end.

Ventilation must be thorough and continuous—WITHOUT DRAFT. This is automatic in the open type. In the closed, it is effected by means of ventilators, louvre boards, windows and doors. Animals rarely suffer greatly from cold air provided there is no draft. They will however suffer greatly from foul air, hence the imporance of an abundant supply of fresh air. Ventilators and louvre boards are constructed in the stable roofs and serve to carry off the warm tainted air. The principle supply of fresh air is obtained through windows and doors. Windows should be built to hinge at the bottom and open inwards, thus forcing the incoming fresh cool air up and over the animals instead of directly on them. Doors are apt to cause drafts. They should be closed on the windward side in stormy weather. Any unpleasant odor perceived on entering a stable is proof of insufficient ventilation and should be corrected immediately.

Flooring of Stables should be level, non absorbent and roughened sufficiently to prevent animals from slipping. The alleyways of closed stables and roadways surrounding open stables may be made of any

suitable paving material. If nothing else is available macadam can be constructed of crushed rock or cinders and clay. The more durable the better, and the more economical in maintenance.

Stall Floorings are constructed of various materials, but for all around use there is nothing better than concrete when properly laid down. It must be level, except for the slight drainage slope, and roughened to prevent slips and falls. Its hardness is its greatest objection but this is inconsiderate if stalls are properly bedded and animals worked and tied out on the picket lines during the day as they should be.

Wood Floorings, either creosoted blocks or planks are good, but they absorb urine, and are also apt to be slippery. They wear out in a couple of years, hence are rather expensive.

Vitrified Brick makes one of the best floorings. COMMON BRICK is apt to be too absorbent. Cobble stones may be used and makes a lasting floor, but are not recommended on account of their unevenness. Failing any of these durable materials, a macadam of clay, and crushed rock or cinders may be used. Sand floors will serve for temporary use, but on account of the never ending repair necessary to keep them level, they are expensive and the least desirable. Sand is objectionable also on account of the danger of sand colic.

Plain dirt or clay is perhaps the easiest on animal's feet, but are open to two serious objections: They constantly absorb urine and are therefore unsanitary being productive of thrush and canker; they are continually wearing out requiring daily repair to keep them level. There is no greater nuisance in our service than dirt floors.

The old theory that the dirt floor was the best and most economical and that no hard material could be used on account of the animal's feet, has unquestionably been refuted by experience. Hard floors when abused are not the best, but used rationally they are, and far more economical in the long run than any soft material.

The Lighting should be ample, both for sanitation and convenience. Windows accomplish this in the day and artificial lights (preferably electric) at night.

Dimensions: Stables should be large enough to hold the number of stalls required. They should be wide enough for full length stalls and in closed stables allow for one or more alleyways about 12 feet wide. They should be high to assist in securing good ventilation. The dimensions of stalls should be eleven feet in length from wall to heel post and 5½ feet wide.

Fittings: Mangers should be of iron sheeting. There is no better manger than one made of iron sheeting in the shape of a rounded trough about two feet wide and one foot deep, and running across the full width of the stall. The sides are bent around and secured to 2 by 4 or similar rails about 3½ feet above the floor. The ends should be closed. There should be nothing below the trough except props from its outer edge to the wall for support when necessary. The advantages of this manger are: easy to keep clean; holds large quantity of feed

necessary when chop is fed; permits spreading out of the feed to break up greedy feeding; catches any hay falling from hay nets or racks above; can be used for long hay if desired; economy, saving feed; and favors thorough cleaning of stall floors.

Various types of metal feed boxes are issued, which are sanitary and serve to feed grain. Their capacity is too small however to hold a proper chop feed, and they are not as desirable as the manger. For feeding cooked feeds there should be a shallow bucket, which is set down in the manger.

If hay nets are used, and they should be, no hay rack is necessary. If not in use there should be hay racks against the wall above the manger. These may be made of twisted baling wire, or wooden or iron slats.

PICKET LINES AND STANDINGS

Picket Lines are used in stable corrals and to a large extent in the field. They are either elevated lines or ground lines, the former being much preferable. They are made of one and one half inch rope or small wire cable. In emergencies a picket line of lariats can be used. They should be long enough to provide four feet of space for each animal, Picket lines must be kept drawn taut at all times. The elevated line is supported by heavy posts, about five and one half feet above the ground. This height is sufficient to hang hay nets from and to keep animals from eating their bedding, at the same time allowing them to lie down, and have access to their hay if laid on the ground. There is no chance for them to become tangled in it or to be rope burned.

A second line below the first, breast-high is excellent for keeping the animals all on one side, which is much the best plan whenever there is space and rope enough. It will prevent fighting across the line, the tangling up of animals, and permits laying the hay just across the line where it can be reached but will not be trampled upon.

Ground Lines are picket lines stretched on the ground and secured at intervals and at the ends by pins. It is the simplest form of line, but should never be used when it is possible to elevate the line. Animals are continually becoming tangled with it and their halter shanks, and many rope burns result. It is also far less secure, requiring much closer attention.

The Standing of picket lines require the same general features as stall floorings. Except in very dry or sandy soils it is not safe to use unimproved standings for more than a few days, and in poorly drained and muddy soils it is imperative that some sort of well drained dry surface be improvised without delay or the animals will suffer. Few conditions detract from the health and condition more quickly than standing in mud. It is always a cause for much debility and a large sick report. The lines should be placed on firm, sloping ground. If there is insufficient slope it must be constructed, preferably sloping from line to heels and drained by a ditch running parallel to the line

Method of Stretching the Picket Line

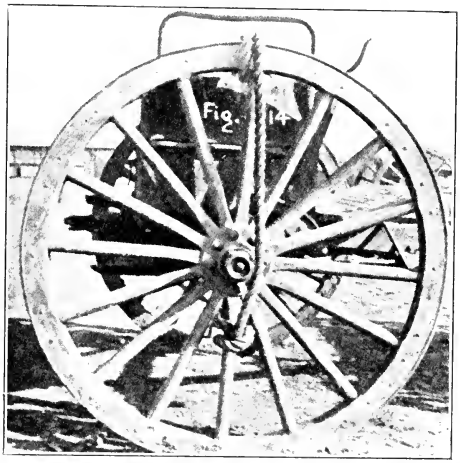


Figure 14. Attaching end of picket line. Tie used on spoke just below hub is a clove hitch.

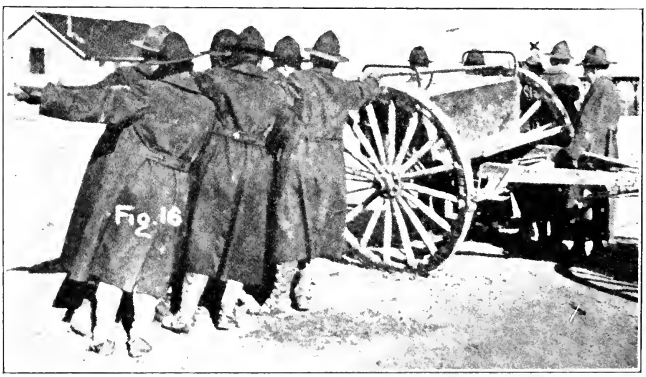
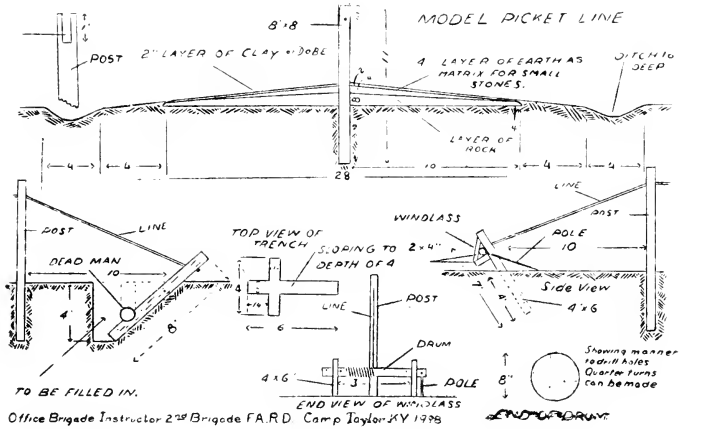


Figure 16. Stretching picket line between carriages. Cannoneer marked X is taking up the slack provided by the lifting of the left wheel of the carriage and by pulling on the line, and is holding all the line he gets by means of a round turn on the felloe.

and about ten or twelve feet from it. If necessary to use a considerable slope, the line should run up and down the slope instead of on a contour, around it. This gives a much better position for all the animals.

It is rarely practicable to have permanent standings as in stall floors, but some sort of macadam, clay and crushed rock or cinders, etc., must be constructed. In wet climates it should be well raised above the ground level, first using large rocks as a foundation and smaller ones as the surface is approached. When bound with clay and carefully built, this makes a very durable, suitable standing.

In the A. E. F. poor standings was one of the chief causes for loss of animal life.



Construction of Model Picket Line

DRIVER'S EXAMINATION

Subject No. 1—Harness-Fitting and Draft Quiz:	Reference:
1. Why is a detailed knowledge of harness-fitting essential?	—F. A. D. R., par. 632.
2. Name the ways in which a collar may be adjusted.	—3", 3.8", 4.7" and 6" Material Handbooks.
3. What are the six axioms of saddle-fitting?	—F. A. D. R., par. 230.
4. How should the Snaffle Bridle fit?	—F. A. D. R., par. 233.
5. How would you test the fit of a collar?	—F. A. D. R., par. 420.
6. How should the following be adjusted: Back Strap; Collar Strap; Hip Straps; Side Straps; Martingale; Breast Straps; Loin Straps; Traces; Coupling Rein?	—Handbook of 6" Howitzer Materiel, p. 112 F. A. D. R., par. 420.
7. What is known as the useless component in draft and how is it minimized?	—School of Fire Notes.

Subject No. 2—Equitation Quizz:	Reference:
1. Describe a good "seat" on horseback.	—F. A. D. R., par. 283.
2. Why is riding without reins so beneficial.	—F. A. D. R., par. 283.
3. What are the aids, and which is the most important?	—F. A. D. R., pars. 288-291.
4. Which aid is most abused? Which is most neglected in use?	—1. Reins. 2. Weight.
5. Why is bareback or blanket riding so valuable?	—Because it teaches the natural seat.
6. What gait usually best shows up poor equitation? Why?	—The gallop. The equilibrium and harmony that should exist between horse and rider are destroyed by riding with a pull instead of an easy handling of the weight of the rider.

