BOX NUMBER 14 UNCLASSIFIED

Provisional Regulations for Operation and Training of Division Trains

Prepared by
War Plans Division
General Staff



WAR PLANS DIVISION
OCTOBER, 1918

WAR DEPARTMENT
Document No. 877
Office of the Adjutant General

42200

REGRADED Unclassified
BY AUTHORITY OF DOD DIR 5200.1.2
BY Randall Peters
ON 15 August 2025

UNCLASSIFIED

WAR DEPARTMENT,

WASHINGTON, *October* 25, 1918.

The following pamphlet, entitled, "Provisional Regulations for Operation and Training of Division Trains," is published for the information and guidance of all concerned.

(062.1 A. G. O.)

BY ORDER OF THE SECRETARY OF WAR:

PEYTON C. MARCH,
General, Chief of Staff.

OFFICIAL:

P. C. HARRIS,
The Adjutant General.

Table of Contents

	PAGE
Part I. Mechanical transport. The company	7
Organization of motor truck companies	7
Technical administration	7
General duties of company commanders	8
Duties of the company commander during convoy	9
Duties of truckmaster	11
Duties of chief mechanic and mechanics	11
Duties of chief of section	11
Duties of company clerk	12
Duties of mess and property sergeant	12
Duties of chauffeur	12
Company schools	13
Map reading and orientation	13
Marking equipment	13
Repair and salvage	13
Repair service	14
Salvage	15
Accidents	16
Road formation	16
Park formations	16
Line	17
Double line	17
Column of sections	17
Double column of sections	17
Corral	17
Inspections	17
Formation for inspection	18
Position of "prepare for inspection"	18
Dismounted instruction	18
Discipline	18
Small arms practice	18
Instruction	18
Signals	19
Conduct of marches	19
Order of march	19
Grouping of units	20
File closer	20
Distance between vehicles	20
Starting	21
Indication of tail of column	21
Rate of march	21
In cities and villages	21
March discipline	22
Road difficulties	22
Mud	23
Sand	23
Crossing streams	23
Steep grades	23
Railroad crossing	24
Halts	24
Daily marches	24
Daily inspection and upkeep	24
Replenishment of gasoline, oil, grease, etc	25

PAGE
Cooking on the march ... 25
Road rules ... 25
Road and route signs ... 26
Night marches ... 27
In the presence of the enemy ... 27
Rate of march ... 27
Distance between vehicles ... 27
Other night marches ... 27
Troop convoys ... 27
Loads and cargoes ... 28
Survey ... 28
Ammunition ... 28
Mixed loads ... 29
Long loads ... 29
Tail gates ... 29
Table of cargoes ... 30
Quartermaster stores ... 30
Ammunition ... 31
Engineers stores ... 32
Miscellaneous ... 32
Camp and bivouac ... 33
Camp ... 33
Bivouac ... 33
Billeting ... 33
Precaution against fire ... 34
(*a*) Gasoline must be handled with care and common sense 34
(*b*) In case of fire do not try to put it out with water ... 34
(*c*) In case of a truck catching on fire ... 34
(*d*) Do not let a pool of gasoline drip ... 34
(*e*) Keep all engine parts, drip pans and under parts of vehicles clean ... 34
(*f*) A waste can will be kept in shop and in park ... 35
(*g*) Gasoline will not be used for other purposes than fuel ... 35
Organization of larger motor commands ... 35
Commanding officers, trains and groups ... 36
The adjutant ... 36
The supply officer ... 36
Formations and marches ... 36
The route column ... 37
The position of the train commander ... 37
A motorcycle messenger ... 37
Distance between vehicles and companies ... 37
Position of company commander in train ... 37
Transportation system ... 37
Reports ... 38
Passenger cars ... 38
Motorcycles ... 39
Motor trucks ... 39
Passenger regulations ... 39
Police regulations ... 39
Part II. Animal drawn transport. The company ... 40
Composition of companies ... 40
Technical administration ... 40
Duties of company commanders ... 40
Duties of the first sergeant ... 41
Duties of chiefs of section (assistant wagon masters) ... 41

PAGE
Duties of other N. C. O.'s 42
Duties of wagoners 42
Driving 42
Coupling reins 42
Holding the reins 43
Driving four-in-hand 43
The reins 44
Adjusting the reins 44
Wheel reins 44
Lead reins 44
Any single rein 44
Dexterity with reins 44
Crossing the road 44
Turning to left 45
Turning to right 45
The whip 45
To start 45
Pulling up 45
A few hints 46
Harness and horse equipment 46
To clean and dress the harness 47
To oil the harness 47
Formations required will be generally confined to those for march, park and inspection 47
Road formations 47
Park formations 48
Line 48
Line of sections 48
Column of sections 48
Column of vehicles or corral 48
Inspections 48
Informal 48
Formal 48
Dismounted instruction 48
Visual and whistle signals 48
Conduct of marches 49
Rate of march 49
Daily march 49
Difficulties, steep grades, etc 49
Crossing bridges, fords and ferries 50
Overturned vehicles, thrown animals, etc 50
Defensive measures 50
Cargoes 51
Care of animals on the march 51
Part III. Division trains 55
Formations for component units 56
Truck company, ammunition train 56
Caisson company, horsed battalion, ammunition train 56
Wagon company, horsed battalion, ammunition train 57
The engineer train 57
The motorized ambulance company 57
Animal-drawn ambulance company, sanitary train 57
Motorized field hospital company 57
Animal-drawn field hospital company, sanitary train 58
Truck company, supply train 58
Mobile ordnance repair shop 58
Military police 58

PAGE
Training of divisional trains ... 58
Chauffeurs and motorcyclists ... 59
Mechanics ... 59
Company clerk ... 59
Property sergeant ... 59
Assistant truck master ... 59
Truck master ... 59
Officers ... 60
Company instruction (practical) ... 60
The military police ... 60
Appendix A. Schedule of inspection and maintenance ... 61
1. General principles of good upkeep ... 61
2. Repairs made by the company ... 61
3. After each run ... 62
4. At end of 250 miles ... 62
5. At end of 1,000 miles ... 62
Summary of engine troubles and their causes ... 62
1. Engine fails to start ... 62
2. Engine irregular and lacks power ... 63
3. Engine stops ... 63
4. Engine overheats ... 63
5. Engine knocks ... 63
Appendix B. Instruction for motor storage ... 64
1. Placing trucks in storage ... 64
2. Removing trucks from storage ... 64
Appendix C. Solid tires ... 65
1. Care ... 65
2. Trimming ... 65
Appendix D. Consumption of gasoline and oil ... 66
Appendix E. Dimensions and weight of various trucks ... 67
Appendix F. Shipment of trucks by rail ... 68
1. Loading ... 68
2. Details ... 68
3. Packing ... 68
4. Skids and ramps ... 68
5. Carload ... 69
6. Draining ... 69
7. Blocking ... 69
8. Invoice ... 69
9. Inspection ... 69
10. Materials ... 69
Appendix G. Hints on driving ... 70
Appendix H. Winter driving ... 72
1. Fluid freezing ... 72
2. Draining radiators ... 72
3. Starting in cold weather ... 73
4. Lubrication ... 73
Appendix I. Numbering and marking motor vehicles. System of classification ... 75
System of numbering ... 75
Additional markings for motor vehicles ... 75
Convoy problem ... 77
Solution of problem ... 77
Motor transport order ... 79
Form of fire order ... 80
Fire orders ... 80

Part I

MECHANICAL TRANSPORT

THE COMPANY

In motor truck companies, the principal means of discipline open to the line, "Drills of Precision" are, in large part, impracticable and, consequently, the most effective means at hand consist in requiring the utmost particularity in uniform and dress; the absolute cleanliness of equipment; the proper sanitation and police of camp and a rigid enforcement of proper military deportment and saluting.

ORGANIZATION OF MOTOR TRUCK COMPANIES.

1. The details of personnel, arms and truck equipment will be found in current Tables of Organization, issued by the War Department.

TECHNICAL ADMINISTRATION.

2. The administration of a truck company is identical with that of a company, troop or battery (see A. R. 283).

(*a*) The entire personnel must be impressed with a sense of organization and a definite knowledge of the duties and the responsibilities of each member of the company. The truck master and the assistant truck masters must realize their responsibility and be required to exercise their authority in a firm and military manner.

(*b*) The division of responsibility with reference to operation, repair and upkeep of the mechanical equipment should be established by the company commander and published in a company order, so that each member of the company shall be thoroughly familiar therewith.

(*c*) Two men should be permanently assigned to each truck, a chauffeur and an assistant chauffeur. These men should be impressed with their entire responsibility for the proper maintenance of their vehicle. The entire personnel of the company, except cooks should be qualified chauffeurs.

(*d*) The general practice is to make each driver responsible for the operation, repair and upkeep of the truck and equipment, as well as all other property assigned him. The extent of the repairs that they should be required to make depends much on the ability of the personnel. In general, however, this will extend to what are classified as minor repairs, not requiring a more extensive mechanical knowledge than is possessed by the ordinary chauffeur.

(*e*) The company is normally organized into sections. The service cars are kept under the immediate orders of the company commander, these not forming an integral part of the cargo section. When the company is not operated as a train, these

trucks may be assigned to cargo work and in such cases should be attached to sections.

(*f*) The trucks of each section are under the direct supervision of the chief of section, who is held responsible for their upkeep and repairs. Likewise, the chief mechanic, assisted by other mechanics, has general supervision over the mechanism of the truck equipment, as well as the detailed repair work devolving on them.

(*g*) Extensive repairs, embracing work on the motor, ignition system, etc., are under the direct supervision and orders of the chief mechanic.

(*h*) It is contemplated that company commanders supervise actively the operation of their trucks and for this purpose will make daily inspections of the operations of their details at work. During this inspection, officers will observe carefully the character and amount of work being done by these details and, if convinced that the number of trucks employed on any duty is in excess of actual requirements, will make memorandum report of changes recommended. No change will, however, be made without reference to proper authority. They will also compute the approximate time which should be consumed in the execution of various assignments and will cause a check to be made with a view to preventing drivers from loitering away from the company park.

GENERAL DUTIES OF COMPANY COMMANDERS.

The company cammander must realize that his company is a transport organ in the service of the United States and, in making any decision, this fact should be uppermost in his mind.

3. The following points are noted that call for special attention on his part:

(*a*) Prevent speeding of trucks. Speeding is a practice very difficult to prevent, but it is one very destructive to truck mechanism, extremely conductive to accident and markedly destructive to discipline. Punish all violations of speed orders with heavy hand. Trucks are built for strength, not speed.

(*b*) See that all motor governors are properly regulated. Seal these governors and keep the sealing tool in your personal possession. Allow no seal to be broken without your *express* authority and severely punish any man who tampers with the seal. The practice of opening governors is a common one and very hard to stop, but it is very destructive to motors by permitting them to run at excessive speeds.

(*c*) Keep accurate check on gasoline and lubricating supplies. There is a great temptation to dispose of gasoline unlawfully. The gasoline supply should be under immediate supervision of the property sergeant who should make a careful record of all issues. Check warehouse or Quartermaster receipts against record of issue of this man, as well as record of consumption as taken from driver's daily reports. Be careful in the minute details of property handling and you will not be troubled by the larger details. This care of property extends to all equipment. Take individual checks of the equipment at frequent intervals, to assure not only that your equipment is complete, but also to detect carelessness or theft. Remember that automobile and

motor parts are high priced and extremely salable and, if some of your men realize that your supervision is lax, they will sell your trucks from under your nose.

(*d*) Never allow a cut-out to be used and keep mufflers repaired and in working order at all times. The cut-out gives less than a fraction of one per cent more power. The noise made when the cut-out is open, or muffler not properly working, is a nuisance to everyone and in addition the exhaust of gases, striking the roadway direct raises excessive clouds of dust. This is another favorite practice with chauffeurs, which must be severely punished in order to stop.

(*e*) Do not allow motors to run while trucks are at rest longer than a period of a minute. Drivers object to the sometimes difficult work of cranking a motor and will avoid doing it whenever possible. This practice, in addition to wasting gasoline, may lead to serious results when company is operating in field service.

(*f*) Always remember that your motto should be "Service First" and "Deliver your Cargo." Don't lose sight of the mission of your company by getting too much interested in the working of the truck mechanism.

(*g*) The company commander should endeavor to standardize, in writing if possible, all company procedure. Unless all duties and functions are clean-cut and clearly defined, an organization of the size of a motor transport company will become cumbersome and inefficient.

(*h*) The development of company spirit, or esprit de corps, must be fostered in every way possible by the company commander. No one factor can be of more value in maintaining good discipline in camp and on the road. See that the men are neat in their personal appearance and that their vehicles are at all times clean. Men can be led to take great pride in their trucks and in their work. The development of esprit de corps must necessarily rest very largely upon the personality of the company commander and the spirit which he instills into his non-commissioned officers and men.

DUTIES OF THE COMPANY COMMANDER DURING CONVOY.

4. Each company or convoy will be commanded by an officer or experienced non-commissioned officer, who will have charge of the personnel, vehicles and *cargo of the convoy. He will be responsible for the discipline of his command, the care, maintenance and operation of the vehicles in convoy and see that all* rules of operation are complied with. When operating in the advance section, convoy commanders are not required to give receipts for their cargoes. Their total responsibility therefore rests in the exercise of due care in the operation of their trucks and delivery of their loads.

5. Before a convoy starts from its initial point, the company commander will see that the necessary supplies of gasoline and oil for his vehicles and rations and supplies for his men, are provided in adequate quantities; that the cargo in each truck is properly loaded and secured and will provide himself with necessary passes, orders, maps, etc., for the trip that he is to

make. Before starting he will make an informal but effective inspection of his personnel and vehicles.

6. When a halt is made, the company commander will see that each driver does whatever is necessary to make his vehicle ready for an immediate start. After this has been done, it is the duty of the company commander to see that his men are fed and lodged when necessary.

7. For short convoys not employing many trucks and going to loading and unloading points well known to the men, it is often unnecessary for the company commander to be present. Ordinarily, however, he should be in active command and, with exceptions noted below, he should habitually ride in the rear of his convoy, passing the vehicles of his column from time to time to assure himself of its efficient operation.

8. The company commander should precede his convoy when:

(*a*) Covering little known roads.

(*b*) To reconnoiter loading and unloading points so as to prepare the way for the trucks.

(*c*) Before the convoy arrives at a large town the company commander should be there to find the route through the town and to get information regarding traffic rules, etc., having instructed the truckmaster where to halt and wait outside of the town.

(*d*) At all other times made necessary by any situation arising.

9. The company commander should never leave his convoy without having given definite instructions to the officer or truckmaster left in charge.

10. Railroad crossings should be examined before arrival of the convoy and, if necessary, a man should be posted at the crossing. Avoid splitting the convoy.

11. The company commander should always try to settle for himself any unforseen difficulties arising during the convoy, such as undue delays at loading points. He should telephone to his commanding officer only when absolutely necessary.

12. In covering little known roads, the officer in charge of the convoy will make a personal inspection of all bridges or will otherwise assure himself that the bridges to be crossed are in good condition and will support any loads required.

13. During long convoys, at intervals of approximately three hours, the company should be stopped to allow the men to relieve themselves and to make such minor adjustments as may be required.

14. In case of danger of attack by enemy aeroplanes, convoy commanders will take all necessary precautions. They will, if possible, use roads which are under the shade of trees or are camouflaged and, in case of actual attack by enemy aeroplanes, will spread trucks of their convoy so that there shall be an interval of at least fifty yards between trucks.

15. As far as possible, all orders, which must be issued to men or non-commissioned officers of the convoy, will be transmitted by the company commander through regular channels.

Convoy commanders will avoid, as much as practicable, the giving of commands directly to the men.

16. Vehicles, upon being loaded and unloaded, should only in very rare cases be dispatched to their next destination singly, but should be dispatched in sections under the command of non-commissioned officers.

17. In convoys covering long distances, or on little known roads, the convoy commander will provide all non-commissioned officers of the convoy and such other men as may be necessary, with complete details as to itinerary, destination and all other desirable information.

18. It is not the duty of the drivers to load or unload cargoes. Fatigue parties from other troops should be furnished for this work.

19. *Duties of truckmaster.*—He is the first sergeant and executive of the company; he sees that all orders, regulations and other requirements are properly carried out; that all the men perform their duty properly and report to the company commander any cases of neglect or violation of orders requiring disciplinary action. He should be a man chosen for his administrative and executive ability, his efficiency in handling men and for his mechanical knowledge. The chief mechanic may well be chosen for his ability as a mechanic, irrespective of his ability to handle men, but the first sergeant should be a man of force, as his prime duty is to maintain proper discipline for the efficient operation of the company.

20. *Duties of chief mechanic and mechanics.*—The practice in reference to mechanics varies in different companies according to local circumstances. The two general systems are (1) chief mechanic and assistants are under direct control of the truckmaster and are not assigned to a given section; (2) each mechanic is assigned to a section and comes under the control of the corresponding chief of section. In either case, however, the chief mechanic should be held generally responsible that the proper repairs are made. He is in charge of the repair truck, tools and equipment pertaining thereto and will keep a record of all spare parts and supplies issued. He should sign for tools and equipment and issue it to assistant mechanics on proper receipt. He should be held responsible that this equipment is properly kept up and that any shortages by damage, loss, etc., are properly made up. Normally, he should see that the assistant mechanics are properly qualified or should instruct them in their work. When mechanics are assigned to section, this duty falls upon the assistant truckmasters.