Subject No. 3—Driving Drill Quiz:	Reference:
1. Explain the use of the whip in driving a pair.	—F. A. R., par. 443.
2. How and when is the voice used?	—F. A. D. R., par. 444.

3. How are the bridle reins of the off horse used? —F. A. D. R., par. 445.

4. What is the proper way to stop a carriage? —F. A. D. R., par. 452.

5. How should the brake be applied in stopping the carriage? —F. A. D. R., par. 453.

6. What should be done when a carriage is "stuck"? What effect does repeated failures have on a team? —F. A. D. R., pars. 457 and 460.

DRILL SIGNALS

The drill signals include both the preparatory commands and the commands of execution; the last note is the command of execution.

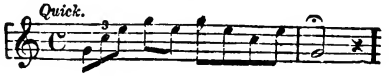
The drill signals are taught in succession, a few at a time, until the officers and men are thoroughly familiar with them, some drills being specially devoted to this purpose.

The memorizing of these signals will be facilitated by observing that signals for all movements to the right are on the ascending scale; that signals for the corresponding movements to the left are corresponding signals on the descending scale; that the changes of gait are all upon the same note; that captains' call is the first two bars of officers' call with the attention added.

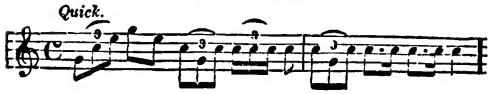
In the presence of the enemy all bugle calls are prohibited.

TO HORSE.

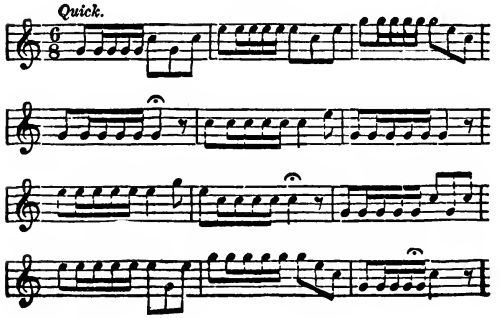
WATER.



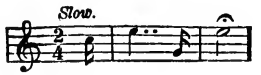
BOOTS AND SADDLES



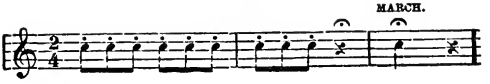
STABLE.



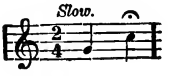
ATTENTION.



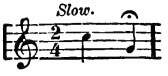
GALLOP.



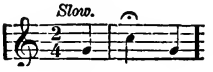
GUIDE RIGHT.



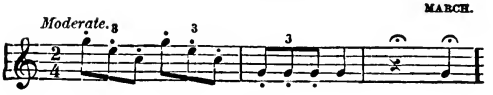
GUIDE LEFT.



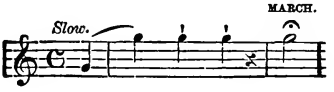
GUIDE CENTER.



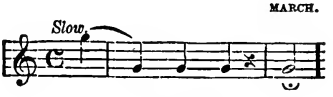
COUNTERMARCH.



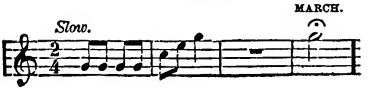
RIGHT ABOUT.



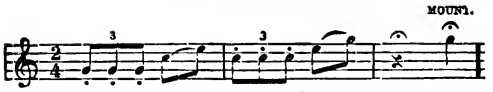
LEFT ABOUT.



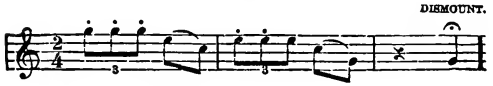
COLUMN RIGHT.



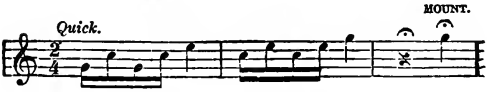
DRIVERS PREPARE TO MOUNT.



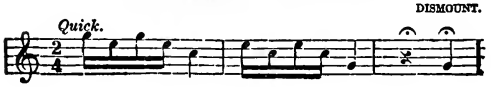
DRIVERS PREPARE TO DISMOUNT.



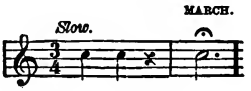
CANNONEERS PREPARE TO MOUNT.



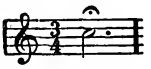
CANNONEERS PREPARE TO DISMOUNT.



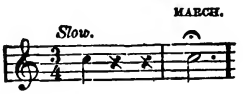
FORWARD.



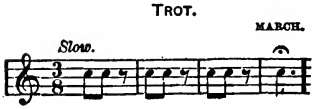
HALT.



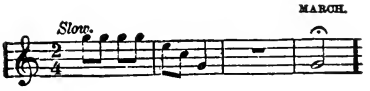
WALK.



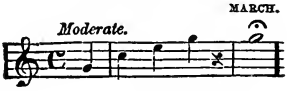
TROT.



COLUMN LEFT.



BY THE RIGHT FLANK.



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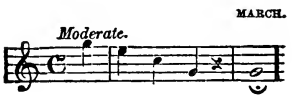
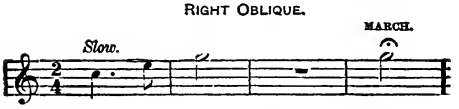
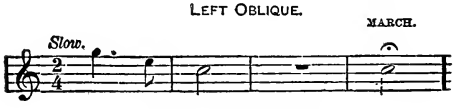


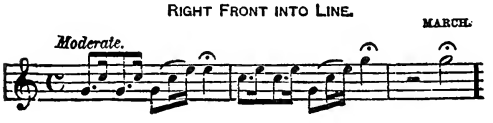
RIGHT OBLIQUE.



LEFT OBLIQUE.



RIGHT FRONT INTO LINE.



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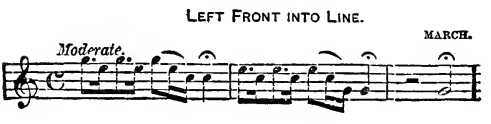

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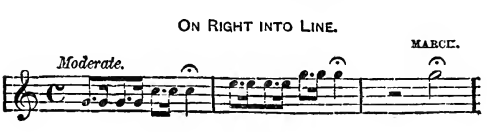

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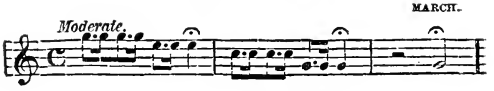

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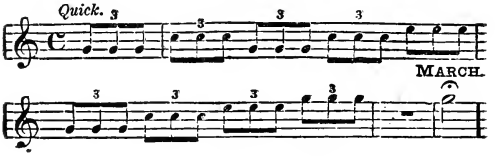

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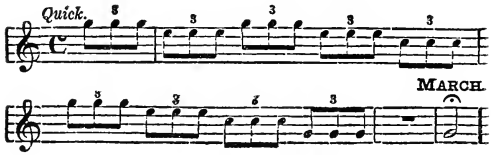

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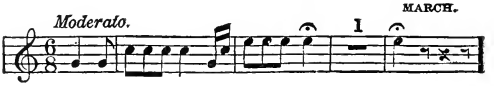

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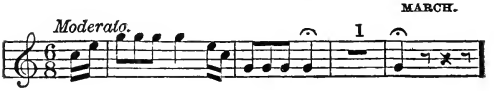

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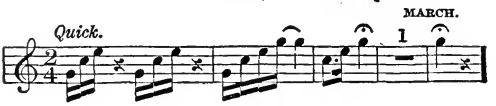

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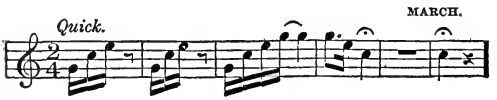

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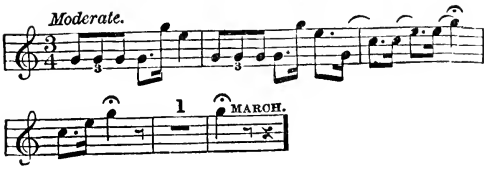

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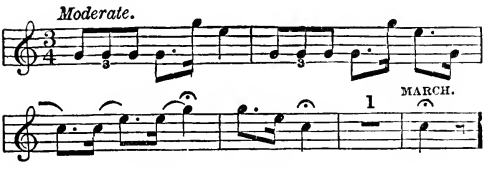

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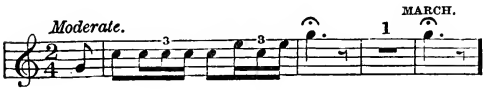

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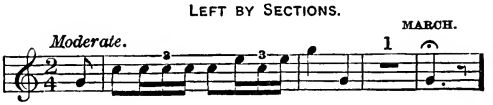

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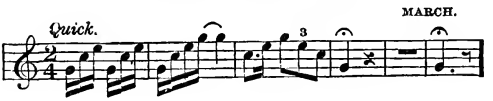

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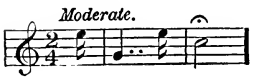

FIRST TWELVE DAY PERIOD

Equitation

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Read, explain and question the men on Pars. 590 and 591.

Impress thoroughly upon the men that the secret of success in handling horses is patience and kindness. Explain that a horse is an animal with very little brains but an excellent memory, and is extremely nervous. Harsh treatment or a kind act are never forgotten. From the very beginning instil a pride in the men in the appearance and care of their horses and their equipment.

The object of horsemanship in the army is to enable the soldier to so condition and ride his horse that the animal will be able to carry both rider and load the required distance in the required time, with the least injury to both rider and horse.

Read and explain Pars. 205 to 213, incl., and 603, 604 and 605.

Explain and demonstrate "stand to heel." Par. 236. Insist on snap without exciting the horses. Demonstrate how to approach a horse. Assign each man to a horse and issue grooming kits. Have the horses examined and brushed off (5 minutes). After "stand to heel," assemble the men and explain the principal parts of the bridle and saddle. Explain how to fold the saddle blanket and demonstrate it. Par. 226. Fold it several times having the men fold theirs at the same time.

Saddle and bridle a horse, explaining it at the same time. Pars. 228 and 231.

Have the men "stand to heel" with their horse equipment on the ground (if no harness pegs are available), saddle one yard in rear of horse, pommel toward the horse, blanket across the saddle, folded edge towards the pommel, stripe to the right, bridle across the blanket, bit to the right.