21. *Duties of chief of section.*—Each assistant truckmaster is responsible for discipline, instruction and all other matters pertaining to the personnel of his section; for operation, repair and upkeep of the equipment thereto. He is the intermediary between the men of his section and the truckmaster or company commander. His supervision extends to all the details connected with his section, including police and sanitation of tents, seeing that men are properly equipped with necessary articles, including clothing, etc. All orders for his section, either for the personnel or equipment, should be given to him. He should assure himself that his section is in proper condition at all times, by

making regular and systematic inspection of his men and equipment. He should examine all trucks on return from work and see that drivers have taken proper care of same and that proper repairs are made, making a record of all repair parts used. In his absence, for any cause, an acting Chief of Section should be designated to perform his duties.

22. *Duties of company clerk.*—He has charge of all records, reports and correspondence of the company. He will notify members of the company as to orders and instructions received and call upon them for prescribed reports. Other duties are prescribed by the company commander according to local conditions.

23. (*a*) *Duties of mess and property sergeant.*—He has direct charge of the mess hall, kitchen and all dealings pertaining thereto, including supervision of the cooks or other men working therein. He draws rations, sees that they are properly used, makes up bills of fare, sees that kitchen, mess hall and premises are properly cared for. His authority to contract debts or expend money should be carefully watched and checked by company commander personally (see Manual for Army Cooks).

(*b*) The property sergeant is responsible for all supplies and equipment not actually issued to individuals. He is, however, responsible that all issues of property are properly receipted for by the persons responsible. He keeps the store room clean and in proper order and should have a list up to date of all property and disposition of same. All dealings with the quartermaster or supply officer, not requiring the personal intervention of the company commander, should be carried on by him (see Manual for Supply Officers).

24. *Duties of chauffeur.*—He keeps his truck and its equipment clean and in proper repair and working order. In order to do this, he utilizes his spare time while not on duty and does not wait until his truck reaches the park to do all the minor work required thereon. He should be especially cautioned to attend to the proper lubrication of all parts of truck mechanism and to promptly report any defect noted or repairs needed. He should be familiar with the mechanism of his truck and its proper operation and for this purpose he should be thoroughly familiar with the contents of the instruction book issued by the makers of the truck. The chauffeur should be required to wear proper uniform and be properly dressed when driving. He should be required to carry with him at all times a suit of fatigue clothes.

The duties of the chauffeur shall also include the proper loading of the truck and securing the same and the safe delivery of all elements of the load to destination; recording of the total weight of each load carried, care being taken that the truck is at no time loaded in excess of its rated carrying capacity, except on the order of a commissioned officer. Should the truck be overloaded, he will report the circumstance at once to the truckmaster; the recording of distance traveled with each load and the distance each truck is run with no load; the recording of the total mileage traveled each day; the recording of the amounts and kinds of other supplies at the time that they are used; the reporting of all defects which can not readily be repaired by the chauffeur himself; the washing, polishing and general cleaning

of all parts of the vehicle; the complete lubrication of all working parts, including the proper lubrication of all parts of the engine, the filling of grease cups and the replenishing of oil or grease in all working parts, cleaning, trimming wicks and filling of oil lamps; the examination every day of both service and emergency brakes; the filling of storage battery with distilled water and the testing of solution with battery hydrometer; the care and repair of spark plugs; the draining of water and dirt from settling chambers of strainers in gasoline tank or gasoline pipe line.

25. *Company schools.*—Company commanders will organize classes for the instruction of all men of the company in the geography of the locality and its environs in which serving. These classes will be continued until all men are conversant with the location of outlying townships and camp sites; the names of main roads and streets; prominent municipal buildings and government warehouses; freight depots, loading stations, etc.

No trucks will be dispatched until the drivers definitely know the location to which going and the shortest direct route thereto. In case of doubt, a rough sketch of the route will be furnished the driver.

26. *Map reading and orientation.*—In addition to the above school all noncommissioned officers must be thoroughly instructed in reading maps and in the preparation of road sketches. In campaign it will be the rule rather than the exception for trucks to be dispatched through unknown territory to obscure points marked or indicated on maps or sketches and consequently the successful execution of any mission will require that the noncommissioned officer in charge be thoroughly acquainted with the subject of map reading and orientation.

27. *Marking equipment.*—All articles of personal and truck equipment will be plainly marked, as prescribed by existing regulations of the War Department.

Each member of the company will be assigned a number and each article of personal or unit equipment issued to an individual will be marked with the number assigned to him.

REPAIR AND SALVAGE.

28. The only way to insure satisfactory service from motor vehicles is to maintain them in the most scrupulous state of cleanliness, lubrication and adjustment and to devote timely attention to the condition of the tires, brakes and minor repairs, in order to defer, as long as possible, the inevitable withdrawal of the vehicles from service for overhauling and to prevent breakdowns on the road at critical times.

29. Unnecessary damage to vehicles and excessive demands for spare parts, repairs and replacements are indications of unskillful use of equipment, just as large consumption of fuel and supplies, in proportion to the known transportation needs of a command, are taken to indicate waste and improper supervision and control.

30. In order to properly maintain the vehicles in serviceable condition and to increase the number of days per year that they are in good operating condition, constant vigilance is necessary in detecting and reporting trouble and sending vehicles in ample

time to service parks for repair or replacement of necessary parts. Vehicles should be sent to service and overhaul parks periodically and should not be kept running until they break down or wear out, unless the exigencies of the service so demand.

31. An officer in control of motor vehicles will require each driver of a motor vehicle under his orders to make a daily inspection of the vehicle. When any part shows undue wear, or breaks, or any trouble or suspected trouble develops beyond the facilities at hand, the part requiring repair or replacement, accompanied by requisition or the vehicle itself, will be sent to the proper service park.

32. M. T. officers will, by frequent inspection and continual supervision, insure the proper operation of motor transportation and prevent waste of supplies. They will be held responsible for such violations of the above prescriptions as may come under their direct jurisdiction and for reporting to proper authority all such as do not come within their control. Regulations for the proper handling of motor transport will be published in orders and specified in approved manuals issued from time to time.

REPAIR SERVICE.

33. The following specific rules will be observed in connection with the repair service:

(*a*) Each motor truck company or other unit is provided with an equipment of hand tools sufficient for the class of repairs that the mechanics therewith will be called upon to make. The repairs made by such formations will be minor repairs and replacements not requiring the use of power machinery.

(*b*) The upkeep and repair of motor vehicles are conducted, outside of transport formations themselves, in three types of repair parks; *i. e.,* service, overhaul and the reconstruction park.

(*c*) When the nature of the repair is such that it cannot be undertaken by the company mechanics, the vehicle is reported to the service park that has been established to serve the unit. If the vehicle will be detained in the park for a period that will interfere with the work of the company, a serviceable vehicle of the same type and make will be issued from the replacement yard affected and the vehicle turned in will be repaired and turned over, when completed, to the replacement yard of the service park. When a vehicle is left at a service park for repair, but not to be replaced, a repair shop receipt will be given the driver, who will be notified of the probable time that repairs will be completed. The repairs that cannot be made by the service park, whether from lack of time or lack of facilities, are normally turned over to a designated overhaul park. The general repairs that a service park will handle include replacement of solid tires, vulcanizing of tubes, minor radiator, welding, machine and blacksmith work and all possible replacements of parts.

(*d*) Each truck company will be assigned by the motor transport officer of the division, or other units served by the company, to a definite service park. For all repairs which would consume more than one working day in the company's shop, the disabled vehicle must be sent to the assigned service park.

(*e*) Companies will be outfitted with spare parts, supplies and material whenever possible according to standard lists. One copy of these should be kept by the company commander and one by the property sergeant. Requisitions for parts, supplies and material shall be made out by the property sergeant on the mechanic's recommendation and signed by the company commander. These requisitions will be forwarded as often as desirable to the service park to which the company is assigned. Stock on hand, plus unfilled requisitions, should equal the standard lists and should form the basis of inventory.

(*f*) When any part shows undue wear or breaks, or any trouble or suspected trouble develops beyond the facilities at hand, the part must be sent immediately to the assigned service park for replacement or repair.

(*g*) Each organization commander before requesting that any motor vehicle under his charge be turned into a repair shop for necessary repairs will make a personal and critical examination of the vehicle in question, determining as far as practicable exactly what repairs are needed, what caused the damage required to be repaired and whether or not the condition of the whole is due to carelessness or neglect on the part of any of the personnel of the organization. The results of this examination will be submitted to the proper authority on a separate memorandum which will accompany the request for repairs.

Upon receipt from the shop of any repaired motor vehicle organization commandeers will again make a careful personal examination and submit a report in writing in case defects or omissions are found.

SALVAGE.

34. In each repair park there is a salvage section organized for the reception and disposition of all worn out or unserviceable material. In service parks such material is received either from the operating units or from the repair section of the park.

35. Each part received as unserviceable will be examined by an officer appointed for that purpose from the personnel of the park. This examination is to determine whether the damage of the part was due to faulty operation, material or design. In case of the first, report will be made to the M. T. Officer of the formation to which the park pertains, so that proper corrective measures can be taken. In the case of one of the latter two, the information is transmitted, so that proper measures can be taken to obviate future breakdowns from that cause.

36. All articles for salvage are properly tagged to show necessary information therewith. In certain cases, such parts originating in overhaul parks may be repaired therein, but such action will be exceptional.

37. All solid tires installed on motor vehicles and trailers will be continued in use until the rubber is worn to within one-half inch above the steel channel of the tire. All trimmings from these tires will be carefully preserved and turned in to salvage sections.

Tires which have been thrown off from the steel channels before the tire is worn out will be preserved with a view to

their exchange, as throwing off under the conditions cited above is an indication of defect in the tire, which normally calls for replacement by the manufacturer. Tires discarded under this paragraph will be tagged with the amount, approximately, of mileage gotten, from them up to date of removal and forwarded to the salvage sections for necessary adjustment. Sheet iron automobile bodies which are bulky should not be sent in.

ACCIDENTS.

38. (*a*) In case of accident the driver will invariably halt and render any assistance possible. He will render a report to his company commander of any accident immediately upon his return to his company, or, in case of serious accident, will at once report by telephone. The driver should procure the following data before leaving scene of accident:

Name and address of driver of car.
Names and addresses of any passengers riding in car.
License number of vehicle and extent of damage.

He should carefully note physical conditions, such as bad roads, or slippery pavement; whether or not a warning signal from the other vehicle or car was heard before the occurrence of the accident and all other circumstances which may show the cause or fix the responsibility for the accident. The driver, before leaving the scene of action, should draw a rough diagram showing location or positions at time of accident and a second diagram showing positions after the accident.

Commanding officers will in every case institute court martial proceedings against drivers who fail to render this report immediately upon return to their organization.

A driver will be held strictly accountable for any accident unless he can clearly show that it was not his fault and also that he could not have possibly avoided it.

(*b*) Officers will make reports of all accidents occurring in their companies, requiring all evidence submitted to be in affidavit form from enlisted men and civilians and in the form of certificates from officers. Diagrams showing street and relative locations should be submitted. In case the injured party states that he does not expect to press claims, statement to that effect should be secured. In making their report, after giving their analysis of the evidence, officers will make a clear, definite and concise recommendation following the general form used in reports of survey.

The formations required of a truck company may be classed generally as formations for road, park and inspection.

39. *Road formations.*—The normal road formation is column of trucks, with 20 to 30 yards distance between trucks, giving the truck company a road space of about 1,000 yards. The distance between trucks may be increased or decreased at the discretion of the company commander according to conditions of the march. When conditions permit, distances will be habitually increased. The distance between trucks should rarely be less than one truck length and then only for very slow rates of speed. When the company halts, trucks close up to 5 yards distance without command before halting (see paragraph 56).

40. *Park formations.*—Parking formations depend very largely upon the facilities of each situation. If necessary to

park in column, leave only enough clearance between trucks to allow any truck to get out and if the road is very narrow leave 20 yards between sections. If possible park cars in line or double line, leaving about 2 yards between trucks and about 5 yards between lines, being sure to align trucks carefully. Make sure the ground used for the park has a resistant soil. Park gasoline trucks away from cargo trucks if possible. Whenever possible, vehicles should be so parked as to be invisible to enemy areoplanes. The company may be parked either in line, in double line, column of sections, double column, or in corral.

(*a*) *Line.*—Trucks are in line normally with two yards interval between trucks. A greater or less interval may be ordered by the company commander according to parking space available.

(*b*) *Double line.*—Trucks are formed in two lines, facing each other, with a distance of one yard between radiators of opposite trucks and two yards interval between adjacent trucks. A greater or less interval may be ordered by company commander. This is the preferable parking method.

(*c*) *Column of sections.*—In forming in column of sections the leading section forms in line with two yards interval between trucks; rear sections forming successively in line covering corresponding trucks of preceding sections; distance between lines of sections is normally 15 yards.

(*d*) *Double column.*—The leading truck draws to the right of the road and halts, the second truck in column moves to the right front and halts on line with the leading truck with an interval of two yards; the third truck closes on the first truck to a distance of five yards; the fourth truck takes position on line with the third and in rear of the second truck. All succeeding vehicles move forward and take their places according to the above principle.

(*e*) *Corral.*—Trucks may be parked so as to form a close corral. This is an exceptional method and would find application mainly in guerilla warfare. The corral may be formed in diamond shape with vehicles in single rank headed inward hub to hub; an alternate formation is by forming in a hollow square, each side of the square being formed by two lines of vehicles escheloned in such manner as to cause the engines of the inside row to be covered by the bodies of the outside row.

INSPECTIONS.

41. Inspections are of two sorts, formal and informal:

(*a*) Informal inspections by the company commander should be going on *constantly;* also by the truckmaster, assistant truckmaster (who should be held particularly responsible for the upkeep of vehicles in their sections) and the mechanics. The officers or noncommissioned officers inspecting cannot be expected to make a complete overhauling at every inspection, but by looking in unexpected places and unscrewing some of the less accessible grease cups many cases of laxity will be uncovered. Any dealings with drivers, as a result of inspections, should go through the proper channels.

(*b*) Formal inspection should be made periodically and under definite rules of procedure. The appearance and neatness of the car must always be emphasized.

42. *Formation for inspection.*—The formation for inspection will be either in line or in column of sections. Interval between trucks two yards; distance between sections fifteen yards.

43. *Position of "Prepare for Inspection."*—Trucks will be formed in line or in column of sections. Men will stand at attention, driver one foot from front fender on side of driver's seat and on a line with the front of the radiator. Assistant truckmaster in a corresponding position to the driver, but on the opposite side of the right truck in section.

Assistant chauffeurs and mechanics in a position corresponding to that of the driver, but on the opposite side of the trucks in which they ride. Truckmaster in line on the right of the rank. Company commander one yard in front of his roadster.

Bonnets of all trucks and automobiles will be raised so as to expose the motor. All articles of equipment will be laid out so that the company stencils are plainly visible. Tail gates will be lowered until horizontal. Foot boards will be raised.

All truck equipment will be laid out in a uniform manner on the ground alongside of tool box.

Articles of personal equipment will be laid out on the shelter half, rear of the shelter half being 4 feet in front of the radiator and in front of each individual. All tool boxes or other receptacles will be open to show interior. Seat cushions will be raised to expose under side.

DISMOUNTED INSTRUCTION.

44. The company, without truck equipment and except as hereinafter prescribed, marches and maneuvers by the methods and means prescribed in the Infantry Drill Regulations. Every effort will be seized by company commanders to give their men instruction in the "School of the Soldier" and "School of the Squad."

45. Arrangements should be made for securing the service of a medical officer for giving instructions in "First Aid to the Wounded."

46. Full and careful instruction will be given in "Gas Defense."

DISCIPLINE.

47. Members of motor truck companies are soldiers before they are anything else and officers must not lose sight of this fact. *Frequently the mechanical phase of truck operation is permitted to overshadow all else and officers make the mistake of subordinating military instruction and discipline to mechanical instruction.* It is not essential to the efficient operation of a truck company that the chauffeurs be mechanics, but it is *absolutely* essential that chauffeurs be well disciplined and subordinate soldiers. Company schools should be established for the instruction of the personnel in military deportment and soldierly bearing.

SMALL ARMS PRACTICE.

48. *Instruction.*—When conditions permit, instruction will be given each day to such men as are available in the care and

use of the rifle and pistol, as outlined in "Small Arms Firing Manual." This instruction will be continued until all men are proficient and thereafter given at such intervals that when opportunity presents itself for range practice the company will be prepared.

SIGNALS.

49.

Verbal.	Whistle.	Signs.
Attention	Several short blasts	Hand moved above the head quickly from side to side.
Crank motors	2 long blasts	Circles described in front of body with right arm.
Forward	1 long blast	Arm raised vertically and lowered several times.
Halt	1 long blast	Arm extended horizontally.
Ready (to start)	None	Arm extended horizontally.
Slow down	No whistle	Arm extended and hand moved from the wrist.
Stop motors	2 short and 1 long blast	Arms crossed in front of body at waist and moved sharply to sides.

50. These signals are standard and variations therefrom are not authorized.

51. Complicated signals are difficult to observe and should be discouraged. Rear trucks conform to the movements of those in front, the drivers watching their leaders carefully for indications as to contemplated movements.

52. The driver will drive the vehicle, keeping to the right-hand side of the road. He will follow the vehicle of the convoy which precedes him at the distance prescribed. The assistant driver will watch for all signals and communicate them to the driver. He will look back at frequent intervals to see if the truck behind is following. He will pass on the necessary signals to the vehicles following.

CONDUCT OF MARCHES.