Have the men saddle and bridle by detail, and lead out individually. Par. 238. Inspect the fit of each bridle and the saddling of each horse. Have faults corrected and explained individually to each man. As the men file by have them form line one yard apart. Par. 239.

Explain and demonstrate "stand to horse" and prepare to mount and mount. Pars. 237, 240 and 244.

Have the men adjust their stirrups approximately by the length of their arms, the tread of the stirrup placed under the arm pits, and the fingers touching the center of the saddle.

Have the men mount and move out at a walk in a column of files, one yard from head to croup, form an elipse about forty by eighty yards. Study the individual men and correct their faults without shouting or nagging. Explain in general the position of the soldier mounted. Explain the position of the reins in both hands.

Allow forty minutes to unsaddle, clean the equipment and groom. Return the squad to the stables. Form line and explain and demonstrate, "prepare to dismount" and "dismount," Par. 245. Have the men dismount. Explain and demonstrate how to unsaddle and to remove the bridle. Pars. 229 and 235. Have the bits washed and dried, inspect them and have the equipment put up. Issue grooming kits, explain and demonstrate grooming by detail.

Have the men "stand to heel" and groom by detail. Impress upon them the absolute necessity for a thorough grooming.

Lesson 2.

Assign men to the same horses they had in the first lesson. Issue grooming kits. "Stand to heel" briskly. Have horses examined and brushed off. Cease grooming, "stand to heel." Assemble the men, using one horse, explain and demonstrate the method of picking up and holding a horse's foot. In raising the hind foot, insist upon the man swinging his inside leg well to the rear, the horse's fetlock resting on the thigh of the man's leg. Par. 39 (*Army Horseshoer*). Explain why and how to clean the feet. Whenever cases of thrush are found, assemble the men and explain the cause, result and remedy.

Issue horse equipment. Refold saddle blankets several times. Have the men saddle by detail and adjust their bridles. In this connection have sufficient holes punched in the check straps of the new model bridles to permit their proper adjustment.

Form line to the right, the men standing to horse properly. Explain and demonstrate prepare to mount and mount, and prepare to dismount, and dismount. Have the men execute this several times. Insist on their keeping the toe of their left foot from touching the horse. This can be done by pointing the toe to the rear in mounting and to the front in dismounting and keeping their left knee against the horse.

Move out on the track as in the first lesson. After a few minutes at a walk, from a circle, have all horses faced inward. From the center of the circle explain in detail the position of the soldier mounted, and give reasons. Demonstrate the habitual incorrect positions and the ill effects to both rider and horse.

Move back on the track and change hands frequently. Pars. 250, 252.

Have men come to the center of the track to adjust equipment or stirrups. Study each man and have him properly adjust his stirrups.

On returning to the picket line, unsaddle and groom by detail. Continue the exactness and snap.

Lesson 3.

Repeat Lessons 1 and 2. Get more speed in the saddling and grooming, but not at the expense of exactness.

Explain the holding of the reins. Pars. 250, 251, 252, and 253. Have it executed. Explain at ease, rest and route order. Par. 258

Explain gathering the horse to move forward and halt. Pars. 297, 298, and 299. Have it executed several times.

Explain the change in gait from the walk to trot. Have the men sit down in the saddle. Don't permit posting. Have them take the jolt. It will emphasize the necessity of having a supple waist line and relaxed muscles.

Return to the picket line and unsaddle and groom as before.

Lesson 4.

Repeat Lessons 1, 2 and 3 omitting the explanations, except in individual cases where necessary.

After forming line rigidly inspect equipment. Have every fault corrected carefully, explaining the reason. For example, explain and demonstrate the method of putting on a stirrup strap; give the rule for remembering it. Have the buckle toward the horse and down close to the top of the stirrup. Have the quarter straps of such length that the quarter strap safe will be split by the lower edge of the blanket. Have the quarterstrap buckle always close up to the square at the cantle of the saddle, the tongue of the buckle pointed up. Explain and demonstrate how to put it together. Have the center of the cincha under the center of the horse's belly. Remember that the details of equipment can not be understood or remembered by the men if given all at one time, as at harness cleaning. Explain them as cases arise without delaying the drill.

After getting the men on the track repeat the exercise at a walk, in taking the reins in different hands, carry reins habitually in both hands. After getting all stirrups adjusted, move into the slow trot. Change the holding of the reins from one hand to the other at the trot. Gradually insist on the men keeping their eyes up while changing the reins, keeping a very light, steady feel on the horse's mouth.

Change the gait frequently from the trot to the walk and vice versa. See that the horses are properly gathered before each increase in gait.

Execute "rest" several times, always from the walk. Insist on the horse being "gathered," and the reins quickly released. The horse will lower his head and relax all over if this is properly done.

Change hands on the track frequently and walk the horses at least five minutes before returning to the stables.

In unsaddling remember the requirements about loosening the cincha for a few minutes before unsaddling. Par. 591. During this time have the bits washed and grooming kits drawn, leaving a few men to watch the horses. Use this time to explain things to the men. Encourage them to ask questions.

Explain how to tie a horse to the picket line and in the stall. Groom by detail.

Lesson 5.

Repeat as much as the former lessons as may be necessary. After getting the men settled down in the saddles with a little trotting have them cross or take off their stirrups, and execute the slow trot at intervals of never more than ten minutes. Have the men sit up at this exercise keeping away from the cantle of the saddle, the legs hanging naturally. Par. 285.

Explain the aids, and the changes of direction, and execute by the flank. Pars. 288, 289, 290, 291, 294, 295, 296, 303, and 304.

Wherever necessary permit a man to retake his stirrups. There is nothing gained in getting a man chafed. Groom by detail.

Lesson 6.

Review parts of all former lessons. Vary the exercises. First at a walk and then a trot, have the men drop their reins. Par. 285. Groom by detail.

Lesson 7.

After settling the men down, have them cross or remove their stirrups and drop their reins; vary this with changes by the flanks and right and left abouts, reins in both hands and watch for the proper use of all aids. Groom by detail.

Lesson 8.

After riding without reins or stirrups, explain and execute movements by the flank with the reins in one hand. Throughout all of the work, constantly coach the individual rider and correct his faults. Groom by detail.

Lesson 9.

Ride without stirrups or reins. Explain and execute the exercises under Pars. 264 to 278, incl., first with the stirrups and then without them. Groom by detail.

Lesson 10.

Before leaving the picket line, explain, demonstrate, and have the men execute mount and dismount from the right side. On returning dismount from the right side. Repeat this from time to time. On the track first ride without reins or stirrups. Later execute numerous changes of gait and direction. Groom by detail.

Lesson 11.

After riding without reins or stirrups, execute the changes of gait and direction several times. Insist on the horses being "gathered" before each change of direction. Execute "rest" several times. Groom by detail.

Lesson 12.

Review the principal parts of all former lessons. Groom by detail.

FIRST TWELVE DAY PERIOD

Hints on Equitation

(Light Batteries.)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

The Seat: The saddle is so constructed that if the rider assumes a correct seat, the weight will be equally distributed on the side bars.

If the weight is too far back in the cantle, more weight than is desirable is on the rear of the side bars, and a sore back results. If the rider leans too far forward, stands in his stirrups, etc., sore withers result. The question is: Where should he sit to get even distribution of weight? Answer: By taking his feet out of the stirrups, placing his hand on the pommel, and pulling himself forward until he feels that he is starting to "slide up hill," the rider will place himself in the deepest part of the saddle. The saddle being properly placed on the horse's back, the rider should be directly over the center of gravity, which is also the center of motion, or the spot where the rider would receive the least motion. The next question is: What becomes of the rider's feet and legs, and how should they be held? Answer: Let the legs and feet hang down **naturally.** The tread of the stirrup should strike the instep about where the spur strap crosses. Now **without** moving the buttocks in the saddle, reach for the stirrups and place the ball of the feet on the tread of the stirrup. **Supple** and relax the ankle so that the heel will be lower than the ball of the foot. The calf of the leg should **maintain** contact with the side of the horse. Do not think the ankle joint is supple when the heel is lowered by sticking the feet to the front; this will bring the heel lower, but the ankle joint is not supple and the calf of the leg ceases to maintain contact. Contact at the calf of the leg is one of the most important things to watch in riding. When the rider has done the above correctly, the following will be the result. (1) The thigh makes an agle of about 30 degrees with the vertical. (2) The "lower leg" (knee down) is a little in rear of the vertical. (3) The stirrup strap is vertical. (4) The calf is in contact. (5) The ankle joint is supple. (6) The heel is below the ball of the foot.

In connection with the foregoing, the following remarks are applicable and explain the reason for the same: (1) The thigh is let down in order to assist in securing a firm seat. If you have ever seen a running race or steeple chase, where the rider's thighs are horizontal, it will be appreciated how very insecure the rider's seat is; the slightest move beyond the expected, and "off he goes." The reason is: "no thigh grip." The jockey takes this seat because more speed can be obtained by the rider's weight being as far forward as possible. The seat itself in a race of that kind is sacrificed for speed. (2) The ankle is supple, and the heel is below the ball of the foot. This is done to insure the thigh being well let down so that the seat is secure. If you have ever noticed a man on a bucking horse, just before he goes over the horse's head, you will note the following: The heels are "up" and the thigh approaches the horizontal. "Heels up, thigh up," go hand in hand. An insecure seat is bound to result. (3) The calf of the leg is in constant contact, because the aids are first applied with the calf, later running down to the spur if the horse does not answer them by calf application. The rider's calf should always be the first to apply the aids, not the spur. To stick the heel to the front, and then strike the horse with the spur without giving the animal the correct aids with the calf, is the strongest proof of a poor and unintelligent rider. The calf

must be in contact. Gathering the horse and the aids all start with the calf. Contact can only be obtained by the "lower leg" being slightly in rear of the vertical. To obtain this contact, the rider should turn the toe and knee **out** until he has obtained the same. There should be no constraint to these movements. Normally the rider's foot will turn out about the same amount as it does when he walks. If the rider takes this position of his lower leg, the stirrup strap will be vertical.

A general rule which will assist the rider to tell when his lower leg is correctly placed is: The point of the toe should be obscured by the knee cap (assuming that the rider's seat is correct).

We have now worked from the rider's seat to his heels; now we will work from seat up.

The "seat," as taught, is a combination of "grip and balance." The grip elements have already been discussed, "balance" remains.

Let us consider a straight stiff rod, and a strung bow (bow such as used with bow and arrow). Suppose we take the stiff rod, and placing our hand on the top of it, strike the ground. There is no give to the rod and all of the force is taken up on the hand. Now take the bow and do the same. Part of the force is taken up by the bow bending, and part on the hand, the more supple the bow, the less force on the hand. So it is with a stiff and supple back. The first pounds the horse, the second "pats," the rest of the "pound" being taken up in the supple back.

Here begins one of the hardest things to teach recruits. **The back must be supple** and the **bow** in the back must be in the **lower part,** namely, where the belt crosses the spinal column. The **rest** of the back is supple, but **is erect.** One way of explaining to the recruit, is to tell him, "Let your stomach say 'How do you do' to your backbone."

"Suppling exercises," such as patting the horse on the right shoulder, etc., increase suppleness, and will be taken up in instructions on the schedule.

Remember the supple back "pats" the horse, the stiff "pounds." The next to consider is the "hands." How should the hands be carried? Answer: Stiff shoulders and arms make the rider jerk his horse on the mouth at each step of the trot. If the hands (reins in both hands) are held low, forearm inclined slightly downward, backs of hands out, hands separated about six inches, the rider has the right start. A light "feel" of the horse's mouth, but giving to the motion of the head, will insure the rest. The rider with hands in the above position is ready to "give and take." The "upper arm" is held **without stiffness,** close to the body, and is slightly in front of the vertical.

The head is held erect, but without stiffness.

The following sum up what to look for in locating faults of the rider.

(1) Is the thigh well let down?
(2) Is the "lower leg" back?
(3) Is the heel depressed, ankle supple?

(4) Is the rider rounding his entire back instead of giving at the waist only?
(5) Are the backs of the hands out?
(6) Are the hands separated about 6 inches?
(7) Has the rider a correct position of the upper and forearm?
(8) Has the rider a light feel of the horse's mouth?
(9) Is the rider's head erect, eyes looking to the front, and not down?

In the adjustment of the bridle many riders, when looking to see if the bit clears the "tusk," look at the **lower** tusk. This is **wrong**; look and see that the bit clears the **upper** tusk. The bits must not be too low. If the bit clears the **upper** tusk and does not pull the corners of the mouth, the rider has his bit adjusted.

Gathering: The leg pressure acts in a "vibratory or pulsating" manner—the action being from **rear to front.** Gathering causes the horse to get his haunches under him ready to move out. The rider "drives the haunches under" by leg action and prevents him moving forward by the pressure on the bit. The horse is between two forces—the legs pushing him forward, and the bit pressure preventing him actually moving forward. The action resembles a river being dammed—the dam is the bit, the current the leg action.

Move forward: When we release the pressure on the rein and **increase** the action of the legs, the horse has received the "forward aids." The action in this case is to break the dam and allow the current to act. Remember, if the leg action is not "vibratory or pulsating," the aid has not been given but the rider **has merely tightened his grip.** The leg action is from "rear to front," the calf not going back more than one-half inch under ordinary circumstances. Should it be necessary to increase the action aid develops into "taps"; should further increase be necessary, the toe is turned slightly out and the spur begins to act. With little training most horses will answer the aid applied by calf action alone.

The subject of the accord of the aids can not be dealt with too strongly. To illustrate: Suppose the rider gives the aids to move forward, the horse answers it and the rider loses his balance. To save himself the rider "hangs" on to the reins. What has the rider done? He has given the aids to move forward, then immediately applied the aid to stop.

Remember in equitation you must "remake" yourself. For instance, when a man falls he will naturally use his hands and arms to save himself. In equitation this is impossible. Your hands must not act; your **legs** and balance are what count. For illustration, suppose a horse rears and the rider loses his balance; if he pulls on the reins, he is pulling the horse over backward, the worst thing he could do. The rider must learn to tighten his grip by his **legs.** The hands must **never** be used to hold on by.

SECOND TWELVE DAY PERIOD

Equitation

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Have men mount and dismount from right side. After settling the riders and horses down, have them remove the stirrups. Place the stirrups where each man can find his proper stirrups. This is necessary to prevent hooded stirrups being placed on team saddles at the end of the exercise. Have the men ride without stirrups and without reins. A knot should be tied in the reins and the men permitted to take them whenever necessary to control the horses. Explain gaits—Pars. 351 and illustrate.

Teach three or four of the suppling exercises, Pars. 264 to 278, inclusive. In teaching these exercises, explain the objects to be attained by them. Replace the stirrups when necessary. Do not ride more than fifteen minutes without stirrups. Execute several changes of direction. Remember to have the horses properly gathered each time. Groom by detail.

Lesson 2.

Before leaving the picket line, insist that the equipment be properly adjusted in every detail. Watch carefully for articles of horse equipment and harness getting mixed; a common fault when saddles and bridles from artillery harness are used with horse equipment for equitation. In order to correct this, it is necessary for the instructor to know the nomenclature and model of all items of both harness and horse equipment, and their uses.

Before removing stirrups always see that both horses and riders are settled down. Limit the riding without stirrups and reins to fifteen or twenty minutes. There is nothing gained in getting the men chafed and sore. Do not take the stirrups from a man who is badly chafed.

Repeat the suppling exercises already taught and teach three or four new ones. Execute changes of gait from walk to slow trot, and vice versa, several times. Insist on the men starting and stopping their horses together. See that the last men start out with the first. Execute by the right and left flank several times.

Before replacing the stirrups have the stirrup straps removed from the stirrups, and then put together. Explain how to twist the stirrup straps correctly. Groom by detail.

Lesson 3.

While riding without stirrups continue the supplying exercises and teach a few new ones. Select especially gentle horses and teach and execute the mounted gymnastic with the horse in place, Pars. 279 to

280, inclusive. Wherever necessary have a man hold the horses. Be very careful not to undertake exercises that are too difficult or dangerous, nor continue them too long.

Vary these exercises with changes in gait and movements by the flank. Intersperse several halts. Insist upon the horses being properly gathered. Constantly correct the individual riders. Insist upon their keeping their legs back, their heels down, and heads up and their hands down. Don't permit anything that tends to stiffen their muscles.

Groom by detail. During the grooming explain to the individual men the proper method of picking out the horse's feet. Point out to all the men any cases of thrush you may find.

Lesson 4.

Continue the suppling exercises and mounted gymnastics with the changes in gait. Form the men in a circle and explain the aids, Pars. 288 to 295, inclusive. Demonstrate them. From now on insist upon the correct application of the proper aids at all times. Execute changes of direction at a walk at first when teaching the aids. Where necessary with sluggish horses have the men wear spurs.

Groom by detail. During the grooming each day teach the proper method of plucking a horse's tail, and have the tails that require it plucked, being careful to do only a little plucking each day as the horse's tail will otherwise become very sore.

Lesson 5.

Repeat parts of all former lessons and teach more of the mounted gymnastics. Repeat the explanation of any of the aids that seem necessary. Encourage the use of the voice aids without permitting any shouting. This is particularly necessary with artillery horses in draft or when they become excited. Groom by detail.

Lesson 6.

Explain and demonstrate the half halt and its use. Repeat the suppling exercises and change the direction without stirrups. Change hands on the track frequently. Make frequent changes in gait. Insist on the horses being started and stopped together.

Groom by detail.

Lesson 7.

Repeat Lesson 6. Take up "circles," Par. 306. Explain having troopers in column of files. "By the right or left flank" given where guide shifts, Par. 340. Continue work on the track. Remember during all instructions to watch for faults of riders. Take up remainder of suppling exercises. Frequently change the gait. Watch that at the preparatory command the horses are "gathered"; at the "march," see that aids are properly applied and that aids are coördinated.

Lesson 8.

See that equipment is properly adjusted. Get recruits in the habit of "looking over" their horses to see that shoes, feet, etc., are in good condition. Take up circles, flank movements, decreasing the gait.

Make constant corrections of seat. Teach "Right by file, march," Par. 341, and "To ( ) yards, take distance, march," Par. 342. Use the latter frequently to break up the "herding instinct" of the horses. Call men by name and have them individually execute a "right or left about" and join the rear of the column. Teach "To ( ) yards, close, march." Par. 343.

Lesson 9.

Teach the different model bridles and bits. Watch for equipment not properly adjusted. Take up "Backward, March." Par. 307. Review all previous movements. See that men do not stiffen their bodies when applying leg aids. Correct all mistakes in seat, etc. Teach Right into line, March; Squad, Halt. Par. 344.

Teach, On right into line March, Squad Halt. Par. 345. During time when horses are "allowed their heads" and men are riding "at ease" teach parts of saddle by saying "Put your hand on the pommel, cantel, left side bar, cinch," etc. Same principal for bridle. Review all previous movements—suppling exercises, etc.

Lesson 10.

Teach "By fours, by the right (left) flank, March." Being in column of files on the track, first count off from head of column. The men count off 1, 2, 3, 4, 1, 2, 3, etc. The instructor gives "By fours by the right (left) flank, March," when he has the leading four properly placed. The **leading** set of fours executes individually "by the right flank." The remaining sets of fours continue the march, each set of fours **individually** executing "by the right flank" on the **same** ground as the **leading** set of four. The instructor will then have his class in "column of fours" with extended intervals and distances. With the class so formed execute circles, flank movements, halts, etc. To break in "column of files" again from above formation give "By fours by the right (left) flank, march." The leading set of four executes **individually** "by the right (left) flank," and "takes the track." The remaining sets of four continue the march and when on the same ground as the leading set of four was, individually execute " by the right flank." Teach "Column of twos from column of files," and vice versa. Pars. 346-347.

Lessons 11 and 12.

Review all previous exercises. Remember, to **learn,** men must know where they are at fault. See Hints in Second Twelve Day Period. Work a lot with men in "By fours by right (left) flank" formation. By giving halts, increase gaits, circles, flank movements, the instructor can cause the recruits to get considerable practice in applying aids.

SECOND TWELVE DAY PERIOD

Hints on Equitation

(Light Batteries)

The Second Twelve Day Period had for its object the teaching of the soldier:

(a) What the correct seat is and how to take it.
(b) The gather, forward, halt, and the preliminaries to the turn and about.

The Third Twelve Day Period has for its object:

(a) Establishing in the soldier a correct seat.
(b) Perfecting him in the application of the simple aids.