53. *Order of march.*—The order of sections in column should ordinarily alternate daily. The repair car should be in rear of company, the kitchen car being in front. It is sometimes advisable to have one of the gasoline carrying trucks in the center of the train, but there should always be at least one at the rear, immediately in front of the repair car. Cooks and mess sergeant ride well towards the head of the company in order to start preparing the meal on arrival at camp. The company commander rides wherever he judges his presence necessary, but it is especially in rear that he will be best placed to render his efficient. The truckmaster rides wherever the judgment of the company commander dictates. The assistant truckmasters ride with their sections where they can most efficiently

conduct the operation of their sections. The chief mechanic ordinarily rides in the repair car. The assistant mechanics may ride either on the repair car or may be placed on trucks in the forward sections of the train. The slowest trucks should be placed at the head of the column.

A noncommissioned officer, usually the truckmaster, should ride on the first vehicle of the first section. In addition to the duties shown in paragraph above he will act as the guide of the convoy. He will carry maps of the country being traversed and will be acquainted with the route to be followed. He will see that the speeds shown below are not exceeded. He will see that the convoy keeps to the right-hand side of the road. He will take command of the convoy in the absence of the commissioned officers of the convoy.

54. *Grouping of units.*—(*a*) Except when absolutely necessary, a single truck should not be dispatched on any particular duty, but several should be grouped into one unit, to be placed under the immediate charge of any officer, noncommissioned officer or selected chauffeur. When a major portion of the company is dispatched, an officer will accompany and supervise the operation of his unit.

(*b*) When it is impracticable to keep trucks together throughout the entire march, they should be grouped for as long a period as possible in order to insure proper control and discipline, reduction of dust and noninterference with other traffic. This system also possesses the advantage of keeping trucks together to mutually assist and tow each other in case of injury or breakdown.

55. *File closer.*—The last truck of the convoy should carry the tools, ropes, jacks, etc., which are necessary to effect simple repairs. This vehicle will be in charge of the mechanic or other experienced man, who will act as a file closer and will have the assistant mechanics as near him as possible on the other trucks, available to act under his orders. His duties are to assist any disabled vehicle and to make proper disposition of broken down vehicles, subject to orders of the commanding officer. The file closer will not leave any vehicle of the convoy without taking the proper measures either to repair the vehicle on the road, tow it along with the convoy, or make other proper disposition subject to the decision of the convoy commander. This repair truck should not, ordinarily, stop more than twenty minutes before going ahead to rejoin the convoy.

56. *Distance between vehicles.*—Except on very dusty roads, those with heavy grades and when road space is unimportant, where greater distances may be taken, the vehicles should be from 20 to 30 yards apart. Due to variations in mechanism and skill in drivers, different vehicles do not ascend slopes at same speed; therefore these distances will vary, but the leading vehicle should normally slow down after climbing a slope so that the train will not spread out too much. In some cases after climbing or descending a difficult slope the leading vehicle should stop to allow the train to close up.

The distance to be maintained by the vehicles of [illegible] are as follows:

Between vehicles on the road outside of cities, villages and towns, at the average speed, 20 to 30 yards.

Between sections on the road outside of cities, villages and towns, at average speed, 40 yards.

Between vehicles passing through cities, villages and towns, at average speed, 5 yards.

Between sections passing through cities, villages and towns, at average speed, 25 yards.

Between vehicles halted, 5 yards
Between sections halted, 15 yards } These distances may be modified at road or railway crossings.

57. *Starting.*—All vehicles in a section should start at the same time. In starting vehicles should not exceed a speed of two or three miles per hour for about the first hundred yards, in order that vehicles may take their proper distances in section. A section should not start until the section commander has assured himself that all the vehicles are ready to start. This can be determined by vocal, visual and whistle signals.

58. *Indication of tail of column.*—The last vehicle of each section shall have projecting laterally upward from the rear of the vehicle on the left-hand side a yellow disc, 12 inches in diameter, fixed in such a manner as to be clearly visible from the rear. The last vehicle of the convoy will carry a double yellow disc, as above, readily discernable by vehicles or persons encountering the column. The use of this disc at once determines the rear of any column or section and thus avoids the confusion and delay incident to mistakes as to the length and road space of a truck column.

59. *Rate of march.*—This depends on condition of road, the amount and nature of cargo carried, as well as on other incidents of the march. The leading truck should rarely take the maximum authorized speed, as trucks in rear will have to exceed that speed. The speed should be as regular as possible, that all trucks may keep their distances without speeding. Never allow individual trucks to exceed authorized speed limit.

The guarantee speed of 16 miles per hour for 1½-ton trucks and 12 miles for 3-ton trucks will be possible only under most exceptional circumstances.

The maximum speed of motor vehicles is prescribed as follows:

In Cities and Villages.

Trucks	8 miles per hour.
Passenger cars, ambulances, motorcycles	15 " " "

On Open Roads Outside of Cities and Villages.

Trucks	12 miles per hour.
Ambulances	14 " " "
Passenger cars and motorcycles	35 " " "

In districts under the supervision of an American system of traffic control, the rules and regulations as laid down by it will be strictly observed.

In districts under the control of the French "Commission Regulatrice Automobile" will be found "roufes gardees" (policed roads) which are the important communicating roads between points along the French front. The guards of these routes wear green and white arm bands.

60. *March discipline.*—Vehicles must always keep well on the right of the road. This is especially necessary in operating on roads in field service and must be rigidly enforced. The driver of each truck, personally or through his assistant chauffeur, should keep in touch with the trucks in rear, so that if any halt is made he can do likewise and give proper signal to trucks in front. Under no circumstances should a train spread out on the road, nor should individual drivers exceed the speed limit in catching up with the car ahead. This should be a constant preoccupation of all in authority in the company. If a truck stops, the company commander (or the truckmaster, if so authorized) should ascertain the time required for the repair and nature of same. The company commander will promptly decide whether to halt the company until the repair is completed, leave the truck and sufficient personnel to make repair to later rejoin train, tow the truck or to shift load and abandon truck. This decision will depend upon the distance to new camping place or the urgency of the duty on which train is engaged. The company commander, in deciding such cases, must remember that "service" is the mission of the company and that it is no disgrace to abandon a truck whose mechanism has broken down. This point of service is one that the company commander should constantly bear in mind, as his subordinates are generally more interested in the mechanism of the truck and are apt to lose sight of the purpose of the train in their interest in the mechanism or in "demonstrating" the perfection of the particular type of truck assigned to the train.

No truck should be allowed to pass ahead of another without the express order of the company commander. If a truck halts, those in rear will not move ahead unless ordered by competent authority.

In villages never double vehicles moving in same direction.

A slower moving convoy must never be doubled without making certain that the doubling can be completed without confusion.

Never double a halted convoy, a halted body of troops, or a body of troops moving in the same direction, without first having gained the permission of the officer in charge of the convoy or the troops to be doubled. If the convoy is to pass it is preferable for the other column to halt during the passage, especially if composed of marching troops. The same rules hold in case the company crosses the line of march of another column.

The convoy *must* be kept together.

Drivers must at all times keep in touch with the truck immediately behind. The truck behind is always the truck which governs the speed of the convoy.

The first truck of the convoy will slow up several hundred yards before entering a village or city, in order that the distance between trucks while traversing the city may be reduced to five yards.

The first truck of the convoy will run slowly after leaving a village or city, long enough to allow delayed trucks to close up to the required distance in the convoy.

61. *Road difficulties.*—These are due to the nature of the road surface, the grades or natural obstacles encountered. In

getting trucks through sand or mud the greatest part depends on the practical genius of the members of the company.

62. *Mud.*—In muddy roads it will be necessary to use chains on the traction wheels. If there are not sufficient, build a suitable track for wheels by utilizing any material available, such as brush, grass, etc. It is often advantageous to carry planks on the truck about 10 feet long and 4 inches thick and 6 or 8 inches wide, or pieces of 6 inch by 6 inch lumber to place under rear wheels to enable wheel to get sufficient traction. In case a truck has gotten across a mud hole safely, it is advisable to attach a long towing line to the other trucks and haul them through by utilizing the truck working on hard ground; similarily it will often be necessary to haul a truck out of mud or sand in the same way. A handy substitute for the towing cable is a piece of 3-inch pipe about 10 feet in length made with suitable clevis on each end and to be used for both pushing and towing.

Do not let truck wheels revolve uselessly, as that simply serves to dig it in deeper.

On roads where surface is slimy or muddy and under surface is fairly hard, it will be found better to start in second speed, which will prevent the driving wheels from spinning and give them a better chance to get traction.

Do not allow trucks in rear to push or bump trucks in lead, as the bumpers seldom come together properly, causing either the rear bumper of lead truck or the front bumper of moving truck to be broken.

63. *Sand.*—In crossing sandy stretches every effort should be made to keep all trucks moving. A truck which has come to rest can probably not be put into motion again under its own power. A block and tackle may be utilized to pull trucks from difficult positions. An improvised winch may be rigged by jacking up a hind wheel, taking a turn of rope around the tire and applying motive power to the wheel.

64. *Crossing streams.*—When crossing streams or standing water the actual depth of the water and the character of the stream bed should be determined before undertaking a crossing. If the water is shallow and the bottom treacherous it is advisable to place a piece of canvas over the radiator to keep water from splashing into the engine. The leading truck is then driven through at good speed, being assisted if necessary by man power.

Other trucks cross successively in like manner or by the use of long tow lines.

If water is deep and must be crossed magnetoes and carburetors may be removed, openings to engine stopped with waste and other materials and trucks dragged across.

65. *Steep grades.*—In going up steep grades or crossing streams keep trucks far apart, to avoid any possible accident. In descending steep slopes brakes should not be relied on, but the gear should be set in second or low speed and the motor shut off and used as a brake, thus preventing burning out of brake bands and danger from defective brakes. The leading truck should start down the hill slowly to insure proper control throughout the train. In descending *unusually* steep slopes trucks may be closed up to a distance of about one (1) yard and proceed down the grade in a very slow and cautious manner. This latter pre-

caution will prevent trucks which get out of control from causing damage by crashing into the next truck in front. With heavily loaded trucks in mountainous country this procedure is very useful. A driver is held pecuniarily responsible for having his radiator smashed by collision caused by carelessness or neglect.

66. *Railroad crossing.*—When crossing a railroad track at a grade crossing, or at any other dangerous place, station a man during the entire passage of the train to insure the safety of all vehicles.

67. *Halts.*—About one-half hour after starting the column is halted to allow a brief inspection of the mechanism and for those purposes that a column of troops is halted. Thereafter, a halt of ten minutes every three hours to rest the drivers and allow a brief inspection of the trucks. Ordinarily, however, it will be found that these three-hourly halts are unnecessary, as there will be several halts between these hours due to mechanical or other trouble. All vehicles should stop gradually, pulling well over to the right hand side of the road while reducing speed, the assistant driver making the signal "halt" to the vehicle behind. When a convoy stops, the distances herein prescribed will be maintained between vehicles and sections. Care should be taken not to block streets, cross roads or road forks.

Whenever the train halts rigidly enforce the rule to stop motors. In case of a check on the road, each assistant chauffeur will immediately dismount and take station to observe company commander (or truckmaster), who will at once investigate cause of delay and indicate by signal as to whether motors will be stopped.

It is usual to make a midday halt of from thirty minutes to one hour duration, to permit a lunch to be eaten, to rest the drivers and to make a more extended inspection of truck mechanism. For this noon meal it will be found advantageous to carry a fireless cooker to allow a hot stew to be served as well as a cup of coffee. These cookers may be readily improvised by placing a couple of the large milk cans in boxes, properly insulated by the use of hay, straw or similar material, which, to be effective, must be packed very tight. Do not make the noon halt too long, as it is better to get into camp early than to use up time on the road and thus get into camp after dark. It will also be found that if the halt is long the men are apt to take naps and thus will be half asleep and careless during the afternoon drive. Give them some hot food and a big cup of hot black coffee and they will drive as well in the afternoon as in the forenoon.

68. *Daily marches.*—The normal daily march for a motor truck company is sixty miles. This may be increased when the roads are excellent or if conditions are very favorable. It likewise may be decreased if conditions are the opposite.

Do not run after dark if not absolutely necessary—running at night is difficult, fatiguing and very conducive to accident.

In service in France most running will be done at night, without lights.

69. *Daily inspection and upkeep.*—On arrival at camp or bivouac, drivers will make a thorough inspection of their trucks,

under supervision of assistant truckmasters and all possible repairs will be made. In case of impossibility of repairing a truck the company commander decides as to the disposition of the truck and its cargo. If the train arrives late at night in the darkness it is advisable, conditions so permitting, to make this inspection and repair on the following morning before leaving camp.

70. *Replenishment of gasoline, oil, grease, etc.*—As soon as trucks get into camp or bivouac, they should be replenished with the above supplies. By reason of the danger of fire, the gasoline tanks should be filled during daylight. If this is impracticable, due to the lateness of the hour, the company commander decides, according to the special circumstances, whether to put this off until the following morning or to fill them in the dark. In the latter case great precaution should be taken. Electric lights of the trucks or flashlights should be used. There should always be a sufficient number of fire extinguishers handy and several pails of sand or soft earth to smother any gasoline that may take fire. If lanterns are in vicinity they should be hung high, so that they will not ignite gasoline vapors, which, being heavier than air, sink to the ground.

The rule to be enforced, unless conditions absolutely prevent, is to have all trucks filled with gasoline and oil and ready to start as soon as possible after reaching camp. Do not put off anything to the next day if you can possible avoid it.

71. *Cooking on the march.*—On the march there is little time in the morning for the preparation of breakfast and no attempt should be made to have a great variety of food. A few components, good and substantial, including plenty of hot coffee, should be provided.

Upon arrival in camp it is necessary to provide a quick meal, as the men are usually tired and hungry. While the organization is making camp and attending to the necessary camp details the cooks have ample time to prepare the main meal of the day, which is usually served late in the afternoon. For this reason the kitchen car should lead the train.

72. *Road rules.*—

(*a*) Drivers will keep on the right-hand side of the road *at all times* whether *moving* or *standing*.

(*b*) In passing vehicles traveling in the same direction *the driver will always pass the vehicle on the left and sound his horn.*

(*c*) A driver will always pass an approaching vehicle on the right of the road and give it half of the road.

(*d*) Never *block* the road.

(*e*) In passing a standing or moving convoy *a driver will slow down and sound his horn.*

(*f*) The use of the muffler cut-out is absolutely forbidden at *all times.*

(*g*) Motors will not be left running to exceed one (1) minute when the vehicle is standing.

(*h*) In changing direction or stopping *always* give appropriate hand signals.

(*i*) Drivers will not permit civilians or unauthorized soldiers to ride on their vehicles, on the fenders, or running boards or to hang to the rear end of the vehicles.

(*j*) If any repairs are needed, drivers will report same immediately to their commanding officer.

(*k*) The military police on duty will be strictly obeyed.

(*l*) Cars, trucks and motorcycles will be brought under easy control at all street or road crossings.

(*m*) Do not smoke while driving.

(*n*) In descending a steep hill use the engine as a brake by shifting to a lower gear.

(*o*) When stopped on a hill, put a block under the rear wheel.

(*p*) Examine amount of water, gas and oil after each stop.

(*q*) Investigate and find the cause of all unusual noises.

(*r*) Pay careful attention to road signs and to convoy signals.

(*s*) Except in case of emergency, no motor vehicle will be driven by any person except the driver regularly assigned thereto.

73. *Road and route signs.*—The following signs, with arrows where necessary are commonly used. The traffic signs consist of box frames on which white cloth is tacked with inscriptions painted in black. At night they are illuminated from the inside by candles. For intensive night traffic these illuminated signs are indispensable. Lights should be so placed as to be invisible from above:

Put Out All Lights.
Put Out Headlights.
Put on Helmets.
Have Your Gas Mask Ready.
X Miles to Y.
One-way Road. Entrance.
One-way Road. Exit.
Road Reserved for Motor Traffic.
Road Reserved for Horse Trains.
Road Reserved for Foot Traffic.
Cross Roads at Z Yards.
Slow Down—Bad Turn.
Slow Down—Railroad Crossing.
Slow Down—Bridge.
Slow Down—Cross Roads.
Slow Down—Steep Hill.
Maximum Speed X Miles Per Hour.
Maximum Speed for Trucks, — Miles Per Hour.
Maximum Speed Touring Cars, — Miles Per Hour.
Maximum Speed Motorcycles, — Miles Per Hour.
Maximum Speed Ambulances, — Miles Per Hour.
Bridge Down, No Traffic.
Bridge Carries Only X Tons.
Guarded Road.
No Doubling Allowed.
No Stopping Allowed.
Communication Line.
Space Cars at Y Yards.
Road to X Nth Turn to Right; at Y Yards.
Road to X Nth Turn to Left.

74. *Night Marches.*—Night marches may be classified as follows:

(*a*) Marches in the presence of the enemy.
(*b*) Other night marches.

75. *In the presence of the enemy* it is absolutely essential that no lights be exhibited. All head and tail lights will be extinguished. No lighting of matches or smoking will be permitted. Flash lights will be used only by officers and senior noncommissioned officers and then with the utmost circumspection. Rigid discipline is required to prevent the abuse of these measures.

76. *Rate of march.*—The rate of march must be materially decreased and will not exceed 5 or 6 miles per hour under the most favorable circumstances.

With bad roads or unfavorable weather conditions the rate may be greatly decreased.

77. *Distance between vehicles.*—The distance between vehicles may be decreased on dark nights to as little as fifteen feet. In order to enable drivers to discern the next truck in front, all trucks should have a broad white stripe painted upon the center panel of the tail gate, which stripe will be kept absolutely clean. Driver must be kept wide awake and instantly alert for any change of speed or direction. Unusual precaution is taken that the proper road is followed. When units cannot be kept well closed, men will be placed at road forks and crossings to insure the proper direction being taken by the successive units of the column.