Riding without stirrups and suppling exercises are of the utmost importance in suppling the soldier and properly seating him. On the other hand if carried to the extreme "without stirrups," will have the opposite effect. For example: If the instructor rides his class without stirrups to such an extent that the men become chafed, there will be an unconscious setting of the muscles because of the discomfort in riding. Under these circumstances the muscles, instead of relaxing as desired, become set and tense. The instructor must therefore use judgment when giving the same to the class.

The gaits to be employed are:

(a) The slow trot, six miles per hour.
(b) The gallop, twelve miles per hour.

Never use the eight mile per hour trot when riding without stirrups. Always permit the soldier to take stirrups when he feels that he is chafed.

The work with the class in an open formation (such as when by fours by the right flank has been executed) permits the instructor to take up right or left, increase or decrease of gaits. Ordinarily, flank movements, circles, etc., should be executed at the **slow trot.** The instructor should constantly watch for faults in the seat and the application of the aids. Never permit "posting" during this Twelve Day Period.

The rein aids taught are.

(a) The leading rein.
(b) The bearing rein.
(c) The direct rein of opposition.

The leading rein is used when the reins are held in both hands and its action is as its name implies, "to lead." For example: being on the track, the reins held in both hands; "Right about, March." At the preparatory command, "gather." At the command of execution, open out the right rein by carrying the right hand to the right about four inches and "leading" the horse around.

There is little or no pull to the rein in a backward direction; its action is to the right. The legs are used for two purposes: (a) To

keep up the gait, (b) To turn. To keep up the gait, the "forward aids" are used. To turn, the inside leg is active and the outside leg "guards" and prevents the haunches from swinging outside the circle made by the forelegs.

It will be seen from the above that if a horse is inclined to throw his haunches to the inside in making the about, the rider's inside leg will become more active and force the haunches back on the circle; the outside leg acting as a "guard" to prevent the haunches from swinging too far. The opposite is the case when the haunches have the tendency to swing to the outside. The rider's weight is shifted to the right buttock. The gait is kept up for "forward aids," should there be an attempt to slow same on the turn.

The bearing rein is used to make changes of direction when the reins are held in one hand. When the horse answers this aid, he "reins over the neck" (civilian expression). The effect of this rein is as follows: the rein acts against the side of the horse's neck in front of the withers and bears in the direction which the rider wishes to go. There is little action on the bit proper, the effect being to push the mass of the horse's neck to the left or right.

For example: "Right about, March" (rein aid only discussed). The reins being held in one hand, are carried to the right so that the left rein bears against the left side of the horse's neck in front of the withers, thereby having a tendency to push the mass of the neck to the right. It will be seen that the right rein, because of the fact that the reins are carried to the right, acts as a leading or opening rein. Therefore, when the reins are used as above described, they have two distinct effects, one bearing and the other leading.

The bearing rein may best be taught by having the soldier hold the reins in both hands and when executing an "about," or a change of direction, starting it by the use of the opening rein, completing the movement with the bearing rein predominating.

The "direct rein of opposition" opposes the forward movement and acts directly to the rear, for example, when halting.

If the gallop is taken for suppling purposes, it is better to form a large circle with the instructor at the center, and increase the gait until the horses break from the trot to the gallop. In this case, the action of the outside leg should be stronger than that of the inside. Do not take the gallop at the beginning of the hour.

One common fault in applying leg aids is for the rider to carry the "lower leg" back by bending the knee and allowing the heel to come up. This is **wrong.** The lower leg moves to the rear only slightly. In a well trained horse, this movement is imperceptible, in an untrained animal the leg should not move more than an inch. Under any circumstances, **the heel is always down.** Leg aids are vibratory or pulsating in character. A steady squeeze is merely tightening the grip.

In working with circles, about, flank movements, etc., do not jump from one movement to another. Give the rider a chance to get his horse "in hand" before giving another movement. Five or ten yards will straighten out a horse.

In circles (Par. 306), the outer rein "measures" the amount of bend to the horse's neck when the reins are held in both hands. Hence, if the horse bends his neck to the inside too much, the outer rein will check the bend. Because of the difficulty in bending his body around the circle, the horse will tend to slow the gait during this movement. The rider must then change his aids to the "forward drive" and then resume the proper aids for circling.

THIRD TWELVE DAY PERIOD

Equitation

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lessons 1 to 12.

Take up Equitation movements as taught in Second and Third twelve Day Periods.

Side stepping Par. 315. Posting Par. 361 and 362.

Note: 1. The side step, with slight modifications, is used in limbering. In this operation the horse swings on an arc of a circle in addition to the side step movement. The aids applied will be considered in the following discussion; the direction of side stepping is assumed as left.

The horse is gathered, weight transferred slightly to the left buttock, right rein bears, left rein leads, moving the horse's forehand to the left at the same time both reins are ready to prevent too much movement, the right leg becomes active and pushes the horse's haunches to the left. The left leg acts as a guard and prevents the haunches swinging too far. Use the voice and proper aids in halting and straightening. When the reins are held in one hand only; the bearing rein is used but it will be remembered that in previous discussion of the use of the rein it was shown that there were two effects, leading and pushing.

When the movement for limbering is practiced with the pair, the driver, in addition to applying the above mentioned aid to the near horse, must apply the proper aids to the off horse, (whip, voice, and rein. See Drill Regulations.)

Note: 2 When rising to the trot the instructor must pay attention to the following points:

(a) That the rider's back is supple and bows to the rear **only where the belt crosses the spinal column.**

(b) That the rider's body moves **forward** and upward when rising to the trot. The knees act as a pivot in this case.

Under no circumstances should the rider while rising to the trot, hollow the back. If the back is bowed **inward** the buttocks are not under the rider; furthermore, when rising to the trot under these circumstances, the body will not conform to the motion of the horse, but will rise from the saddle in a vertical direction only. There is always an "effort" on the part of the rider to post if the back is hollowed. In posting the rider should receive the propulsion from the thrust of the hind leg.

FIRST TWELVE DAY PERIOD

Driving Instruction, Dismounted

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Teach the following arm signals.

Attention.

(1) Forward—March.
(2) Halt.
(3) By the right flank, March.
(4) By the left flank, March.
(5) Right about, March.
(6) Left about, March.

Explain the formation of the battery in line, Par. 477.

Explain the formation of the battery in section column, Par. 478.

Explain the formation of the battery in flank column, Par. 479.

For instruction in battery drill use each driver to represent his pair. Have the three drivers of each team formed as a team, two yards distance between the men of each team and separate the "teams" by any amount to represent the space occupied by the carriage. (The men of each team can take hold of ropes to represent traces or any other improvised method which will assist instruction may be used.) Have the drivers of the "piece" tie handkerchiefs on their left arms. Have the chief of section and caisson corporal take their posts. The idea is to teach the drivers the various formations and evolutions of the battery.

Lesson 2.

Review Lesson 1.

Teach the following signals:

(1) Countermarch, March.
(2) Right and left about March.
(3) Right sections, forward, March.
(4) Right and left and oblique March.
(5) Increase the gait.
(6) Decrease the gait.

Explain Pars. 508-515, incl.

Lesson 3.

Review Lessons 1 and 2.

Teach the following arm signals.

(1) Halt.
(2) Change direction to the right and left.
(3) Close intervals. March.
(4) Extended intervals. March.
(5) Right (left) by section.

(6) Right (left) front into line.
Explain Rules 1 and 2, Par. 519.
Explain to align the battery, Par. 520.

Lesson 4.

Review previous arm signals.
Teach the following arm signals.
(1) Right (left) into line, March.
(2) Pieces front, March.
(3) Caissons front, March.
(4) Flank column right (left) oblique March.
(5) Double section right (left) oblique March.
(6) Action front (right, left, rear).
(7) Limber.
Forward March, Par. 522.
Battery Halt, Par. 523.
By the right and left flank, Pars. 524 and 525.

Lesson 5.

Review all arm signals.
Take up the following movements.
Right (left about) March, Par. 526.
Countermarch, March.
Right section forward, March, Par. 527.
Review all previous movements.

Lesson 6.

Review all arm signals.
Right (left) oblique, March Par. 529.
Column right (left) March Par. 530.
Column half right (left) March Par. 531.
Pieces (caissons front), March Par. 532.
Review all previous movements.

Lesson 7.

Review all arm signals.
To close or extend intervals in line. Par. 533.
To form line from section column Pars. 535-536.
Review all previous movements.

Lesson 8.

Review all arm signals.
On right (left) into line, March Par. 537 and 538.
Flank column right (left) oblique, March. Par. 539.
Right (left) front into line, March Par. 540.
Review all previous movements.

Lesson 9.

Review all arm signals.
At (so many) yards right (left) into line. March Par. 541.
Pieces (caissons) front, March, Par. 542.

To form double section and to resume the previous order. Par. 543 and Par. 544.

Being in flank column, double section, right (left) oblique, March. Pars. 245 and 246.

Review all previous movements.

Lessons 10 to 12.

Review all arm signals and movements.

SECOND TWELVE DAY PERIOD

Drivers' Instruction with Harness

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Nomenclature of harness, function of parts of harness.

Handbook of 3-inch Gun Material, Pages 145 to 151; and Par. 406.

Lesson 2.

Same as Lesson 1.

Lesson 3.

Nomenclature and function of parts of harness.

Handbook, Pages 145 to 151.

Disposition of harness in the field, Par. 408.

Lesson 4.

Nomenclature and funtion of parts of harness.

Handbook, Pages 145 to 151.

Disposition of harness in garrison and in the field. Pars. 408 to 409.

Disposition of harness in entraining, Par. 409.

Lesson 5.

Review Pars. 408-409.

Harnessing and unharnessing by the instructor, Par. 410.

Nomenclature and function of parts of harness.

Handbook, Pages 145 to 151.

Lesson 6.

To harness and unharness by detail, Pars. 411 to 414, incl.

Nomenclature of harness.

Lesson 7.

To harness by detail, Par. 411.

Adjustment and fitting of harness, Pars. 416 to 420, incl.

By detail to unharness, Par. 413.

Nomenclature and function of parts of harness.

Lesson 8.

Same as Lesson 7.

Lesson 9.
To harness and unharness in the field, Par. 415.
Disposition of harness in the field, Par. 408.
Nomenclature and function of parts of harness, Pars. 416 to 420.

Lesson 10
Nomenclature of harness.
To harness and unharness in garrison, Par. 412 to 414.
Adjustment and fitting of harness; function of parts of harness.

Lesson 11.
To harness and unharness in the field, Par. 415.
Adjustment and fitting of harness, Pars. 416 to 420.
Nomenclature of harness; Handbook.
Function of parts of harness.

Lesson 12.
To harness and unharness in the field, Par. 415.
Adjustment and fitting of harness, Par. 416 to 420.
Function of parts of harness.
Nomenclature of harness.

SECOND TWELVE DAY PERIOD

Hints on Drivers' Instruction with Harness
(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Harnessing.

The instructor should take a complete set of harness and place it on the harness pegs in accordance with Par. 407, giving the reasons for the arrangement of each part. For example: the near and then the off bridle are removed first and placed on the upper peg next to the heel post, as they are the last to be put on when harnessing. The traces are arranged next over the upper peg with the toggles of each pair on opposite sides for convenience in harnessing.

In this connection it is better to drive a spike about six inches above the upper peg for the traces rather than place them on the peg, as this arrangement gives more room on the upper peg for the off saddle, and permits the saddle to be removed without disarranging the traces.

Only the near saddle and blanket are placed on the lower peg. Both collars are placed on the upper peg to avoid disarranging the breeching and other attachments of the off saddle, as would be the case if the near collar were placed on the lower peg with the saddle.

The blankets are placed over the saddles to prevent injury to the seat of the saddle particularly to protect the zinc linings of the collars.

It is advisable to hang both bridles on the outer end of the upper peg under the off saddle as the harness will not have to be removed in order

to reach the bridles. This also permits of better inspection of the bits for cleanliness.

A pair of horses should then be harnessed by the instructor "by detail," Par. 411. He should give the command and explain thoroughly the method of placing each part of the harness on the horses.

After placing the saddle on the horse the collar strap is fastened. This should be done immediately to prevent the collar sliding up behind the horse's head, should the animal lower his head. The back strap is then turned back with the right hand, the cincha strap lowered with the left and the cincha passed over to the off side with the right hand. The driver then goes to the off side of the horse, sees that the cincha is properly lowered, comes back to the rear of the horse, grasps the crupper with the right hand and the horse's tail with the left, raises the tail and passes the crupper under the tail, and buckles the crupper. The saddle should be evenly buckled on both sides, that is in corresponding holes.

While standing in the rear of the horse the driver should glance along the horse's back through the cantle arch and see that the saddle is correctly placed. He then steps up on the near side and completes the saddling as in Par. 228.

In putting the trace toggles through the hame tugs the toggles should be run through the loop from the inside out. While the trace chains of the two traces for each horse are required to be hooked in the same corresponding link, it is better to have all four trace chains of the pair hooked in the same corresponding link. This will prevent any injury to the horse from pulling with traces of unequal length, in case the four traces become mixed when hung on the harness peg.

When using the old model bridle, after passing the off rein through the lead rein roller the driver should make a twist in the reins by passing the bight through the loop in the reins, the reins having been drawn through the roller sufficiently to permit the bight to be passed through the loop so formed. This will prevent the reins slipping back through the roller. Tying a knot in the bight is objectionable because it is hard to undo and often results in having to cut the reins to get them out of the roller.

Before coupling the pair is placed in the passageway in the rear of the stalls. Unless this is done the chain or wire supporting the kicking bar will prevent the pair from being led or backed out of the stall. While Par. 411 prescribes that the hook at the end of the coupling rein be attached to the right pommel ring of the near saddle, this hook should be placed with the collar strap hook on the "D" ring on the pommel of the near saddle. This ring is securely fastened by a rivet through the pommel arch and can not easily be pulled out, while the pommel ring is fastened to the side bar by two wood screws which are easily displaced. It should be explained that snapping of the coupling rein strap into the "D" ring instead of into the right pommel ring is distinctly at variance with the drill regulations. When leading the pair the driver should always be on the near side.

Before giving the command "yoke" care should be taken that the breast straps are hooked to the outside of the wheel collars with the buckle end of the breast straps up and outside. This is necessary as the inside ends of the breast straps are passed through the roller at the end of the neck yoke from the outside in. The buckle end of the breast strap will not pass through the roller and therefore should be attached to the outside of the collar. The upper side of the breast strap has on it a re-inforced strap.

If the breast strap is turned with the buckle upward, the re-inforced strap is turned downward and does not bear against the roller as intended. In fastening the neck yoke the driver stands between the two horses of the pair opposite their chests, facing in the same direction as the horses, holds the center of the neck yoke with his left hand. With his right hand he grasps the free end of the breast strap of the off horse and passes it through the neck yoke roller from the outside and hooks the end of the breast strap hook in the near side of the collar of the off horse. He then passes the neck yoke into his right hand and similarly fastens the breast strap of the near horse. The breast strap always passes from the outside inward through the roller. Before passing the martingale through the standing loop on the cincha, care should be taken that the neck yoke is so held that the upper surface of the martingale, or the side that comes against the horse, is upward. This will place the "D" ring at the end of the martingale downward. If the neck yoke is turned around, the martingale will be upside down, which is wrong.

After fastening the breast strap of the near horse, the driver is left facing partly toward the near horse. He then stoops down and passes the martingale of the near horse between the front legs through the cincha and attaches the hooks of the side straps into the martingale through the "D" ring, beginning with the left strap, and then hooks the right side strap to the near horse in same ring. He then faces about and passes the martingale of the off horse through in the same manner and hooks the side straps, beginning with the right one.

He should be careful to see that the side straps are not twisted After hooking them in the "D" ring the side strap hook and the buckle on the side strap near the breeching ring should be downward.

Unharnessing: At the command "unyoke," each wheel driver, before attempting to unhook the breast straps, should always unhook the side straps from the martingale "D" rings of both horses and draw the martingales out of the cinchas. If the breast straps are unhooked first the neck yoke falls to the ground with the martingales still attached, and is apt to frighten the horses; a mistake often made. The horses must be uncoupled before being led into the stalls. After uncoupling, the coupling rein is usually thrown over the neck of the off horse.

Time is always saved in harnessing by carefully hanging the two traces of each horse, when unharnessing, with the toggles in the opposite direction.

In unsaddling the driver first passes over the near stirrup and unfastens the cincha, letting the cincha strap hang. He then steps to the

rear of the horse, unbuckles the crupper and removes it from under the horse's tail; in the case of wheel drivers removing the breeching body to the outside of the horse's tail.

He then goes to the off side of the horse and passes over the off stirrup and the cincha, taking the off stirrup in the left hand and the cincha in the right, in order to save time. He then goes back to the near side of the horse and when opposite the horse's left hip, grasps the back strap where the crupper joins, with the right hand; in the case of wheel drivers, picking up the center of the breeching body with his right hand, as he passes in rear of the horse, and then grasping the back strap with the same hand, as explained for other drivers. Without stopping, he grasps the cincha strap with left hand as he steps forward on the near side of the horse and folds over the cincha strap with the left hand and the back strap with the right. Next he unhooks the collar strap and removes the saddle.

Unharnessing in the Field: The order of unharnessing as stated in Par. 411 is changed to suit the disposition of the harness. For example, after unyoking, the neck yoke with the martingales is placed on the foot board of the limber.

The traces instead of the bridle are next removed and after being removed are laid on the ground, there being no other place to put them. The wheel traces are released from the hame tugs only and are turned back on the foot board of the limber, still attached to the single trees.

The saddle is next removed and placed on the limber pole. The traces are then picked up, folded, and placed across the blankets over the saddle.

The bridles are next removed and placed over the traces. The collars are removed and placed across the saddle with the bridles. If care is taken both the collar and bridle can be placed on the seat of the saddle over the blankets, which will permit the bridles to be moved without disturbing the collar. It is often necessary to remove the bridle, as when leading to water and so on.

Adjustment and Fitting of Harness: The adjustment and fitting of harness is carefully laid down in Par. 420.

Before attempting to adjust the harness, holes of the proper size and the normal distance apart, should be punched in the following straps: back straps, loin straps, hip straps and side straps, using a leather punch. Under no condition should they be cut with a knife or punched through with any other instrument. By doing this any set of harness can be fitted to any horse for draft purposes by simply taking up, or letting out the strap without having to stop to punch holes.

Common faults in fitting harness are as follows: The back strap is usually left too long and the crupper taken up too short, this draws the hip strap, particularly with the wheel horses, too near the horse's tail and does not pull the breeching body up in its proper place.

While the drill regulations require that the hip straps be so adjusted as to enable the breeching body to bear flat against the thighs and to rest from twelve to fifteen inches below the dock, it is better to shorten

the rear hip straps until the breeching body is just below the point of the buttock. The front hip strap should be so adjusted so as to allow as far as possible a straight pull from the point of the buttocks through the breeching body and side straps to the "D" ring of the martingale. In other words the breeching body should be tilted until it is about in the prolongation of the side straps. If the front hip straps are shortened so as to make the breeching body hang horizontal, all the strain in backing the carriage comes on the front hip straps, which are very easily broken. The breeching body should not hang horizontally, but should be tilted to the front as before explained. Side straps are then shortened sufficiently for the carriage to be stopped by the point of the horse's buttock against the breeching body and not by the top of his neck against the collar as is commonly the case.

The breeching should be carefully watched in draft to see that it does not chafe the horse's buttock or the point of the stifle. As soon as any chafing is noticed the side straps should be let out and gradually tightened, as the skin is hardened.

In adjusting the breeching and the side straps the starting point is the martingale. The martingale cincha strap should be of such length as to permit the "D" ring of the martingale to extend three or four inches through the standing loop on the cincha. With this as a starting point, adjust the side strap and breeching as indicated above. If this is not done, or if the side straps are too long and the martingale cincha strap is taken up too short, the "D" ring will be slipped forward through the standing loop and tear it from the cincha.

Final adjustment of harness must be made after the team has been placed in draft. It is then the duty of officers and non-commissioned officers and drivers constantly to watch the harness and to make or have made such adjustments as are necessary.

A good way of impressing upon beginners the importance of carefully adjusting the martingale, side straps and breeching is to hitch a quiet team to a carriage with the martingale, cincha straps and side straps too long and with the breeching hanging too loose, as is commonly seen. Have the carriage move down a gentle slope at a fast walk or slow trot and suddenly stop, without putting on the brakes. Both wheel horses will lift their heads in an effort to stop the carriage with the tops of their necks by means of the collars, and the carriage will be stopped without the breechings becoming tight. This is what causes the sores on the tops of the horse's neck, commonly known as a "collar boil," which the ignorant driver would claim was caused from a hot collar pad, particularly if the collar had been left in the sun.