78. *Other night marches.*—All night marches *"in time of peace"* or *"without the presence of the enemy"* can be conducted with lights burning and without regard to non-visibility. In general these marches are conducted as for daylight marching. The rate of march will, however, be somewhat reduced and the distance between trucks be somewhat increased. Strict discipline must be maintained, however, to insure that drivers remain awake and properly handle their machines.

TROOP CONVOYS.

79. The transportation of troops presents a number of features not to be found in ordinary cargo transport and company commanders must at all times be in a position to prepare their trucks for this purpose at short notice. All portions of the truck equipment that have been removed, such as tops, benches and bows, must be kept together where they cannot be molested or lost and can be readily replaced on the trucks. The company commander will verify the oil, gasoline and kerosene supply of each truck and condition of the lamps. He will ascertain the probable duration of the convoy and provide his men with food and clothing accordingly. It must be remembered that the troop capacity stated for a given truck includes the personal equipment of the troops, so that, unless called for, extra trucks need not be provided.

80. *Be on time.*

81. On the march, drivers and noncommissioned officers of the convoy have charge of the men they are transporting and

must watch them, particularly with view to protecting the trucks from damage.

82. In transporting troops always carry along at least one empty truck to each company in case of trouble or breakdown. The troops must be gotten to their destination on time.

83. Stop the convoy for ten minutes at intervals of about three hours and allow the men to get out. Do not stop in or near towns.

84. Observe the following rules in loading troops:

(*a*) The company commander must always be at loading point well in advance of his convoy so as to have plenty of time to reconnoiter the place and to confer and make all necessary arrangements with the troop commander for distribution of troops for loading.

(*b*) The convoy must ordinarily be halted so that the last truck is just at the head of the column of troops, facing in the direction of the destination.

(*c*) On halting, each driver will attend to dropping the tailboard of his truck and the arrangement of the benches for the men. In the meanwhile the noncommissioned officers in charge of each section will assemble the assistant drivers of his section in column, single file, *facing* the troops with the men arranged in order to trucks, first truck first, then second truck. The assistant drivers of the first section are then marched toward the troops, the men of the other sections falling in behind. All the assistant drivers are halted and then execute "left face," facing center of road. Then the troops are successively marched off in blocks of 20 (or whatever may be the capacity of the truck), and each assistant driver takes charge of his section of troops, marching at the head until his truck is reached, when he and the driver of his truck attend to the loading of the men and the replacement of the tailboard.

(*d*) Non-commissioned officers in charge of sections signal to the company commander (or truckmaster) that their sections are loaded and the convoy is ready to start.

85. Unload the men transported in the trucks with the convoy headed in such a direction that the trucks will not have to double back and mix up with the troops in getting away.

LOADS AND CARGOES.

86. *Survey.*—When a specified cargo is to be loaded, a survey of it should be made by the company commander accompanied by his truckmaster and assistant truckmasters and classification made with reference to weight and bulk of articles comprised in the cargo.

87. *Ammunition.*—

(*a*) In handling all types of ammunition, care must be taken that crates are not broken; or, if uncrated, that the copper bands at base of shell are not scratched. Damaged bands render the shells not only useless but dangerous to fire.

(*b*) Do not allow colors painted on shells to be effaced; they were put there for a purpose and are necessary.

(*c*) Protect ammunition from sun and rain; both are harmful to the high explosive filling.

(*d*) When fuses are attached to shells, do not handle by fuses; you may destroy the protective cover and ruin the fuse. Where fuses are not attached, plugs replace them; should one of these fall out, put it back at once.

(*e*) When handling gas shells, be provided with mask to protect against leaky shells.

(*f*) All ammunition is highly explosive, therefore dangerous Do not smoke while moving it and HANDLE IT WITH CARE.

88. *Mixed loads.*—Compact and heavy pieces should be sorted out and loaded in the bottom of the trucks, the greatest weight being placed about the middle of the body. Lighter articles should be next loaded, those in more staple form or crates following first, with bulky and fragile articles loaded on top. The load should be so adjusted that it is firm and staple and does not hang over the driver's seat, over the sides nor over the tail gate. With bows on the trucks, there is no difficulty in this respect, but without bows the tendency is to spread out the load as its height increases, thus bringing a damaging pressure upon the side boards and tail gates. Every effort must be made to keep the load as low as possible, the center of gravity being, if possible, below the tops of the side boards.

89. *Long loads.*—When lumber longer than the body is being hauled, a piece of 4-inch by 4-inch or thicker material should be secured across the extreme rear end of the truck bed, the tail gate being lowered so that no part of the load will rest upon it. Lumber is then loaded, with the forward ends pushed snugly against the front end gate and the rear ends projecting beyond the rear of the truck and resting on the 4-inch by 4-inch above referred to. When long bulky articles, as water-troughs, are carried, they are loaded in the same manner as lumber and, in addition, the front ends are fastened by drawing chains or ropes entirely around the body and not by securing these ropes or chains to the lash staples on the side boards or front end gates. If this is not insisted upon, the upper part of side boards and front end gate will split and break.

90. *Tail gates.*—The tail gate must, except with long loads, be completely closed and secured with the tail gate chains drawn snug. Under no circumstances should tail gate be left swinging loose. The practice of fastening tail gates in a position approaching horizontal, with a view to extending the body and supporting the load, tends not only to break the tail gate, but also to pull out the iron supports in the ends of the sides and to bring undue and unnatural strain upon the entire machine.

TABLE OF CARGOES.

91. *Quartermaster Stores.*

Articles	Pkg.	Unit Weight lbs.	1½ Ton Truck		3 Ton Truck		5 Ton Truck	
			No. Units	Tons Weight	No. Units	Tons Weight	No. Units	Tons Weight
Rations:								
Beans, flour, etc.....	Bag	100	30	1½	60	3	100	5
Cornmeal	Bag	90	33	1½	66	3	110	5
Ham	Bbl.	200	15	1½	28	2¾	28	2¾
Vinegar	Bbl.	156	20	1½	38	2¾	38	2¾
Hay	Bale	100	26	1¼	60	3	60	3
Oats	Bag	100	26	1¼	50	2½	50	2½
Firewood (Green)..	Cord	...	1¼	⅞	2½	..	3	..
Blankets	Box	47	36	1⅛	60	1½	60	1½
Clothing	Box	64	36	1½	60	2	60	2
Cots	Bdls.	106	28	1½	56	2	56	2
Axes	Crate	50	60	1½	120	3	200	5
Helves (Pickaxe)...	Crate	67	45	1½	90	3	100	3⅜
Pickaxes	Crate	146	20	1½	40	3	75	4¾
Shovels	Bdls.	35	86	1½	178	3	200	3½
Tents, Conical	Bale	...	..	1½	...	..	5	5
Tents, Pyramidal ..	Bale	115	26	..	52	3	52	3
Coal	Ton	...	..	1½	...	3	...	5

92. *Ammunition.*

Size	Article	1½ Ton	3 Ton	5 Ton	Remarks
37 mm.	Complete cartridge	1800 (30 cases)	4020 (67 cases)	5760 (96 cases)	
75 mm.	Complete cartridge	135 (15 cases)	281 (29 cases)	432 (48 cases)	Cases on bottom
4.7 Gun	Complete cartridge	50 (25 cases)	102 (51 cases)	170 (85 cases)	Cases on bottom
5″ S. C. Gun	Shell	52 loose or 12 cases	104 loose or 24 cases	172 loose or 40 cases	Cases flat Shell on end
	Charge	166 (wt. full)	333 (wt. full)	400 (space full)	Cartridge on end
155 mm.	Shell	32 loose or 13 cases	63 loose or 27 cases	115 loose or 45 cases	Shell on end Cases flat
	Charge	150 cases (wt. full)	250 cases	250 cases (space full)	Cartridge on end
6″ S. C. Gun	Shell	33 loose or 11 cases	66 loose or 22 cases	110 loose or 37 cases	Shell on end Cases flat
	Charge	75 cases	150 cases	187 cases	Case on end
	Shell	(wt. full) 15 loose or 13 cases	(wt. full) 30 loose or 27 cases	(space full) 50 loose or 44 cases 54 cases	Shell on end Cases flat
	Charge	26 cases (wt.)	48 cases (wt.)	(space)	Containers on end
8″ How	Shell	15 loose or 13 cases	30 loose or 27 cases	50 loose or 44 cases 54 cases	Shell on end Cases flat
	Charge	26 (wt.)	48 cases (wt.)	(space)	Containers on end

93. *Engineer Stores.—*

	1½-ton trucks	3-ton trucks	5-ton trucks
Barracks, "Adrain" (21 feet x 98 feet)	...	½	½
Bricks	720	1,500	2,500
Camouflage, finished, rolls of 20 sq. Kds.	80	100	120
Cracked stone, cubic yards	1½	3	5
Cement barrels (4-100 pound bags)	12	24	30
Corrugated iron, sheets, square feet	1,200	3,000	3,000
Expanded metal large mesh, square feet	1,600	2,500	2,500
I-Beams, 4 inches by 12 feet long, piece	40	80	110
Lumber, feet, B. M.	1,200	2,500	3,500
Nails, all sizes, 100 pounds, kegs	30	60	80
Paint, 50 gallons, barrels	4	9	14
Pickets, wood 50 per cent. long, 50 per cent. short	350	500	500
Post, angle iron	500	1,000	1,700
Posts, screw	700	1,400	2,400
Rails, 10 feet 0 inches to 12 feet 0 inch long, 25 pounds, per yard	40	80	110
Riveting, fascines, 10 inches by 9 feet 0 inches	30	35	35
Revetting, gabions, 2 feet 0 inches by 3 feet 2 inches	25	32	32
Road planks, 5 inches by 9 inches by 9 feet 0 inches	50	75	75
Sand bags, number	42	70	70
Round posts, 6 inches rough, lineal feet	10,000	15,000	15,000
Ties, for narrow gauge, 4 feet 6 inches by 6 inches by 4 inches	650	1,000	1,000
Wire, barbed, 50 pound rolls	46 40	92 50	152 50

94. *Miscellaneous.—*

	1½-ton trucks	3-ton trucks	5-ton trucks
Tanks, 50 gallons, full	10	18	27
Tanks, 50 gallons, empty	18	27	27
Tanks, 13 gallons, full	30	60	100
Tanks, 13 gallons, empty	84	125	125
Tires, pneumatic	75	150	150
Mail bags	30	50	60
Tarpaulins	25	50	70
Barrack bags	25	50	70
Trunks, army	30	60	60
Men, without baggage	18	35	35
Men, with baggage	12	20	25

95. Inasmuch as trucks will habitually be utilized for carrying troops, as well as cargoes, they should be fitted with seats, these seats being arranged as are the seats in an ambulance, the side seats swinging on eye bolts fixed to the sides of the body

and permitting the seats to be lowered when not in use or to be entirely removed by unscrewing the taps on the eye bolt rods.

The center seat to be removable, 22 inches wide and constructed with three folding legs. When not in use, this seat is to be carried on the framework immediately under the body. This center seat when in place will comfortably seat two rows of men back to back.

CAMP AND BIVOUAC.

96. *Camp.*—The diagram hereunder indicates a good general form for a permanent motor truck camp. This diagram should be regarded as a guide, the form being varied to suit local conditions. The ground used for the park should have a resistant soil, either gravel, macadamized or paved. A distance of two truck lengths is sufficient to enable a truck to enter or leave the line and is the minimum distance allowable for trucks to enter or leave the park.

97. *Bivouacs.*—During road marches, it is often necessary to bivouac on the road, to avoid taking the trucks on the soft soil of fields. In such cases, two general procedures are possible:

(*a*) Where roadway is sufficiently wide or has practicable sides, place the trucks perpendicular to the roadway with the radiators away from the roadway, but keeping the traction wheels on firm ground, though clearing the roadway as much as possible. If the space on either side of roadway is sufficient, the company may thus be drawn up in two lines on either side of road. This formation will be unusual and permissible only on little traveled roads.

(*b*) Where the road is not sufficiently wide for the above, the train should be closed up in a column of trucks with a maximum of five yards distance between trucks and placed as far to the right of the roadway as possible, leaving all possible room on roadway for free circulation of other vehicles.

98. In each of the above cases, care should be taken to leave the greatest possible clear passageway for passing vehicles. Precautions should also be taken to prevent accident from such vehicles. This may be done by placing lanterns or lights on end trucks and by stationing sentinels at both ends of the line or column to warn passing vehicles and to make them take a moderate rate of speed while passing the trucks.

99. The normal camping rules as to sanitation should be rigidly enforced. All refuse should be burned or buried. This is especially necessary where the bivouac is made along the highway.

100. When in bivouac, the men will ordinarily sleep on trucks or on ground thereby, the use of the regular shelter tents being superfluous.

BILLETING.

101. Unless all arrangements have been made for the company, the company commander must observe the following rules:

(*a*) If possible, always reconnoiter the new site well in advance of the change and consult with the military authorities of the place. Make sure of suitable billets (or camping ground)

for the men and of parking place for the trucks. The two should be as near together as possible.

(*b*) The park for vehicles should never be on a dead end street or on soft soil. The vehicles should be kept together, so as to be more easily accessible and more easily guarded. If possible keep them under cover of trees, so as to be less visible to enemy aeroplanes.

(*c*) Upon arrival, attend to the more important things first. Assemble the men and give them all necessary instructions. Establish guard, billet men, park the vehicles, find out where to draw rations and establish kitchen and mess facilities.

(*d*) Arrange for garbage disposal.

(*e*) Construct latrines, if necessary, according to standard specifications.

(*f*) Be sure of a good supply of drinking water and water for washing.

(*g*) Look up existing rules of the town and establish police rules governing the men.

(*h*) Arrange for telephone connections.

(*i*) Find out locations of new ammunition depots, engineer parks, etc., to be served.

(*j*) Ascertain the location of the service park the company is assigned to.

(*k*) Arrange for gasoline, oil and wood supplies.

(*l*) When changing cantonment, if arrangements have not been made beforehand for the company, company commanders *must* consult with the authorities of the town or district. If in the zone of the armies, the military commander of the town will be looked up. Otherwise the "Maire" (Mayor).

(*m*) On leaving the cantonment, the company commander should make it a point to see that it is left clean. If desirable, a certificate may be obtained from the authorities in proof of the fact that no material damage was caused by the company during its stay.

PRECAUTION AGAINST FIRE.

102. (*a*) *Gasoline must be handled with care and common sense.*—Gasoline vaporizes easily and, as the vapor is heavier than air, it sinks to the ground. When filling the gasoline tank, be sure that there are no open lights or fire near. If the tank is to be filled at night, do not use a flame lamp. Use an electric flash lamp. Do not use gasoline funnel for anything else.

(*b*) *In case of fire do not try to put it out with water.*—The burning gasoline will float and spread the fire. Always keep a pail or two of sand handy and smother the flame with it. A fire extinguisher should also be kept at hand in the shop or in the truck park.

(*c*) *In case of a truck catching on fire.*—The first thing to do, if possible, is to turn off the supply cock from the tank to the carburetor and then push the car away from the blazing gasoline on the ground.

(*d*) *Do not let a pool of gasoline drip* from the carburetor when priming it as a chance short circuit may give a spark that will set it on fire.

(*e*) *Keep all engine parts, drip pans and under parts of vehicles clean.*—The gasoline that drips onto these parts will soon evaporate, thereby greatly reducing the possibility of fire.

(*f*) *A waste can will be kept in shop and in park.*—All oily, greasy and inflammable waste or rags will be placed therein and not left lying on benches or floor. This soiled waste can be washed in gasoline and used several times, thereby reducing expenditure, if it is carefully placed in cans until convenient to clean. Care must, however, be had against spontaneous combustion.

(*g*) *Gasoline will not be used for other purposes than fuel.*—Only in emergencies justifying this use and then only under the personal direction of the company commander. Kerosene will be habitually used for cleaning engines and other mechanical parts. A strong tendency exists to use a mixture of oils and gasoline for cleaning trucks. This is expensive, wasteful, destroys paint and collects dirt and dust and, consequently, is strictly prohibited.

ORGANIZATION OF LARGER MOTOR COMMANDS.

103. For administrative and for tactical purposes, units are organized into larger commands.

104. Operating units are organized into trains, consisting of from two to six units of a similar nature. Whenever feasible, trains should in turn be organized into groups, consisting of two to four trains. Whereas, ordinarily a group will consist of a combination of trains, nevertheless the word "group" should be used to define any combination, however large, of dissimilar units. For example, a headquarteers group might consist of a motor transport company, a motorcycle company, a motor car company and a service park, all of these units being under a single command.

105. Larger commands should take it upon themselves to relieve the units composing them of as much routine administrative work as possible, thereby leaving the smaller organizations freer to do the transport work assigned to them.

106. In large movements of material or personnel, trains or groups should work as tactical units, the work for each smaller unit being assigned to it by roster from its immediate headquarters.

107. The details of personnel, arms and equipment will be found in current "Tables of Organization" and "Equipment Tables" issued by the War Department. In addition to the F. S. R.'s, much valuable data on train operation may be obtained from the following sources:

(*a*) Instructions concerning the Organization of a Line of Communications for Intensive Traffic. (Doc. 676, A. G. O.)

(*b*) Notes on Railroads and Mechanical and Wagon Transport on the Western Front. (Doc. 586, A. G. O.)

(*c*) Lecture on the Supply of Ammunition. (Doc. 670, A. G. O.)

(*d*) Lecture on Supply, Organization and Transportation. (Doc. 755, A. G. O.)

(*e*) Manual for the Quartermaster Corps, 1916.

(*f*) Army Service Corps Training (British), part 1, 1909.