SECOND TWELVE DAY PERIOD

Drivers' Instruction—Theory—Drill Regulations
(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Care of horses, Pars. 590 and 591.
Object and sequence of instruction, Pars. 205 to 210, incl.
Standard required, Pars. 211 to 213, incl.
Hints to instructors, Pars. 214 to 224, incl.

Lesson 2.

Review Lesson 1.
To blanket, Par. 227.
Fitting the saddle, Par. 230.
To saddle, Par. 228.
To unsaddle, Par. 229.

Lesson 3.

Review Lesson 2.
To bridle, Pars. 231 and 232.
To fit the snaffle bridle, Par. 233.
To fit the double bridle, Par. 234.
To remove the bridle, Par. 235.

Lesson 4.

Review Lesson 3.
To mount, Pars. 240 to 244, incl.
To dismount, Pars. 245 to 249, incl.
Holding the reins, Pars. 250 to 254.
The stirrups, Par. 255.
Position of the soldier mounted, Par. 256.
Note: See Hints on E—Equitation, Second Twelve Day Period.

Lesson 5.

Review Lesson 4.
Establishing confidence, Pars. 260 to 262, incl.
Establishing a firm and correct seat, Pars. 283 to 284, incl.
Riding without reins and stirrups, Pars. 285 and 286.

Lesson 6.

Review Lesson 5.
The aids, Par. 288.
Leg aids, Par. 289.
Discuss in detail the application of the leg aid. Consider different movements and teach how the leg aids act in each case.
See Hints on E—Equitation, Second Twelve Day Period.

Rein aids, Par. 290.

Discuss in detail the application of the rein aid. Consider different movements and teach how the rein aids act in each case.

Lesson 7.

Review Lesson 6.

Use of spurs, Par. 292.

Impress upon the recruit that the spur is not a means of punishment, but a means of accentuating the leg aids.

The weight, Par. 291.

Discuss in detail when the weight is used and its effect.

Lesson 8.

Review Lesson 7.

The whip, Par. 293.

The voice, Par. 294.

Impress upon the recruit that the voice is one of the most powerful aids employed in Equitation. Its employment is of the utmost importance, particularly to the Artilleryman. Discuss in detail how to use this aid.

The use and accord of aids, Par. 295.

Teach what accord of the aids means and the effect of contradictory aids. See Hints on E—Equitation Second Twelve Day Period.

Lesson 9.

Review Lesson 8.

Gathering the horse, Par. 297.

Teach the aids employed and the effect of their application. See Hints on E—Equitation, Second Twelve Day Period.

Forward, March, Par. 298.

Teach the effect of the gather and the aids following for, Forward, March.

To halt, Par. 299.

Teach the theory of the application for the aids employed.

The half halt, Par. 300.

Teach the aids employed and their application.

Lesson 10.

Review Lesson 9.

Change of gait, Par. 301.

Extending or reducing the speed at the various gaits. Teach the aids employed and the theory of their application.

Change of direction, Par. 303.

To march by the flank, Par. 304.

Teach the aids employed and the theory of their application.

Lesson 11.

Review Lesson 10.

Circles, Par. 306.

Teach the aids employed and theory of their application.

To back and halt, Par. 307.
Teach the aids employed and the theory of their application.

Lesson 12.
Review Lessons 6 to 11, incl. General quiz.

SECOND TWELVE DAY PERIOD

Hints on Drivers' Instruction—Theory—Drill Regulations

(Light Batteries)

See Hints on E—Equitation, Second Twelve Day Period.

In discussing the fitting of the bridle, the instructor will also teach the following:

The snaffle bit acts on the corners of the horse's mouth and when the rein becomes active, tends to elevate the horse's head. The curb bit acts on the bars and when active lowers the horse's head. Because of the fact that the curb acts on the "bars" and that leverage is obtained, this bit is much more severe than the snaffle.

In teaching the theory of the application of aids, impress on the recruit the effect which the application has on the horse. In every case show the effect of contradictory aids.

In general the voice has the following effects:
(1) To soothe or quiet.
(2) To encourage.
(3) To admonish.
The weight has the following effects:
(1) To act as a brake, (the halt, for example).
(2) To change the center of gravity of the horse.
The rein aids have the following effects:
(1) To assist in changing direction.
(2) To diminish the gait.
(3) To change the center of gravity of the horse.
The leg aids may be classified as follows:

(1) **Active:** (For example, both legs are active when applying the forward leg aids.)

(2) **Passive:** (For example, both legs are passive when they are not applying an aid, as when the rider is moving at the gait he desires while on a straight line.)

(3) **Guarding:** (For example, in circling left, the right leg is carried back **slightly** in order to be in a position to prevent the haunches swinging to the outside of the circle. If the haunches remain on the circle the right leg remains passive, but if haunches tend to swing outside, the leg becomes active.)

The instructor will obtain excellent results in this subject, if he will first read a paragraph from the book and then in his own words, explain and discuss it. His discussion where possible should include a hypothetical case to illustrate and bring out the point he desires to impress.

All paragraphs covered in these lessons are of the utmost importance. Much assistance can be given the class by picking out the "meat" of each paragraph and covering the same by a question and answer. These questions and answers may be printed and a copy given each member of the class. Illustration: What are the three principles of feeding? Answer: 1—Water before feeding. 2—Feed in small quantities and often. 3—Do not work a horse hard immediately after a full feed.

SECOND TWELVE DAY PERIOD

Noncommissioned Officers' Instructions—Theory—Drill Regulations (Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Note: The Instructor will read the paragraph and discuss it, illustrating where practicable. The review will consist of quizzes.

Lesson 1.

Pars. 205 to 224, incl.

Lesson 2.

Review Lesson 1.
Position of the soldier mounted, Pars. 256 and 257.
The rests, Par. 258.
Establishing confidence, Par. 260.
Exercises favorable to imparting confidence, Par. 261.
Suppling exercises, Pars. 262 and 263.

Lesson 3.

Review Lesson 2.
Establishing correct seat, Par. 283.
Favorable exercises, Par. 284.
Riding without rein and stirrups, Par. 285.
Jumping, Par. 287.

Lesson 4.

Review Lesson 3.
Teaching aids, Par. 288.
Leg aids, Par. 289.
Rein aids, Par. 290.
The weight, Par. 291.

Lesson 5.

Review Lesson 4.
Use of the spur, Par. 292.
The whip, Par. 293.
The voice, Par. 294.

The accord of aids, Par. 295.
Terms employed, Par. 296.
Gathering the horse, Par. 297.

Lesson 6.
Review Lesson 5.
Care, conditioning and training of horses, Par. 590.
Rules for the care of horses, Par. 591.

Lesson 7.
Review Lesson 6.
Stables and stable management, Pars. 592 to 595.
Feeding, Pars. 596 to 600, incl.

Lesson 8.
Review Lesson 7.
Watering, Pars. 601 and 602.
Stable duty, Pars. 603 and 604.

Lesson 9.
Review Lesson 8.
Grooming, Pars. 605 to 610.
Shoeing, Pars. 611 to 613.

Lesson 10.
Condition and exercise, Pars. 614 to 623.
Care of horses on the march and in the field, Pars. 623 to 633.

Lessons 11 and 12.
Review Lesson 10.
General quiz.

THIRD TWELVE DAY PERIOD

Driving Instruction Dismounted

(Light and Heavy Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery, 1917.

Same as for the Second Twelve Day Period.

In addition, take up Pars. 551 to 568, incl., teaching the movements prescribed therein which affect the driver.

THIRD TWELVE DAY PERIOD

Driving (Lessons and Hints)

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery, (Horse and Light), 1917.

Lessons 1 to 12.

The work in this period consists of teaching the driver how to handle the pair. At the beginning of the hour the instructor should work with the pairs on the track. During this time equitation movements will be taken up; viz: Forward, Increase and Decrease of gait; Backward, etc., (see that the about is executed on a six-yard radius); Halt; Backward, etc., (See Par. 447). The instructor must insist on both the near and off horses being "gathered" and aids for the movement being properly applied to both near and off animals. Pay special attention to the use of the voice. See Pars. 442-450.

After the horses have been worked out as above described, the instructor will form the pairs into teams, (Par. 448.) **The traces will not be hooked.** In order to hold up the traces of the wheel horses, halter swivel snaps should be drawn and by means of an open link of one-quarter inch round iron permanently attached to the ring end of the wheel trace (which holds the quick release device). The end of the wheel trace can then be snapped or hooked in the ring at the end of the breeching body (where the side straps are fastened). This will not only hold the wheel traces in place in pair drill, but will prevent the front hip straps to which the wheel traces are supposed to be fastened from being torn out by the pull of the swing and lead pairs in team drill. The lead and swing traces will be crossed over the horse's back behind the cantle and fastened by passing the trace toggle (left, for example) through the ring on the trace chain (right ring, in this case).

The movements prescribed in *The Battery Mounted*, Pars. 464 to 568, will be covered by means of drill. Remember that the traces are not hooked, but that the pairs are in "team formation." Use arm signals, as well as verbal commands, gradually working away from the latter. During this Twelve Day Period the instructor may, if he so desires, take one or two short road marches (without carriages, traces unhooked and placed as previously described). If the road march is taken the instructor will conduct it as prescribed in *Field Service Regulations*. The following points must be insisted upon in order to conduct a successful march:

(1) **Steady Gaits.**

Nothing will break down horses more than unsteady gaits. If the walk is too slow, the teams jam, necessitating a continuous halting and closing up during the march; if too fast, there is a continuous "jigging" throughout the column in order to maintain proper position. The four mile per hour walk can be taken by the average horse, when draft is good. Teach the soldier this gait over a staked course. If the trot is too slow, there will be a continuous change of gaits (walk and trot) in the column. This results in a continual jamming and opening out, from front to rear. If the trot is too fast, some of the animals will either "pound themselves to death" or will be forced to "break" the gait.

The knowledge of the four mile walk and the eight mile trot is one of the secrets of "horses in condition."

Lameness, founder, etc., generally mean **poor gaits.** In case a carriage or team is forced to fall out during the march it should close on the rear of the column at the regulation trot and take its place in column at the next halt, unless otherwise ordered.

(2) **During the Halt.**

(a) When halting, teams and carriages should halt on the **right side of the road, leaving the left clear so that traffic will not be congested. Individually mounted men must also keep to the right of the road.** This is of the utmost importance, because of the fact that orders are continually sent from front to rear and vice versa. Before going into action and during the "approach march" it often happens that organizations in rear are ordered forward. Their march must not be delayed by a congested road.