COMMANDING OFFICERS, TRAINS AND GROUPS.

108. A train or group is commanded by an officer regularly assigned in orders. In the absence of its regular commander, the command devolves upon the senior officer of the train on duty with it. Army regulations relating to regimental and battalion administration apply to trains or groups serving independently.

The commanding officer is responsible for the instruction, tactical efficiency and preparation for war service of the companies of his train, battalion or group.

The commander should prescribe a systematic course of instruction in disciplinary drills and the care and use of small arms and he should give personal attention to the instruction and training of non-commissioned officers.

In regard to property, he has power to approve surveys and condemn and dispose of unserviceable property, parts and accessories unless otherwise prescribed by regulations. He should make frequent inspection of his entire command. In these inspections, he should check property to see that equipment is complete as prescribed and that this equipment is serviceable.

THE ADJUTANT.

109. The adjutant, under the direction of the commanding officer, will have charge of the various rosters of service. He will make, publish and verify all details and keep the records of the train and perform such military duties with troops as are required by regulations. Through him the commanding officer communicates with the officers and men of his command. The adjutant should be courteous to and be on friendly terms with the officers of the train and will avoid all discussions of orders or military conduct of his superiors. He should inform himself upon all points of military usage and etiquette and on proper occasions aid with his advice and experience the officers of the train, especially those just entering the service. He will orginally ride in the touring car with the commanding officer.

THE SUPPLY OFFICER.

110. The duties of the supply officer are those of a property officer for the whole train. He is accountable for all property of the train, including that of the companies. He will issue property to the company commander on memorandum receipt. On request of company commander he prepares proper requisitions for property, parts, accessories, stores and rations. He will ordinarily ride in touring car with the commanding officer.

FORMATIONS AND MARCHES.

111. The train forms, marches and parks by the same commands and means as the company, the commanding officer indicating the desired formation by messenger or signal.

112. *Marches* are conducted according to the rules laid down in the "School of the Company." Good marching is secured by careful preparation, strict discipline and the due observance of march sanitation. When possible, ample notice is given so that preparation can be made without haste.

The conduct of the march (forming the column, distribution of companies, start, rate and length, etc.) is controlled by the situation and object to be accomplished. It is the duty of the commander to see that all necessary preparations are made; that all trains are loaded as prescribed, that proper measures are inaugurated for the replenishment of supplies and that the necessary arrangements are made for the care and evacuation of the sick and wounded. No man or truck leaves the column without authority.

Before starting upon any march, all officers should regulate their watches by that of the train commander.

THE ROUTE COLUMN.

113. *The position of the train commander* is at the head of the column. He will, however, frequently ride at the rear or in intervals of the column, to insure that the march is progressing in a uniform and favorable manner.

114. *A motorcycle messenger* should follow each commanding officer's car at twenty to thirty yards distance, the messenger remaining with the commanding officer at all times unless detached by proper order.

If the commanding officer leaves his position at the head of the column, the regulation of the march devolves upon the commanding officer of the leading truck company.

DISTANCES BETWEEN VEHICLES AND COMPANIES.

115. In the truck column, the distance between trucks will be about twenty to thirty yards, while five hundred yards distance will be maintained between companies. This distance permits staff and other cars to take positions temporarily in column between companies when passing other columns or troops and facilitates traffic at cross roads.

All distances above prescribed are laid down as a guide and will not be adhered to rigidly. They will be closed or extended as conditions require in maintaining a uniform rate of travel throughout the column.

POSITION OF COMPANY COMMANDERS IN TRAIN.

116. When the company commander leads his company, he will be followed by the leading truck at a distance of thirty yards. When the company commander is not leading, the leading truck of his company will maintain the prescribed distance from the company next preceding. The company commander of the leading truck company will habitually march at the head of his company, the company commanders of intermediate and rear companies should take position in rear of their companies, moving to the heads of their companies as conditions indicate.

TRANSPORTATION SYSTEM.

117. The train commander may be called upon to map out a transportation system and superintend its operation. The following proceedure is therefore described, suitable changes being made to conform to local conditions.

When two or three trucks are dispatched on the same detail, one of the drivers will be placed in charge and held responsible

for the proper execution of the duty, the maintenance of good order, etc. In larger details, an assistant truckmaster will be sent in charge. Whenever the major portion of a company is dispatched upon the same detail, an officer of the company should accompany the detail and personally supervise its operation. The daily work of trucks will be regulated in accordance with special instructions. Calls for trucks will be issued to the companies by the truck dispatcher, who, in the discharge of his duty, will be considered as acting in the name of the commanding officer. Unless otherwise ordered, one truck of each company will be kept in daily for general overhauling.

118. A suitable non-commissioned officer is permanently detailed as truck dispatcher, an assistant being detailed when necessary. These men are continually on duty from 6:30 A. M. to 8:30 P. M. The dispatcher sleeps in the dispatcher's office within sound of the telephone.

119. Each evening the dispatcher makes out written orders for trucks on the various companies to fill the work details for the next day. There is certain work, involving delivery routes, that is permanently assigned certain trucks. Other regular classes of work are done by each company according to roster with a view to equalizing details. In a similar manner, each truck company takes its turn by roster to be on duty to answer special calls.

120. All orders for trucks, except the regular details, are entered on a daily blotter.

121. Each order for trucks is made out in triplicate. The copies are signed by the truckmaster or assistant and one copy is retained in book. The remaining two copies are taken by the truckmaster, one for his own company record, the other for the driver of the truck, or man in charge of the group of trucks responding to the order.

When the truck is sent out from the company, the driver or man in charge signs the copy retained by the company and has his copy signed by the person to whom the trucks are ordered to report. He turns in this copy to his company on his return.

122. *Reports.*—Each truck company will turn in a report daily showing the number of trucks that will be available for duty on the following day.

The truck dispatcher will submit a daily report showing the number of trucks on duty, on detached service and the number from each company not available for duty.

Each company will keep, in a suitable blank book, a daily work record of its trucks. In this way accurate record can be kept of the whereabouts of each truck and the number available at any particular time.

The forms used by the dispatcher should be drawn up so as to absolutely fix responsibility for any failure of trucks to properly report. The signature of person to whom truck is directed to report is designated to prevent a truck being taken by some one other than the person intended, a proceeding very common.

123. *Passenger cars.*—

(*a*) Passenger cars will not be assigned permanently to individuals without the approval of the commanding general.

(*b*) When an officer desires a passenger car for a trip of more than 25 miles, or for a period of more than four hours, his application must receive the approval of the chief of his department.

(*c*) Application for cars for trips of more than 24 hours must be submitted the day before and upon returning the officer must sign the necessary certificate for commutation of rations for the drivers. In no case will motor transportation be requested when rail transportation can be used to equal or better advantage.

(*d*) When practicable, two or more officers traveling in the same direction will utilize the same car. The senior is responsible for the car and that the traffic rules are observed. If the car is kept out after eight o'clock P. M. a note stating the time and place he was released will be furnished the driver.

(*e*) All cars will be in the garage from eight o'clock P. M. to 6:30 A. M. and any person who keeps a car out between these hours will furnish the driver with a memorandum to be turned in at the garage stating why the vehicle was kept out and when and where it was dismissed. All drivers upon dismissal will return immediately to the garage and report in. All drivers before leaving the garage will report out to non-commissioned officer in charge.

124. *Motorcycles.*—Motorcycles for messenger and courier services will be assigned by the C. O. headquarters garage.

125. *Motor trucks.*—Application will be made to the garage one day in advance whenever practicable. In order to use transportation to the best advantage, the approximate tonnage to be moved should be given instead of an estimate of the number of trucks. Trucks will not be used as passenger vehicles except in carrying large parties to and from work, or for the transportation of troops.

126. *Passenger regulations.*—

(*a*) The senior officer present is responsible for the car and observance of traffic rules.

(*b*) Whenever practicable two or more officers traveling in the same direction will utilize the same car.

(*c*) If the car is kept out after 8 P. M. a note stating the time and place the driver was released will be furnished him.

(*d*) A copy of "PASSENGER REGULATIONS," printed on a suitable card, should be conspicuously posted in the tonneau of every car.

127. *Police Regulations.*—All Provost Marshals and Military Police are charged with enforcing these regulations and they will report in each case the date, time, the place and number of car and the name of the driver, if obtainable, and the cause of the report. They are especially directed to report all motor vehicles found out of the garage between 8 o'clock P. M. and 6:30 A. M.

Part II
ANIMAL DRAWN TRANSPORT

THE COMPANY

The principles of operation of animal drawn transportation are identical with those for the operation of motor transportation.

128. Just as hay, grain and water are necessary to the draft animal so is the engine dependent on gasoline, oil and water; the daily stables of mounted commands may be likened to the daily period of inspection, cleaning and lubrication of mechanical transport; the care of feet and shoeing of animals is paralleled by the inspection, upkeep and trimming of tires and in fact with proper allowances for differences of interval and distance and for rate and length of march same general rules can be applied throughout for both services.

129. *Composition of companies.*—The details of personnel, arms and equipment will be found in current "Tables of Organization" and "Tables of equipment," issued by the War Department.

130. *Technical administration.*—

(*a*) The company is normally organized into sections, the size and number of sections being dependent upon the character and organization of the company. The special vehicles are ordinarily grouped in one section and operated under the direct orders of the company commander.

(*b*) The vehicles of each section are under the direct supervision of the Chief of Section who is held responsible for their upkeep and repair.

(*c*) Unless otherwise engaged, all companies of trains should make daily marches of from 5 to 10 miles per day, so as to keep the animals in good condition, instruct and train drivers, insure the proper fit of harness and the correctness of the hitching of animals. These daily marches should be frequently made with capacity loads.

(*d*) A record should be kept showing the character of the day's exercise and the distance traveled, of what the loads were composed, the average weight of the load per team the condition of animals, harness and vehicles, the state of shoeing, the hours of watering, grooming and feeding. Accidents to men and animals and the conditions as to wood, water and grass in the country traversed.

(*e*) The watering and feeding of animals should be supervised by an officer.

131. *Duties of company commander.*—

(*a*) It is essential that the company commander have a thorough and practical knowledge of how to care for, condition and train the animals under his charge.

(*b*) He should make himself 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.

(*c*) He 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. He should also possess a practical understanding of the principles of horseshoeing.

(*d*) He 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.

(*e*) He is responsible for the instruction, discipline and training of his subordinate officers and should encourage in them a desire to become skilled and accomplished horsemen.

(*f*) Exceptional care and attention should be devoted by him to the selection and training of non-commissioned officers.

(*g*) The company officers should constantly scrutinize their teams for collar or harness sores or bunches and take steps to cause their immediate relief. Any faulty adjustment of harness should be corrected at once and if due to carelessness on the part of an individual, the latter should be promptly punished.

(*h*) The company commander should endeavor to establish a spirit of competition between his sections and thus to develop the initiative and responsibility of his chiefs of sections.

132. *Duties of the first sergeant.*—The first sergeant is the executive of the company. His principal duty is to maintain discipline and insure the efficient operation of the company. In case a wagon master is not included in the company organization, the following points call for his especial attention.

(*a*) He should possess a thorough knowledge of the art of harnessing, hitching and driving. He should assist an instruction chief of section or assistant wagon masters in the adjustment of harness.

(*b*) He should be skilled in making temporary or emergency repairs to both harness and vehicles.

(*c*) He should be experienced in loading all sorts of cargoes and in equalizing and stableizing loads.

(*d*) His knowledge of marching, road operating and the overcoming of obstacles to travel should be developed and augmented by inquiry and study.

133. *Duties of chiefs of sections (assistant wagon masters).*—

(*a*) Chiefs of sections or assistant wagon masters are assistants to the first sergeant and wagon master and perform duties in train similar to those authorized throughout the service for squad leaders.

(*b*) In general, they are responsible for the maintenance of good order and discipline among their men, for the proper care and treatment of their animals, for the prompt repair and maintenance of all accouterments, harness and material under their charge.

(*c*) They are directly responsible for the proper adjustment and fitting of harness and for the prompt detection of collar or harness sores.

(*d*) They supervise and carefully inspect the grooming of their animals and promptly report any animals needing shoeing or veterinary attention.

(*e*) The chief of section should constantly strive to make his section the best section in the company and to awaken in his men a spirit of confidence in his ability to lead their section safely and in good order over any country in any weather at any time of day or night.

134. *Duties of other N. C. O.'s.*—The duties of mess, stable and supply sergeants and of company clerks will be found fully covered in the "Manual for Army Cooks," "Manual for Stable Sergeants" and "Manual for Non-Commissioned Officers," respectively.

The "Manual for Army Horseshoers" should be closely followed by the horseshoers under the direct supervision of the stable sergeant.

Mechanics and saddlers will ordinarily be found among the personnel of mounted organizations. These men acquire manual dexterity only through long practice and consequently in every company one or more apt soldiers should be under apprenticeship to the blacksmith, horseshoer, mechanic and saddler, respectively.

135. *Duties of wagoners.*—The duties of wagoners include the nomenclature, cleaning and fitting of harness, the handling of hitched teams under all conditions of service, the care and maintenance of the vehicle and the care of the horse with special reference to grooming, feeding and watering and the shoulders.

These subjects are fully covered in the "Drill and Service Regulations of the Mounted Services" and consequently only instructions in driving with long reins is dealt with here.

136. *Driving.*—Never pole too tightly, especially when the pole is a heavy one, because if the pole chains are tight the weight of the pole will continually rest on the neck. On the other hand, if the poling up is too loose the constant swaying will be a source of irritation and danger to the team.

137. *Coupling Reins.*—The correct adjustment of the coupling reins require great care. They should be so fitted that an even pressure is brought to bear on both sides of the animals' mouths and in such a way also that both animals shall go straight and pull evenly on the traces. If the near animal carries his head to the near side, the coupling rein on the off side should be taken up, when his head will be straightened.

Suppose we have two animals apparently well matched, but that the near one carries his head rather out to the front and has a light mouth, while the off animal has a hard mouth and carries his head close to his chest. To get this pair to pull equally on the traces we must have the near animal's rein considerably longer than those of the off animal. In this case we should begin by letting out the off side coupling rein and taking up the near side rein the same number of holes.

The reins will now be adjusted so as to permit the near animal to hold his head well in front of the other, while the collars are brought level.

The most general fault is coupling up both reins too tightly, which makes the animals carry their heads in toward the pole, instead of going straight, as they should do. To prevent animals

acquiring this habit it is a good plan to change their positions occassionally instead of always driving them on the same side of the pole.

138. *Holding the reins.*—Place both reins in the left hand, the near rein over the forefinger and the off rein under the middle finger. Thus you have two fingers between the reins. The reason for this is that it gives much more scope for play of the wrist on the mouths than if you have only one finger between the reins. The thumb should point straight to the right and the forefinger be held well out, pointing to the right rear. This will keep the rein close up to the knuckle and the pair may be easily moved across the road by turning the back of hand up or down; up for left turn, down for right turn.

Sit firmly but comfortably in your seat, body erect, without stiffness and elbows close to side. Do not lean forward. Now take the whip in the right hand, at the place where it balances comfortable and you are ready to start.

Bring the pair to attention by feeling their mouths gently and speak to them. If they do not respond, touch them gently with the whip. The moment they start drop the hand slightly; "jibbing" is often caused by neglect of this precaution.

The elbows should be held close to the sides, with the points almost touching the hips.

The wrist should be well bent, as by this means the driver is enabled to keep a perfectly steady bearing on the mouths without any jerking. The forearms should be horizontal and the fingers from 3 to 5 inches from the center of the body, with the knuckles to the front. The thumb should not be pressed down on the rein. The fingers that should grip the reins are the three lower ones.

Never hit an animal while the right hand is holding a rein, because if you try to cut him when you have the off rein in the right hand you must slack that rein off and the pair is apt to dash to the left.

Do not get into the habit of "jabbing" the pair with the bits and do not flap the reins on their backs to start them or make them increase their pace. Drive at a steady, even pace, as nothing tires a team so much as to constantly change the rate of speed. When it is necessary to pull up in a hurry, the proper course to pursue is to catch hold of the reins with the finger and thumb of the right hand, just behind the left and shorten them as much as necessary by pulling them through. This is safer and more businesslike than elevating the hands, which disturb the seat.

The driving gloves should be large and very comfortable. They should never be of a size to cramp the hand in the slightest.

The right hand is known as the whip hand. It is generally used only for holding the whip, for assisting the left hand and shortening the reins by pulling them through from behind the rein hand.

139. *Driving four-in-hand.*—The driving of four animals as they should be driven is an art that can only be learned by constant practice and study.

When driving, the body should be kept upright and square to the front, but all stiffness should be avoided. The ankles and knees should be just touching each other and the arm close to

the sides. The forearm should be about horizontal and the left hand, as in driving a pair, from 4 to 5 inches from the center of the body, the back of the hand being turned toward the front, but inclined a little toward the team. The wrist should be bent slightly toward the body and on no account allowed to bend the other way. This is far the best position for feeling the mouths, as the wrist then acts like a spring and an even pressure can be maintained.

The driver should on no account be half standing, or merely leaning against the seat, with unbent knees, as in the event of a wheeler falling or shying to the side, he will probably be jerked off the wagon.

140. *The reins.*—The reins may be held in either of the following ways: 1. The near lead rein passing into the hand over the left forefinger, the off lead between the forefinger and the middle finger, the near wheel between the same fingers and under the off lead, the off wheel between the middle and third fingers.

The reins must be gripped firmly by the three lower fingers of the left hand. The thumb should point to the right and the forefinger be held well out. The near lead rein should pass over or close to the knuckle of the forefinger and not over the first or second joint.

The near lead rein passing into the hand under the little finger, the off lead between the forefinger and the middle finger, the near wheel between the third and little finger and the off wheel between the middle and third finger.

In this case the back of the hand is up, the bights of both reins passing out of the hand between the thumb and first finger and being held in place by a light pressure of the thumb.

141. *Adjusting the reins.*—All four reins can be shortened as much as is required, by pulling them through from behind, but it is generally quicker and neater to hold the reins with right hand 2 or 3 inches in front of left and then slide the left hand up to the right. This movement is generally required when going down hill .

142. *Wheel reins.*—It is better to shorten these by pulling them through from behind. This is necessary when going down hill, especially when the wheelers are loosely poled up, so as to prevent the singletrees from hitting the leader's hind legs.

143. *Lead reins.*—In order to shorten these, take out both the leaders with the right hand, they then can be passed back to the left hand the required length by letting them slip through the right hand the necessary amount. To lengthen them, simply pull them through from the front.

144. *Any single rein.*—Either push through from the front, with the full of the right hand, or pull through from behind.

145. *Dexterity with reins.*—Dexterity in handling and adjusting reins comes only with long and constant practices. For instructions, sets of short reins with each rein distinctly marked, should be fastened to the walls about the men's quarters and wagoners encouraged to practice with these.

146. *Crossing the road.*—To the left, turn the left hand, knuckles upward and pass it across the body from left to right, the team will incline to the left, the reins on that side being

shorter. To the right, pass the left hand down toward the left hip, back of the hand to the front, with the knuckles of the forefinger downward and that of the little finger uppermost. This shortens the right hand reins and causes the team to incline in that direction. The whip can be applied to the off wheeler in the first instance, or to the near one in the second, if they do not cross rapidly enough.

147. *Turning to left.*—With the right hand seize the near lead and wheel reins under the lower finger; then either pull these reins up toward the center of the body, which will shorten them, or allow the left hand to go slightly to the front, which will slack off the right reins, or better still, combine these motions.

148. *Turning to right.*—Take hold of the off lead and wheel reins with the lower fingers of the right hand and treat them in the same way as in using the left reins.

149. *The whip.*—The handle should rest in the plam of the right hand and be kept firmly in its place by the action of the thumb pressing against the base of the forefinger, the lower fingers will then be left free to catch hold of the reins.

If, however, it is necessary to pull the reins through from behind, the lower fingers must be tightened on the handle, so as to allow the thumb and forefinger to be used.

Hold the whip at an angle of about 30 degrees to the left front and about 40 degrees upward.

The thong ought to have three or four turns round the handle. The point of the thong should be just under the inside of the thumb; this will keep it from slipping. Hold the whip where it will balance comfortably, the end of handle under the forearm, the wrist well bent and the elbow close to the side.

When the right hand is on the reins or using the whip, it should be kept close to the left, the forearm being nearly horizontal. It can then rest on the thigh and yet be ready for any emergency.

The wheelers should be hit in front of the saddles, to avoid making them kick.

The proper hitting of the leaders with the whip can only be acquired by constant practice when off the wagon. A good whip can hit his leaders wherever he desires and without the dangerous, flail-like swipes that some teamsters appear to consider necessary.

150. *To start.*—Feel all the animals' mouths and, if necessary, give them the word to go, dropping the hand to them at once until the vehicle is fairly off. The wheelers ought to start the wagon and this can be effected by touching them with the whip, if they require a hint. It is never safe to start without having the whip in the right hand, ready for immediate use. The whip is to the driver what the leg is to the rider, that is, it keeps the team up to their bits. As soon as the team is going straight, take the right hand off the reins, at the same time keeping it close by, ready for any emergency.

151. *Pulling up.*—When you want to pull up, shorten all the four reins by passing the left hand up to the right, or else by pulling all the four reins through from behind, as before explained; then, having the right forefinger on the near lead rein, the middle finger on the near wheel and the lower fingers of the

right hand on the off reins, pull both hands back toward the body and, if necessary, lean back a little.

Should the team be getting the better of you and you find that you cannot stop it, it will be found a great assistance to place the right leg over all the four reins, as you may be able to stop them by the extra power and leverage thus applied. Of course, it is understood that the brake has been applied.

152. *A few hints.*—Always keep a steady pressure on the reins. Never remove left hand from reins, even though the right may be holding them in front, as it is very difficult to get the left hand back into its place again with the reins in the right places.

Lead reins should seldom be removed from the left hand.

Alter position of the bits if the team pulls hard.

Always take a pull at the team to steady it just before you arrive at the crest of a hill and again begin to descend slowly, holding the leaders steady and with just enough traction to keep their singletrees from hitting them.

In crossing ruts and in turning corners be careful that the leaders are out of draft; otherwise the pole may be snaped off or wheelers pulled down. If, while going down a hill, and especially when near the bottom, you find a wheeler slipping on his hocks, do not try to pull him up, but drop the hand and allow the team to go a trifle faster.

153. *Harness and horse equipment.*—Constant care is required to keep the harness and horse equipment clean, serviceable and in good repair, the leather parts soft and pliable, the metal parts free from rust and dirt and properly painted.

Drivers and individually mounted men will be carefully instructed in the care of harness and horse equipment.

Harness and horse equipment will habitually be cleaned immediately after use. This obligation, like the care of the horse, is to be regarded as a part of the mounted duty and exercises will not be considered as completed until horses, harness and equipment have been cared for and put in order.

The cleaning is performed under the immediate supervision of an officer.

The chiefs of section are in direct charge of the work pertaining to their sections and are responsible that the cleaning is carried out as ordered, that the materials issued are properly expended and that the harness is left in good order.

Ordinarily about 30 minutes should be allowed for a driver to unharness his team and properly care for and dispose of his harness.

To do this the driver wipes and cleans with a damp cloth the bits, the bearing surfaces of the collars and the leather parts of the harness, paying particular attention to the places where the leather is wet from perspiration, dries the bits and rubs them with a cloth damp with oil and puts the harness in order. At this time, also, parts that should be repaired or replaced are given to the chief of section, who is responsible that they are promptly taken to and returned from the saddler or that the necessary new parts are procured from the supply sergeant.

Care should be exercised in handling all articles of harness and horse equipment. Collars must not be subjected to

rough treatment, or they may be bent out of shape and rendered unfit for use.

Such parts as stirrup straps, quarter straps, etc., should occasionally be exchanged or be altered in length so as to bring fresh holes at the buckles or fresh surfaces into wear.

At intervals of from one to four weeks, depending upon climatic conditions and the use to which it has been subjected, the harness should be completely taken apart and thoroughly overhauled, cleaned and dressed.

154. *To clean and dress the harness.*—Take the harness completely apart, unbuckling straps, removing buckles, loops, etc., wherever possible.

With a sponge dampened but not wet with water wipe off all surface dust and mud. Rinse out the sponge, moisten it in clear water, squeeze it until nearly dry, rub it vigorously upon castile soap, and work it about in the hand until a thick, creamy lather is formed. Clean each leather piece thoroughly in this lather, each strap being drawn its entire length through the lathered sponge so as actually to remove therefrom the salt, sweat and dirt.

Again rinse out the sponge and make a thick lather as described above except that saddle soap is used. Go over each piece as before, working the lather well into every part. Place the parts in the shade to dry.

While these parts are drying, clean the buckles and other metal parts of the harness.

After the leather parts have become partially dry, they are rubbed vigorously with a soft cloth. The harness is then assembled.

As long as the saddle soap dressing maintains the leather soft and pliable nothing further is required, but from time to time it will be necessary to apply a little neatsfoot oil. Frequent light applications are of more value than infrequent heavy ones.

155. *To oil the harness.*—Clean the leather parts in the lather of castile soap as described above.

While the parts are still damp apply the oil to the flesh side of the leather with a cloth or cotton waste moistened, but not soaked with oil, using long, light strokes. A light even distribution of the oil should be sought. The tendency is to use too much oil, the amount necessary for each set of harness should rarely exceed two ounces. After oiling, the parts should, if practicable, be allowed to stand for 24 hours in a warm, dry, shady place and should then be rubbed with a dry cloth. The harness is then assembled,

FORMATIONS REQUIRED WILL BE GENERALLY CONFINED TO THOSE FOR MARCH, PARK AND INSPECTION.

156. *Road formations.*—The normal road formation is in column of vehicles with 2 yards distance between vehicles measured from heads of lead pairs in rear to back of tail gates in front. This distance may be increased when the ground is difficult. When road space is unimportant, distances may also be increased to avoid thick dust or other inconveniences. Mounted subordinate leaders are posted to the left of and

on line with the leaders of their leading vehicle. Officers and unassigned non-commissioned officers are posted as directed by the company commander. At route order, all subordinate commanders should march where best able to observe and control their units.

157. *Park formations.*—Vehicles may be parked either in line, line of sections or column of sections, with full or close intervals, or exceptionally in column of vehicles or corral.

Full interval is one hitched vehicle length. Close interval is two yards.

158. *Line.*—Vehicles are abreast of each other with full or close interval.

159. *Line of sections.*—Vehicles of sections in column of vehicles. One hitched vehicle length between sections.

160. *Column of sections.*—Vehicles of sections in line with full or close intervals sections covering in column and closed to two yards distance.

161. *Column of vehicles or corral.*—Column park is exceptional and used only when space is not available for other means of parking. The corral for defense formed as indicated in Part I is exceptional and is rarely used.

INSPECTIONS.

162. *Informal inspections.*—Informal inspections as prescribed for Mechanical Transport should be conducted as frequently as circumstances will permit.

163. *Formal inspections.*—The formation for inspection will habitually be either in line or in column of sections, with full or close interval. Distance between sections is one hitched vehicle length.

If the inspection be mounted, all personnel remain seated at attention upon the vehicles to which assigned. If desired, personnel may be dismounted, precautions being taken that drivers retain control of their teams. Extra personnel form two yards in front of the leaders of their respective vehicles. Group leaders post themselves on the right of the right element of their unit. Unassigned personnel form as indicated by the company commander.

164. *Dismounted instruction.*—The company, dismounted, marches and maneuvers, except as hereinafter prescribed, by the methods and means laid down in the Infantry Drill Regulations. Every opportunity should be seized by officers to give their men physical and disciplinary drills. It is absolutely essential that drivers be well disciplined and subordinate soldiers. Instruction in Small Arms Practice should be given as indicated for personnel of mechanical transport.

165. *Visual and whistle signals.*—Few signals are required and these should be simple and in conformity to those of the branch of the service with which the company normally serves. Officers should remember that with loaded trains the transmission of complicated signals is most difficult. Close attention by drivers to indications from their leaders and to movements of more advanced vehicles will normally suffice.

CONDUCT OF MARCHES.

166. *Conduct of marches.*—The general rules laid down for the conduct of marches with mechanical transport are largely applicable to animal drawn transport, allowances being made for intervals and distances and rates and length of march.

167. *Rate of march.*—The rate of march will depend on conditions of road and weather, the nature and amount of cargo carried, the class and condition of the draft animals, the length of the march, etc. While good teams with light loads on good roads can cover nearly 4 miles an hour, in long columns a rate of 2 miles, including halts is all that can be expected even under favorable conditions. Small trains may make 2½ miles an hour. Teams must not be trotted unless imperative to do so.

168. *Daily march.*—The average march of trains is from 15 to 20 miles. The maximum march for trains is about 28 to 30 miles. Good trains with one day's rest in seven should march 25 miles daily.

169. *Road difficulties, steep grades, etc.*—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. When pulling up a hill the drivers should encourage their horses by a low and quiet use of the voice.

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. Uneven draft quickly results, often to the point of stalling the team. In going over a V-shaped ditch unusual efforts 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 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, if circumstances permit, the company should be halted at the foot of the hill and vehicles 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 vehicle or section, after such a halt, moves out in time for the carriage or section which follows to halt on the same ground. A few men instructed to follow and watch a vehicle 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 first back it for a few feet, in order to put

both horses and carriage on more advantageous ground from which to make the start.

Men should be instructed and regularly practiced in assisting the horses by working at the wheels and along ropes attached to the vehicles. Much delay and confusion on the march may be avoided by such training. To insure teamwork, attention should be given to the spacing of the men along the rope.

When a carriage is mired it may be pulled out by attaching it with ropes to the middle point of a log or balk. The balk acts as a giant doubletree between the two teams attached thereto, and with careful driving the draft will be very even.

The start of a stalled vehicle may at times 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. 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. Should they become loose, he very gradually holds the wheelers back until they tighten up and the horses to the front again come in 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 that frequently results when a pair is brought into 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.

170. *Crossing bridges, fords and ferries.*—Before attempting to cross, a careful examination by an officer is made of fords, boggy places, bridges of doubtful character, ice, etc., as the case may be.

When necessary an officer should directly supervise the crossing.

When roads lead through swamps, quicksand or through streams with treacherous bottoms, their limits are marked and warnings placed at dangerous points. The crossing of many animals and wagons may deepen a ford and make it impassible.

In the use of ferries, the regular operators are interfered with as little as possible. Animals are loaded one at a time. When room for only a single row, animals alternate head and tail; if in two rows they face inward. Animals falling into the water are turned loose. On small ferries vehicles are generally loaded by hand, the animals for a vehicle being, if possible, on the same boat.

171. *Overturned vehicles, thrown animals, etc.*—The head of a thrown and entangled animal should be at once confined to the ground. Other animals are taken out and moved away from the vehicle. Traces and other parts of the harness are disengaged to entirely free the animal. If necessary the vehicle is drawn back and the ground, if slippery, strewn with straw or earth. When all preparations are completed the animal is released.

In case of a turn over, when sufficient men are not available to right the vehicle, that part of the load which has not

already broken away from the lashings is removed. Ropes are attached to wheels in air and thence to doubletrees of teams pulling at right angles.

With very heavy vehicles two stakes are driven about four feet apart and thirty feet from and directly opposite the middle of the vehicle. A block and falls is attached to the two wheels in air, the block attached to one stake and one end of the line to the other. Power, animal or man, is then applied to the other end of the rope.

The overturning of vehicles can be prevented if, when passing over dangerous angles of slope, several ropes are passed over the top of a load and held by men moving, on the uphill side, parallel to and opposite the vehicle.

172. *Defensive measures.*—While convoys are ordinarily protected by the operations of troops in their front, when necessary escorts are provided to protect convoys of troops from surprise and attack. The officer commanding this escort commands the entire convoy. He should defer when possible to the wishes of the company commander as to march, etc., of the transport.

The flanks of a convoy are its vulnerable parts. If menaced by the enemy, the convoy detours, or continues its march under the protection of the escort, or if attacked, the train is parked under cover. If the train cannot be saved, the commander endeavors to escape with the most valuable part, the remainder is fired or otherwise destroyed.

Some protection to teams from fire coming from the front or one flank may be quickly obtained by placing the first vehicle obliquely across the road and closing other vehicles on the leading one, all being obliqued at the same angle as the leading carriage. Partial protection from fire from the front or both flanks may be obtained in like manner by placing the two leading vehicles obliquely across the road, both teams heading inward. Rear vehicles are then closed in double oblique column on the first two. The amount of protection afforded by either of these means is largely dependent on the character of the cargo being carried.

173. *Cargoes.*—Owing to differences of size and body design between vehicles of the animal drawn and the mechanical transport, the carrying capacities of wagons and trucks will not be the same. It may be said that with compact loads the capacity of an escort wagon is 2/5 that of a 3-ton truck and with light bulky loads the capacity is ⅔ that of the same truck.

The actual capacity of animal drawn vehicles is as follows:

4 mule—Army wagon (General Size), 2,765 lbs.
4 mule—Army wagon (Cumlat Train), 2,465 lbs.
Caisson with limber, 106 3-inch shell.
Ambulances, 4 litters.

174. *Care of animals on the march.*—Unless the horses are in condition it is impossible for them to undergo the fatigue and exertion incident to any prolonged effort. It is therefore assumed that in peace the horses have been conditioned before they are called upon to make a march of any importance. In war soft remounts will be furnished perhaps almost continuously. Every effort must then be made to work and condition these

horses during the course of active operation, or the mobility of the train will be vitally impaired and the wastage of horse flesh unnecessarily increased. If under pressure of circumstances the working of unconditioned animals is necessary, the distances to be covered and the time occupied must be comparatively short, unless military necessities override all thought of loss or injury. In its effect upon the animal the length of a march is to be considered not only in miles, but also with regard to the number of hours the horse is under saddle or in harness. The latter consideration is frequently the more important. The advance of a column in service may be at the rate of 1 mile in four or five hours. Under such circumstances a 5-mile march may call for the exhibition of extreme endurance.

Experience tends to prove that six hours' reasonable work a day is good for a conditioned horse.

The horses should be carefully inspected before starting to see that they are fit for work. Special effort must be made to spare those not fit. Oftentimes it will be possible to vary the load in such a way as to spare a team.

The hour of start depends upon circumstances. As a rule it will be made about 1 hour after broad daylight. Both men and animals rest well in the early morning hours. In the dark, feeding arrangements are not satisfactory and saddlery and harness may not be properly adjusted. Night marches are slower and more fatiguing than those in day.

Provided it is not unduly hurried at any point, the quicker the march is completed the less fatiguing it is to both horse and rider.

Frequently where the roads are good, the drivers and individually mounted men are required to dismount and walk. This rests the horses by relieving them of the weight and it also rests the men. This is the best cure for lounging in the saddle.

The first halt is made after marching about three-quarters of an hour and is about 15 minutes long to enable harness and saddles to be adjusted, men to attend to the calls of nature, horses to stale, etc. Judgment should be exercised in selecting the place for the first halt, it should not be made in a village or a place where the objects of the halt would be defeated.