(b) **Immediately** after halting,the soldier must adjust his equipment and harness. This necessitates a careful examination by the soldier and an inspection by the chiefs of section and chiefs of platoon. All animals should be examined to see that they have no sores, or rubs, that the shoeing is O. K. and that no stones have been "picked up," etc. The general condition of the horse should be noted and any symptoms of sickness reported immediately. Under no circumstances will a soldier leave his horse or pair, without first getting a man to "stand by" in his place. It should be remembered that when carriages are used **the pole prop should be let down immediately after halting.**

The chiefs of section and gunners should make it a point to caution "Pole props down," and should inspect to see that this is done.

Horses in harness should not be permitted to graze because of the danger of the animals becoming entangled, thereby resulting in kicking or a stampede of the team. This will prevent the driver from examining the horse's shoulder and the bearing surface of the collar.

If it is intended to water during the halt, two circumstances arise: (1) when the animals may be watered from a running stream, (2) when buckets must be employed. In the first case, the teams are unhitched and the traces looped over the horse's back as prescribed in the Drill Regulations. Each individual driver takes charge of his pair and the Battery, Platoon or Section is formed in column. The watering of the animals is superintended by the Captain and Battery Officers, each chief of section superintending the watering of his section. After the stream has been filled with all the animals which it will accommodate, **all** should be held in the stream until the last horse has finished drinking.

In leading in to water it is advisable to fill the down-stream end first. This method gives the horses on the down-stream side clean water whereas if the up-stream end is filled first, by the time the down-stream side is filled the water in that section is liable to be muddy. The command, "Move out" is then given by the officer superintending the watering, whereupon all the horses leave the stream and form in column in the direction from whence they came. A new batch move

down to the stream and the process is repeated. After the horses are watered the teams are marched back to their carriages.

The above is not a "hide-bound" rule for watering but merely gives the general idea. Watering may be performed by Battery, Platoon or Section. Regardless of the method of watering, an officer should always be present. The reason why all horses are held in the stream until the last horse has finished drinking, is as follows:

"The herding instinct" of the horse is very strong and some horses who would have drank their fill, had they been given time, will go thirsty, rather than leave the other animals.

When the animals are very thirsty it is a good plan to hold back the horses which are waiting to water so that they are unable to see the other animals drinking. This will prevent any uneasiness or bolting for the stream.

The second case requires little discussion. Care should be taken that the cannoneers "stand by" while the drivers are filling the buckets.

(3) **Relaying Signals and Commands.**

(a) All signals and commands must be relayed to the rear element of the column. This permits a smooth execution of changes in gait and informs the rear of the column what to expect. For example: If the command is to halt for ten minutes, a knowledge of the length of halt is necessary in order for the entire organization to be ready to move out at the appointed time. By relaying back this information the entire command will know exactly when it is to move out. This knowledge prevents slowness and straggling.

(4) **March Discipline.** (See *Field Service Regulations*).

(a) On long marches "slouching in the saddle" must be watched All officers and noncommissioned officers are responsible that this does not occur.

(b) Chiefs of section march in rear of their sections.

(c) Chiefs of platoon march in rear of their platoons.

(d) When subdivision takes place all should take their posts.

THIRD TWELVE DAY PERIOD

Drivers' Instruction—Theory—Drill Regulations

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery, (Horse and Light), 1917.

Lesson 1.

Gaits, Par. 351.
The walk, Par. 352.
The trot, Par. 353.
The gallop, Par. 354.
Work on long lines, Par. 356.

Lesson 2.
Review Lesson 1.
Work on varied ground, Pars. 357 to 360.

Lesson 3.
Review Lesson 2.
Management of the pair, Pars. 442 to 449.

Lesson 4.
Review Lesson 3.
Care of the horse, Pars. 590 and 591.
Stables and stable management, Pars. 592 to 595, incl.

Lesson 5.
Review Lesson 4.
Feeding, Pars. 596 to 600.

Lesson 6.
Review Lesson 5.
Watering, Pars. 601 and 602.
Stable duty, Pars. 603 to 610.

Lesson 7.
Review Lesson 6.
Shoeing, Pars. 611 to 613.

Lesson 8.
Review Lesson 7.
Condition and exercise, Pars 614 to 622.

Lesson 9.
Review Lesson 8.
Care of the horse on the march and in the field, Pars. 623 to 633.

Lesson 10.
Review Lessons 1 to 3 incl.

Lesson 11.
Review Lessons 4 to 6 incl.

Lesson 12.
Review Lessons 7 to 9 incl.

THIRD TWELVE DAY PERIOD

Noncommissioned Officers' Instruction—Theory—Drill Regulations

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery, (Horse and Light), 1917.

Note: The instructor will read the paragraph and discuss it, illustrating where practicable. The review will consist of quizzes.

Lesson 1.

Elementary training in equitation, Par. 355.
Work on long lines, Par. 336.
Work on varied ground, Pars. 357 to 360, incl.

Lesson 2.

Review Lesson 1.
Posting, Par. 361.
Changing the diagonal in posting, Par. 362.
The trot, Par. 363.

Lesson 3.

Review Lesson 2.
Conditioning and exercise, Pars. 614 to 623.

Lesson 4.

Review Lesson 3.
Care of horses on the march and in the field, Pars. 623 to 633.

Lesson 5.

Review Lessons 3 and 4, Pars. 614 to 633.

Lesson 6.

Management of the pair, Pars. 442 to 449.

Lesson 7.

Review Lesson 6.
Teams and their management, Par. 450.
Teaming of artillery, Par. 451.
To start a carriage, Par. 452.
To stop a carriage, Par. 453.
To back a carriage, Par. 454.

Lesson 8.

Review Lesson 7.
Turns, Par. 455.
Turn in limbering, Par. 456.
To confirm in horses a willingness to pull, Par. 457.

Lesson 9.

Review Lesson 8.
Driving up steep slopes, Pars. 458 to 463.

Lesson 10.

Review Lessons 1, 2 and 3.

Lesson 11.

Review Lessons 4, 5 and 6.

Lesson 12.

Review Lessons 7, 8 and 9.

FOURTH TWELVE DAY PERIOD

Drivers' Instruction—Theory—Drill Regulations

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery, (Horse and Light) 1917.

Note: The instructor will read and discuss the paragraphs, illustrating where practicable. The review will consist of quizzes.

Lesson 1.
Posting, Pars. 361 and 362.
Management of the pair, Pars. 442 to 449.
Teams and their management in draft, Par. 450.

Lesson 2.
Review Lesson 1.
Teaming of artillery horses, Par. 451.
To start a carriage or increase its speed, Par. 452.
To stop a carriage or reduce its speed, Par. 453.

Lesson 3.
Review Lesson 2.
To back a carriage, Par. 454.
Turns, Par. 455.
To turn in limbering, Par. 456.
To confirm in horses a willingness to pull, Par. 457.

Lesson 4.
Review Lesson 3.
Driving up steep slopes and over difficult ground, Par. 458.

Lesson 5.
Same as Lesson 6, Second Twelve Day Period.

Lesson 6.
Same as Lesson 7, Second Twelve Day Period.

Lesson 7.
Same as Lesson 8, Second Twelve Day Period.

Lesson 8.
Same as Lesson 9, Second Twelve Day Period.

Lesson 9.
Same as Lesson 10, Second Twelve Day Period.

Lesson 10.
Same as Lesson 11, Second Twelve Day Period.

Lessons 11 and 12.
General review of Lessons 1 to 10, incl.

TWELVE DAY PERIOD

S—Stables

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse or Light), 1917.

Groom by detail, Par. 605.

Take up by short talks, Pars. 603-610.

Officers at stables can at this time teach the men the "points of the horse."

Reference should be had to some standard book on this subject.

In telling a man to brush off a certain part, use its correct name, "pastern," "flank," etc.

Make grooming as instructive as possible.

TWELVE DAY PERIOD

Cleaning of Harness and Saddlery

(Light Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery (Horse and Light), 1917.

Lesson 1.

Talk on leather and its care, Pars. 647 to 677.

Hand book 3-inch Gun Material, Page 151. Ordinance Pamphlet No. 1965.

Lesson 2.

Review Lesson 1.

Explain: (a) To clean the harness, Par. 675. (b) To clean and dress the harness, Par. 678. (c) To oil the harness, Par. 679.

Practical demonstration of cleaning the harness by the instructor.

Lesson 3.

Quiz on Lesson 2.

Practical work: "Cleaning the harness."

During the practical work the instructor should go from one man to another and see that he is cleaning the harness as prescribed. He can at this time assist instruction in nomenclature by asking the soldier, "What are you cleaning now? What is its use? How do you know when it is adjusted?"

Lesson 4.

Explain again the difference between: (a) To clean the harness, (b) To clean and dress the harness, (c) To oil the harness.

Practical work in cleaning harness.

Lesson 5.
Practical demonstration by instructor of: "To clean and dress the harness."
The instructor should name each part of the harness as he cleans.

Lesson 6.
Practical work: "To clean and dress the harness."

Lesson 7.
Same as Lesson 6.

Lesson 8.
Quiz on the difference between (a) To clean the harness, (b) To clean and dress the harness, (c) To oil the harness.

Lesson 9.
Practical demonstration by instructor of: "To oil the harness," Par. 679.

Lesson 10.
Practical work: "To oil the harness."

Lessons 11 and 12.
General review of previous lessons.

TWELVE DAY PERIOD

Making Rolls—Shelter Tent Pitching

(Light and Heavy Batteries)

All references are to Provisional Drill and Service Regulations for Field Artillery.

Lesson 1.
Par. 1809-1813.

Lesson 2.
Same as Lesson 1.

Lesson 3.
Par. 1814.

Lesson 4.
Par. 1814-1816.

Lesson 5.
Par. 1815-1818, incl.

Lessons 6.
Par. 1818-1823.

Lesson 7.
Par. 1823-1830.

Lesson 8.
Par. 1856-1860.

Lesson 9.
Same as Lesson 8.

Lesson 10.
Par. 1861-1864, incl.

Lessons 11 and 12.
Review. Subjects taken are at the discretion of the Instructor.
Note: For Heavy Batteries make the necessary modifications in schedule excluding the rolls applying to "the soldier mounted" (Par. 1815 to 1818 incl).