As a rule after the first halt, one of 10 minutes is made each hour; that is, the train marches for 50 minutes and then halts for 10. In very hot weather the halts must be longer and more frequent. Halts must also be frequent when the roads are hilly or difficult.

In small train units may halt simultaneously upon the indication of the commander. In large commands, however, watches should be synchronized and halts made at prearranged hours. The usual rule is to halt the last ten minutes of each hour.

Horses on the march can not be held to their full capacity for work unless they are amply fed. Feeding on the march in peace and war are very different matters. In peace there is usually no sufficient reason why regularity of feeding should be interrupted. In war feeding a little at every opportunity should, if necessary, be practiced; thus at no time is the horse's stomach overloaded and at no time is it entirely empty. On marches in time of peace and when not prevented by other necessity in time of war, there should be regularity of feeding. When men and animals are held to a march long after their mid-day meal, they

become peevish and irritable; some men are likely to abuse their horses or to punish them on the slightest provocation, while the animals fret and worry and needlessly waste their energy. It is while in this state of mind or condition of body that sores and injuries are most liable to be caused. Moreover, when camp is reached every one is tired and out of sorts, the animals are not properly cared for and their proper feeding may be neglected. It is always better to carry food for the men and grain for the animals and to halt promptly at the regular feeding time. Camp is then better made and the horses receive more careful attention.

With full allowance of grain and hay on the march, an effective and convenient plan of feeding is as follows:

At reveille, one-third the grain allowance; at mid-day, one-third the grain allowance; at stables, after watering, one-half the hay allowance; just after the grooming is finished about 5 p. m., one-third the grain allowance; at 11 p. m., one-half the hay allowance to be fed out by the picket-line guard. This serves to keep the horses quiet during the night. When the horses are on the picket line, guards must constantly watch the horses to make sure that feed bags are not tossed off or torn and that each animal gets his grain.

The horses should usually be watered on the march whenever opportunity offers. If the weather is cool it is usually unnecessary to water before an early start, as most of the horses will then refuse water. The principle of watering before feeding and not until 2 hours after feeding should be adhered to, if possible. In hot weather horses will drink copiously 2 or 3 hours after the evening feed of grain. Watering at this time does them great good. This can usually be done without seriously disturbing the men or interfering with their rest.

If a mounted command has to march a long distance without water, so that it will be necessary to camp en route, the animals are fed but denied water until just before starting, when they are permitted to drink freely. The command marches in the afternoon and does not encamp until it has accomplished at least half of the distance; it moves early in the morning to reach water.

Horses must be watered quietly and without confusion; the manner in which this duty is performed is a good test of the discipline of a mounted command.

The horses are led or ridden at a walk to and from the watering place. Crowding will not be permitted, nor will any horse be hurried or have his head jerked up from the water.

The horses are watered under the immediate direction of the senior officer or non-commissioned officer present. An officer should always be present when the horses of other commands are likely to be met at the watering places.

At all halts on a march officers and chiefs of sections will personally see that drivers attend to their horses as prescribed. Any injuries caused by harness and saddlery must be discovered and reported at once.

At the first stables after camp is reached, not only are the men required to report any injuries discovered on their horses, but the officers must personally inspect the back and shoulders of every animal. Where injuries, no matter how slight, have occurred, the officer will direct and supervise a readjustment of the

harness or saddlery. It must be thoroughly appreciated that each injury is due to a certain definite cause, which must be removed to produce no further effect. Practically no case will arise in which a little skill or ingenuity in readjusting parts of saddle or harness will fail to relieve the injured part. A shortened or narrower collar, or a lengthened or broadened one, will relieve injuries which, if neglected, might soon put the animal out of work.

Hand rubbing is the best preventive of sore shoulders and backs. It massages the tissues and stimulates the circulation. It must be employed freely at halts and at stables after the march.

It is only by constant attention to these details on the part of officers and men that animals can be kept fit to march day after day and be ready to meet any reasonable demands which the emergencies of active service may impose.

In temporary camps the animals are tied to picket lines stretched between the carriages. They are tied on the line so that the horses in each section stand together. Precautions should be taken to tie animals of mean disposition where they cannot injure their neighbors by kicking or biting. In cold, wet, or windy weather, horses like to stand with their tails to the wind and effort should be made to place the lines so that this will be possible. In hot weather endeavor should be made to get as much shade as possible; if the camp be permanent, shade for the lines must be extemporized. Continued standing in the hot sun will seriously debilitate the animals.

The sanitation of the picket lines demands constant attention. Ditches should be cut to allow them to drain easily and manure and foul liter must be removed daily. During the fly season the lines should once a week be sprinkled with crude oil or other inflammable material and burned off.

If the ground becomes sodden with rain or otherwise broken up, the position of the lines should be changed.

If there be an extreme range of daily temperature, horse covers are of value. The use of covers, however, is liable to abuse. A horse can stand great cold when properly acclimated.

Part III
DIVISION TRAINS

175. The general principles governing the training of divisional personnel will apply to the personnel and units of the division trains. March discipline will be rigidly enforced so that single vehicles as well as trains, whether halted or moving, shall leave the road open for troops or vehicles trying to pass. The importance of road space must be understood. Advantage will be taken of every opportunity to train units in road discipline.

176. The proper and orderly loading of trucks and wagons will be insisted upon. The spare parts and implements which form a part of the equipment of vehicles will be carried at all times. Unauthorized articles of personal belongings will not be loaded on wagons, nor will such wagons be loaded with soldiers who are not authorized to ride.

In hauling supplies, while in training areas, the many opportunities for assembling trucks or wagons into trains will be used to improve the march discipline of the companies. In these cases, officers and train masters will be required to perform their duties in strict accordance with the regulations.

177. In trains in which mechanical and animal-drawn transports are combined, horse and motor transport should be marched separately. No road is wide enough to allow two lines of vehicles (motor and horse drawn) to pass in both directions, each moving at its natural speed. The two kinds of vehicles get in each other's way. In order therefore to effect this separation, one of the following expedients is necessary:

(*a*) *By use of different roads.*—This is the best method. If a road is paralleled for all or part of its length by another road, the latter should be used for horse vehicles and columns of troops.

(*b*) *By the use of wagon paths.*—If there are no parallel roads, wagon trails may be made through the fields beside the reserved roads. The wagon trails may be improved with fascines where necessary. Horsemen and empty wagons should always be required to use them, and loaded wagons should use them whenever the condition of the ground permits.

(*c*) *By scheduling horse vehicles and motor traffic to move at different hours.*—If the topography of the region or weather conditions make it impossible to use parallel roads or wagon trails, it may become necessary, over some stretches of road, to make schedules for the movement of horse vehicles and motor traffic at hours when they will not conflict.

In such a situation the automobile trains must not be allowed to run during the hours assigned for hauling supplies (but a limited motor traffic, such as touring cars, ambulances and isolated trucks, may move without interfering with the horse traffic)

and, during other hours, periods may be reserved for the automobile trains and no horse vehicles allowed on the road. To get the maximum possible results and regularity, automobile trains will be required to move by schedule.

178. The schedule system consists essentially in giving an automobile train the characteristics of a railway train departing at a certain hour and reaching its terminus at a certain hour. This system applies to simple and regular freight movement (ammunition lots, rations, etc.) from parks where the freight is stored.

For the schedule to be practical its basic rate of speed must be slow (eight miles on good road, from four to five miles on fair road) so that trains by varying their actual speed can make up delays or slow down to arrive at the scheduled hour at the entrance of the road which is called the initial point.

Operation by schedule requires: Arrival at the loading point at the appointed hour, never later; a regular and invariable time allowance for each loading (this requires that the loading gangs always have full membership); departure from the loading point practically on schedule time; regular progress at the specified speed to arrive at the initial point exactly on time.

When these requirements are enforced a company may be run approximately every seven minutes without difficulty and with perfect regularity, rolling five or six miles per hour.

FORMATIONS FOR COMPONENT UNITS, TRUCK COMPANY, AMMUNITION TRAIN.

179. The truck company, ammunition train, is organized as shown in "Table of Organization."

The formations and maneuvers of the truck company, ammunition train, dismounted, shall be as prescribed for a battery of field artillery, light, in "Field Artillery Drill Regulations, Horse and Light." Truck formations will conform to the principles hereinbefore prescribed for Mechanical Transport.

For tactical and administrative purposes, the truck company is divided into sections, as follows:

First to fifth sections.—Cargo, normally 4 sections of 6 trucks and 1 of 3.

Sixth section.—All service trucks.

CAISSON COMPANY, HORSED BATTALION, AMMUNITION TRAIN.

180. The habitual formations and maneuvers for the caisson company are as prescribed for a battery of field artillery, light, in Drill Regulations for Field Artillery, horse and light, with such modifications as may be necessitated by differences in personnel and equipment.

For tactical and administrative purposes the caisson company is divided into sections with equipment as follows:

First to ninth sections, inclusive.—Two caissons, each.

Tenth section.—Service wagons and spare gun and teams.

Eleventh section.—Ration and baggage wagons and kitchen.

WAGON COMPANY, HORSED BATTALION, AMMUNITION TRAIN.

181. Maneuvers and formations, dismounted, will be as prescribed for a battery of field artillery in "Field Artillery Drill Regulations," horse and light, with such modifications as may be necessary due to difference in personnel.

For tactical and administrative purposes the wagon company is divided into 12 sections, with equipment as follows:

First to eleventh sections, inclusive.—Three combat wagons each.

Twelfth section.—Ration and baggage wagons and kitchen.

THE ENGINEER TRAIN.

182. The formations and maneuvers of the engineer train, dismounted, shall be as prescribed for a company of infantry in "Infantry Drill Regulations," with modifications due to difference in personnel.

For tactical and administrative purposes, the engineer train is divided into two sections.

First section.—All animal drawn transport.

Second section.—All mechanical transport.

If imperative to march as one column the motor transport leads.

THE MOTORIZED AMBULANCE COMPANY.

183. The formations and maneuvers of the motorized ambulance company shall be as prescribed in Drill Regulations and Service Manual for Sanitary Troops, United States Army, 1917, subject to provisions for Mechanical Transport hereinbefore prescribed.

For tactical, and administrative purposes, the motorized ambulance company is divided into the following subdivisions:

Three ambulance platoons.

One service platoon.

Chiefs of platoon discharge duties hereinbefore prescribed for chiefs of section.

ANIMAL-DRAWN AMBULANCE COMPANY, SANITARY TRAIN.

184. The formations and maneuvers of the animal-drawn ambulance company, sanitary train, are as prescribed in "Drill Regulations and Service Manual for Sanitary Troops, 1917."

For tactical and administrative purposes the animal-drawn ambulance company is divided into the following parts:

Three ambulance platoons.

One service platoon.

MOTORIZED FIELD HOSPITAL COMPANY.

185. The formations and maneuvers of the company are as prescribed in "Drill Regulations and Service Manual for Sanitary Troops, U. S. Army, 1917," subject to provisions for the operation of mechanical transport hereinbefore prescribed.

For tactical and administrative purposes the motorized field hospital company is divided into three sections, having motor material as follows:

First and second sections.—Four cargo trucks each.

Third sections.—Remaining cargo and service trucks.

ANIMAL-DRAWN FIELD HOSPITAL COMPANY, SANITARY TRAIN.

186. The formations and maneuvers of the animal-drawn field hospital company are as prescribed in "Drill Regulations and Service Manual for Sanitary Troops, 1917," vehicles on the left in line, dismounted men on the right in line. The vehicles form and march as one unit.

TRUCK COMPANY, SUPPLY TRAIN.

187. The formations and maneuvers, dismounted, are as prescribed in the "Infantry Drill Regulations." Trucks march and maneuver as hereinbefore prescribed for mechanical transport.

For tactical and administrative purposes the truck company supply train is divided as follows:

Three sections.—Nine cargo trucks each.

Fourth section.—Service trucks.

MOBILE ORDNANCE REPAIR SHOP.

188. The formations and maneuvers, dismounted, are as prescribed in the "Infantry Drill Regulations." Trucks march and maneuver as hereinbefore prescribed for mechanical transport.

For technical and administrative purposes the mobile repair shop is divided as follows:

First section.—Equipment section.

Section section.—Machinery section.

Third Section.—Headquarters and service section.

MILITARY POLICE.

189. The military police are organized and trained according to the principles laid down in the "Drill and Service Manuals for the Cavalry." The personnel should be especially selected men of excellent character and soldierly bearing. A strong "Esprit de Corps" should be fostered among them.

Special schools should be organized for their individual instruction in control of traffic and the police duties indicated on page 60.

TRAINING OF DIVISIONAL TRAINS.

190. (1) Division ammunition trains, if attached to artillery brigades in separate training areas, will be similarly instructed under the supervision of the artillery commander.

(2) All personnel will be instructed in:

The school of the soldier.
Small arms practice.
Defense against gas.
First aid to the injured.
Personal hygiene.
Care of arms, clothing and equipment.

(3) The following outlines the subjects which the units and personnel must cover:

(*a*) *Chauffeurs and motorcyclists.*—
Cleaning and oiling trucks or motorcycles.
Starting and stopping motor.
Shifting gears.
Making road repairs.
Driving.
Backing and turning around.
Movement in a train.
Parking.
Traffic regulations.
Towing cars.

(*b*) *Mechanics.*—
Adjustment and repair of:
Motor.
Carburetor.
Magneto.
Brakes.
Running gear.
Body.

(*c*) *Company clerk.*—
Reports.
Company records.
Company returns.

(*d*) *Property sergeant.*—
Reports.
Q. M. supplies.
Ordnance supplies.
M. T. supplies.
Care of all supplies.

(*e*) *Assistant truckmaster.*—
Care of vehicles.
Oiling and greasing.
Principal mechanical parts.
Minor repairs and adjustments.
Road rules.
Convoy rules.
Care of vehicle equipment.
Discipline.
Loading and unloading.
Parking.
Map reading.
Signals.

(*f*) *Truckmaster.*—
Duties of road.
Duties in camp.
Care of vehicles.
Oiling and greasing.
Principal parts, mechanical.
Minor repairs and adjustments.
Road rules.
Convoy rules.
Care of equipment.
Requisitioning supplies.
Loading and unloading supplies.

Transportation of troops.
Parking rules.
Company records.
Company reports.
Map reading.
Signals.

(*g*) *Officers.*—
Administration.
Nomenclature, operations, care, adjustments and simple repair of motor vehicles.
Map reading.
Map problems in operation of trains.
Handling of convoys.
Organization and function of division trains.
Transportation of troops.
Duties on the road.
Road and convoy rules.
Loading and unloading supplies.
Parking.

(*h*) *Company instruction (practical).*—
Convoys.
Parking.
Camping.
Night hauling.
Transportation, loading and unloading of troops.

(*i*) *The military police must be instructed in.*—
Equitation.
Care of animals and equipment.
Control of civil circulations.
Discipline of troops.
Traffic control.
Handling of prisoners of war.
Duties in a town.
Duties on the march.
Duties near a battle.

191. The training of the personnel of animal-drawn transport will follow the general scheme of instruction above indicated.

APPENDIX A

SCHEDULE OF INSPECTION AND MAINTENANCE

(1) *General Principles of Good Upkeep.*—

(*a*) The general principles of good upkeep are the same for all motor vehicles. Certain routine operations *must* be periodically attended to by each driver. The necessary upkeep schedule to be followed is outlined below and this procedure must be faithfully adhered to and constantly checked up by means of inspection. A copy of this care and upkeep outline should be part of the equipment of each vehicle.

(*b*) Intelligent upkeep and repair demand a *thorough knowledge* of the particular type of vehicle operated by the company. For this reason each company will be supplied with a set of instruction books issued by the manufacturer. The company commander should fully realize the important minor repairs which must often be made under trying circumstances and by the drivers unassisted by the company mechanics. This demands a knowledge of the car used and the responsibility for adequate instruction of the men is upon the shoulders of the company commander.

(*c*) Much time ordinarily wasted by drivers waiting for their trucks to be loaded and unloaded, should be used to good advantage for lubrication, minor repairs, adjustments and general cleaning.

(*d*) Company commanders should strongly impress upon their drivers the responsibility which the latter have for several thousand dollars' worth of equipment and that this equipment at certain times may have a value which cannot be measured in dollars, owing to the urgent needs which may arise for its employment. In consequence, each driver should understand that his responsibility for his vehicle is similar to that of a naval officer in charge of his vessel; that no matter what the circumstances are attending, damage to his vehicle or loss of equipment, a thorough investigation will be made, even though he is ultimately exonerated with honor. It should be made plain to him that excuses cannot be taken for ignorance of rules, failure to keep proper distances, to maintain proper speed and to keep his vehicle absolutely under control at every moment that he is operating it. He is not only pecuniarily responsible for any damage which he allows to occur to the public property under his care, but he is also subject to disciplinary action for carelessness or negligence of duty in allowing this valuable property confided to him to be damaged. Ordinarily, no explanation is acceptable for damage to a vehicle, other than collision by another vehicle, which the driver could not with all his skill and judgment avoid, or damage by hostile fire.

(2) *Repairs Made by the Company.*—

(*a*) As far as possible actual repairs should be made by the two assistant mechanics, leaving the mechanic free for supervision of repairs and for inspections.

(*b*) A log book is supplied for each vehicle. It *must* remain with the vehicle at all times and the driver will be disciplined if it is lost. In it is entered a record of all repairs of any consequence made on the vehicle.

(*c*) Care must be given to *appearance,* as well as to mechanical perfection. See that the body and wheels are cleaned of dirt and inside of the body cleaned out.

(*d*) Be on the lookout at all times for all leaks and for unusual noises, find the cause *immediately* and remedy it.

(*e*) In screwing up grease cups always make sure that the grease has actually been forced into the bearing.

(*f*) Never cut out the muffler.

(*g*) Never, under any circumstances, fill the gasoline tank or work on the carburetor in the presence of a naked flame or an oil lantern. If this work must be done in the dark use an electric torch.

(3) *After each run* (to be done as soon as truck returns from run).—

(*a*) Fill up gasoline tanks (including reserve supply), oil, lanterns, headlights and generators.

(*b*) Drain carburetors (much water and other impurities are often found in gasoline). In freezing weather drain radiators.

(*c*) Remove mud and dirt from places in immediate proximity to joints and moving parts, such as reach rod joints, spring shackles, distance rod hangers or joints, torsion rod joints and springs.

(*d*) After removing dirt, turn down grease cups at all places *one turn.*

(*e*) Examine and tighten all loose nuts, screws, etc., including those of the woodwork.

(*f*) Wash entire truck, if possible.

(4) *At end of* 250 *miles.*—

(*a*) Fill up all grease cups and see that oil holes are not stopped up.

(*b*) Clean motor and pan under motor, clean spark plugs, oil magneto (only a drop or two), clean carburetor.

(*c*) Examine clutch, permit no oil on a leather faced clutch.

(*d*) Transmission case, fill with lubricant if necessary.

(*e*) Brakes, examine and regulate tension.

(*f*) Chains, examine tension.

(*g*) Clean oil strainers.

(*h*) Examine all wiring as to insulation and connections.

(*i*) Go over all nuts and bolts.

(5) *At end of* 1,000 *miles.*—

(*a*) Drain crank case, wash with kerosene and fill with fresh oil. (Save old oil to return to service park).

(*b*) Jack up body and clean and grease spring leaves.

(*c*) Remove chains, bathe in kerosene, clean with brush, grease and put back.

(*d*) Fill differential case with oil.

(*e*) Examine all grease boots and clean and refill, if necessary.

SUMMARY OF ENGINE TROUBLES AND THEIR CAUSES

(1) *Engine fails to start.*—

(*a*) Gas mixture too lean.

(*b*) Water in gasoline.

(*c*) Water or congealed oil in commutator.
(*d*) Gasoline supply shut off.
(*e*) Carburetor frozen.
(*f*) Carburetor flooded.
(*g*) Water frozen in gasoline.
(*h*) Coil switch off.

(2) *Engine irregular and lacks power.*—
(*a*) Poor compression—leaky valves or piston rings.
(*b*) Gas mixture too rich or too lean.
(*c*) Spark plugs dirty.
(*d*) Air leak in intake manifold.
(*e*) Weak exhaust valve spring.
(*f*) Weak intake valve spring.
(*g*) Too great clearance between valve stem and push rod.
(*h*) Gap between spark plug points improperly adjusted or porcelain broken.
(*i*) Commutator contact imperfect.
(*j*) Motor overheated.
(*k*) Spark excessively retarded.

(3) *Engine stops.*—
(*a*) Gasoline tank empty.
(*b*) Water in gasoline.
(*c*) Flooded carburetor.
(*d*) Dirt in carburetor or feed pipe.
(*e*) Magneto wires loose.
(*f*) Overheated from lack of oil or water.
(*g*) Gas mixture too lean.

(4) *Engine overheats.*—
(*a*) Lack of water.
(*b*) Lack of oil.
(*c*) Fan belt torn, loose or slipping.
(*d*) Carbon deposit in combustion chamber.
(*e*) Spark retarded too far.
(*f*) Gas mixture too rich.
(*g*) Water circulation retarded by sediment in radiator.
(*h*) Dirty spark plugs.

(5) *Engine knocks.*—
(*a*) Carbon deposit on piston heads.
(*b*) Loose connecting rod bearing.
(*c*) Spark advanced too far.
(*d*) Engine overheated.
(*e*) Loose crank shaft bearing or worn crank shaft.
(*f*) Worn wrist or crank pins.

APPENDIX B

INSTRUCTIONS FOR MOTOR STORAGE

(1) *Placing trucks in storage.*—

(*a*) Drain water from circulating pump and radiator, run engine for a few minutes to thoroughly dry cylinder walls and radiator.

(*b*) After stopping engine, open priming cups, pour a few ounces of engine oil in each cylinder.

(*c*) Thoroughly slush all exposed parts of engine with heavy gear oil.

(*d*) Trucks should be raised clear of the ground and substantial blocking placed under either end of front and rear axle. Where this is not practicable, place planking under wheels to prevent tires from coming in contact with the ground. Cover tires with a strip of tar or water-proof canvas.

(*e*) Storage batteries should be tested each two weeks, adding distilled water if the plates are found uncovered. Tighten filler plugs to prevent corrosion.

(*f*) At intervals of two weeks, run each engine for a few minutes under its own power to prevent rusting of cylinder walls, seizing of crank shaft and connecting rod bearings.

(2) *Removing trucks from storage.*—When motors stand for any length of time, oil entirely drains from the lubricating system, cylinder walls and bearings. Cylinder walls have become rusty from condensation. It is therefore necessary that the greatest care be taken in preparing engine for operation. The following precautions should be exercised:

(*a*) Fill radiator with water, examine circulating system for leaks, screw down grease cups, look to oil level in crank case, open priming cups and place one-half pint of kerosene and motor oil of equal proportions in each cylinder. Turn motor over several times by hand with ignition switch in off position to thoroughly work oil into the vital parts. This also tends to fill oil line to main bearings before engine is started.

(*b*) Immediately after starting motor, remove radiator filler cap and examine water circulation. If the water is sluggish, it is very evident that circulating pump is not operating or there is a stoppage in the line.

(*e*) Test oil pressure to insure proper circulation, if pressure does not respond immediately, remove upper end of discharge line leading from oil circulating pump and fill with cylinder oil. The line is then replaced, drum perfectly tight and motor is again started.

(*d*) Do not attempt to adjust carburetor until the engine has become thoroughly warmed.

APPENDIX C

SOLID TIRES

(1) *Care.*—

(*a*) Do not carry loads beyond the prescribed carrying capacity. One overload on tire equipment is sufficient to cause a break-down of the tires and result in their early failure.

(*b*) Sudden starts and stops have a very serious effect on solid tires. Always let the clutch in slowly and apply brake gradually.

(*c*) Running in car tracks cause tires to break down early. Avoid car tracks.

(*d*) When it is necessary to use skid chains, apply them loosely. Never use skid chains when not actually necessary.

(*e*) Tires showing unusual wear indicate improperly aligned wheels. The wheels of such tires must be properly aligned immediately.

(*f*) Equalization of brakes is very important. Drivers should report a tendency of the brake to hold on one wheel and slip on the other.

(2) *Trimming.*—

(*a*) Vigilance will be exercised to see that all tires are properly trimmed. Tire knives must be kept sharp. Dipping them into water occasionally will facilitate the cutting.

(*b*) To trim effectively, grasp the knife firmly with one hand, while with the other put the sliver in such a manner that the knife may reach the extremity of the cut. Then, with a sawing motion, let the knife follow through, bearing the edge outwardly so as to save all of the tire possible. Round the sharp edge slightly. There should be no abrupt edges left to catch in the rocks when the tires have a chance to spin.

(*c*) Tires required to be trimmed are those with small slivers developed along the edge during the day's run. These small slivers soon mature into long and heavy strips of rubber, destroying the life of the tire.

(*d*) To save this premature destruction, each driver will examine all of his tires carefully after the day's trip and report to the truckmaster when trimming is necessary. The man detailed for the purpose will then do the trimming.

(*e*) Any tires which seem to be sluffing away and have the appearance of a herring bone, will be tapered only slightly. There can be more harm than good done in cutting away such tires and special care should therefore be exercised in such cases. Tires with deep cuts will be treated in a like manner.

APPENDIX D

CONSUMPTION OF GASOLINE AND OIL

The consumption of gasoline and oil varies according to road conditions, experience of drivers, train discipline and other incidents of service. The following figures show the average consumption as taken from various truck company records. In figuring gasoline and oil for a trip, especially with a newly organized company, due allowance therefore should be made.

Make of truck	Gasoline miles per gal.	Oil miles per gal.
Packard 1½ ton	5.0	120
Packard 3 ton	4.0	80
Peerless 3 ton	3.5	70
Riker 3 ton	3.6	80
Standard class "B"	3.7	70

The consumption of other lubricants, as well as the proper kind to be used, vary with type of truck and service in which engaged. The best plan is to consult the instruction book issued by the truck manufacturer which will fully cover these points.

APPENDIX E

DIMENSIONS AND WEIGHT OF VARIOUS TRUCKS.

(*a*) Type of truck.

	Weight	Length over all	Width hub to hub	Height over bows	Height to top of seat
		ft. in.	ft. in.	ft. in.	ft. in.
Packard, 1½ ton.....	5800	18 5	6 1	10 0	5 7
Packard, 3 ton.....	8250	20 10	7 6	10 3	5 5
Riker, 3 ton.....	8500	21 3	7 3	10 3	5 10
Peerless, 3 ton.....	9130	21	7 3	10 6	6 0
Standard class "P"...	11500	22	6 2	10 4	6 5

(*b*) Weight of machine shop truck fully equipped:
Packard 3 ton..... 18,200 lbs. } weight of shop truck
Standard class "B"..... 20,600 lbs. } equipment 9,100 pounds.

(*c*) Inside measurements of war body:

	Length feet	Width ft., in.	Depth feet
1½ ton	10	5.1	2
3 ton	12	6.6	2
Height inside of bows.....		6.0	

(*d*) Gross weight of tank truck, full, 13760 lbs.
Gross weight of tank truck, empty, 9800 lbs.

APPENDIX F

SHIPMENT OF TRUCKS BY RAIL.

(1) *Loading.*—This will be done either by the personnel of the company or by details from other sources if company personnel is not available.

(2) *Details.*—The detail should consist of four noncommissioned officers and 22 privates, as follows:

One N. C. O. and 9 privates (4 being carpenters and all having hammers or hatchets), to pack, load, box and crate equipment and nail down blocking.

One N. C. O. and 7 privates, to place skids and truck wheel blocking.

Two privates (experienced chauffeurs), to drive cars on flat cars.

Four privates, to guide cars, steady skids, etc.

Two N. C. O.'s to inspect work, check numbers; etc.

(3) *Packing.*—In the box of each truck body pack the following articles:

(*a*) One tarpaulin, truck cover, 1 spade, 1 axe and helve, 1 pick and helve.

Padlock each end of box and tag the keys carefully with the number of the truck. Forward keys by parcel post unless personnel travels with trucks.

(*b*) In the body of each truck, with the exception of truck Nos. 1, 2, 3, 4, 28, 30 and 31, place the required number of bows and one ridge pole. The bows and ridge of the first four trucks being distributed in trucks Nos. 5 and 6 and the bows and ridges of Nos. 28, 30 and 31 being distributed in Nos. 27 and 29.

(*c*) All other equipment and spare parts, with the exception of seat cushions, milk cans and buckets, G. I., should be securely cased or crated. Number each case beginning with No. 1 and mark plainly with contents and weight.

(*d*) In truck No. 1, pack 30 milk cans upright and 30 buckets on side, securely wired in two nests of 15 each. Pack lash rope around cans and buckets and secure by running pieces of 2 x 4 between necks of milk cans across the truck body. Buckets and lash ropes will be slatted in.

(*e*) In trucks Nos. 2 and 3, pack cases and crates containing tool kits, fire extinguishers, jacks, towing cables, flashlights, pumps and hose, oil cans and tire chains. Keep load below top of side and end boards. Block and cleat with 2 x 4's to insure a firm load and prevent shifting.

NOTE.—Tool kits and jacks may be padlocked in tool boxes and keys tagged as indicated in above paragraph (*a*).

(*f*) In truck No. 4 pack 30 seat cushions snugly, standing them on side edge and cleat them in by running 2 x 4 across the truck body.

(*g*) Ship trucks equipped with gasoline carrying bodies, viz., Nos. 30 and 31, with their regular quota of drums fastened in tightly by straps and turn buckles.

(*h*) Make a careful check of contents of each truck.

(4) *Skids and Ramps.*—When flat cars have been spotted and standing, brake rods removed, send seven men under a non-commissioned officer to place skids from car to car and from car to platform, beginning with the car farthest from loading platform.

These skids are made up of 2 inch material 5 feet long by two feet wide and well cleated. When loading from the ground, use two 16 ft. ramps of 3-inch material 2 ft. wide and brace middle of each ramp from ground. Select two careful drivers and detail one man to proceed and one man to follow each truck, to watch skids and warn driver.

(5) *Carload.*—Load two trucks to a car. Load three-ton trucks with radiators in middle of car to permit tail of trucks to overhang. Load one and one-half trucks facing forward.

Minimum length of flat car for 3-ton trucks, 41 feet.

Minimum length of flat car for 1½-ton trucks, 37 feet.

The flooring of flat cars must be solid and free from holes.

Reject cars with steel flooring.

(6) *Draining.*—Gasoline tanks and radiators will be drained. Batteries of electrically equipped trucks will be disconnected. Oil need not be drawn from crank case.

(7) *Blocking.*—Have the eight men who placed the skids set the steel blocking snugly, one in front of each front wheel and one in front and one behind each rear wheel with flanges outside. Blocking with double flanges preferred. Ten men with hammers should follow and nail down the blocking, using 20d nails.

When properly placed on cars, the brakes of all trucks should be set tight.

(8) *Invoices.*—Take name of railroad and number of car on which each two trucks are loaded, for example:

U. S. A. — 3,901 — 46,569 } T. & N. O. 59,951.
U. S. A. — 3,902 — 49,830 }

Shipping invoice should be made from list with contents and weights of trucks and equipment.

(9) *Inspection.*—After the trucks are thus loaded and secured, make a careful inspection to be sure that:

(*a*) Blocking is fastened properly.
(*b*) All brakes are set.
(*c*) Tail gates secured.
(*d*) Tail gate chains thrown over into bodies.
(*e*) Tarpaulin boxes under bodies are padlocked.
(*f*) Radiators are drained.

(10) *Materials.*—Material required for shipping one truck company is as follows:

Ninty-six pieces steel blocking, right hand.

Ninty-six pieces steel blocking, left hand.

One hundred pounds 20d nails for blocking.

Eight pieces 2 x 4, 16 feet long, for cleating.

200 board feet, 1 x 8 for casing and slatting.

NOTE.—In the event of a scarcity of lumber, a suitable crate or case can be made by using a truck body, packing same to capacity and making cleats across the body with any lumber procurable.

APPENDIX G

HINTS ON DRIVING.

(1) Before starting on a trip, see that gasoline tank, oil reservoir, radiator, grease and oil cups are filled.

Inspect your car for leaks in the hose connections, radiators or around pump of the cooling system.

See that oil pump is in proper working order and all oil connections tight.

(2) Before cranking motor, see that speed change lever is in neutral position and emergency brake lever set. Turn on switch and retard spark. Move throttle control lever up a few notches, just so engine will not race and spin crank with the thumb extended along the crank handle. Do not grasp handle with the thumb around it for, should the engine kick back, the crank would jerk the arm downward and the result would be a strained or broken arm.

(3) After engine is running return to seat, turn switch to magneto side, advance spark and retard throttle to idling position.

Next throw out clutch by pressing clutch pedal and move gear shaft to first speed position. Release emergency brake and engage clutch gradually which will allow the load to be picked up slowly and without jerking or injuring the car.

Before changing to second speed accelerate motor slightly by pressing down on accelerator, throw out clutch and move speed lever to second speed position. On going to a higher gear the speed of engine should be accelerated in relation to the speed ratio of the higher gear.

(4) Should the gears clash do not attempt to force them in mesh. Let clutch in and then disengage it and shift gears quickly. This turns the clutch shaft and moves gears so the teeth will come in mesh. In changing to a lower gear slow car down to the lower gear ratio. Do not try to shift to a lower gear (which is going at a speed of ten miles an hour), from high gear when you are going twenty-five. You may strip the gears.

(5) Most of the damage done to cars by drivers can be laid to two causes, ignorance and carelessness and neither will serve as an excuse.

When filling gasoline tank extinguish all lights having an open flame and do not have the engine running. It is best to strain gasoline through a piece of fine cheese-cloth instead of chamois, for this reason. At times the air is so heavily charged with electricity that the static current is induced in everything around the car. It needs but a slight friction to produce a spark and a fire is the result.

(6) Never allow your engine to race when changing gears. It is a useless and harmful practice which marks the ignorant driver. It does not get you anywhere and will soon cause serious damage to the whole car from vibration.

In going up grades, should your motor labor, change to a lower gear at once. No good can be gained from whipping a tired horse, he will only fall the sooner and the same rule applies here.

(7) Do not try to show someone what your car can do by rushing grades or bad places in the road on high gear. This

places a severe strain on the whole car. If the other fellow happens to be a *good* driver he will not be impressed with your driving. Better show how *far* it will run than how fast.

Always change to the gear needed to take you up a steep grade, *before* attempting it. Gear changing in the center of a steep grade places an added strain on all parts of the car as it has to pick up the load from almost a standstill every time the gears are shifted.

(8) In driving over muddy or sandy roads, endeavor to keep the wheels on one side of solid ground, if possible. Apply brakes gradually at all times. Locking the rear wheels by sudden application of brakes, tears the tires, places a severe strain on the differential and springs. The man who is careful on this point is very seldom seen making a figure eight on the streets when streets are slippery.

Never bring the car to a stop in deep sand, mud or snow if it can be avoided. It may be easy to stop, but remember you have to start again.

(9) In descending a steep grade, when you have a heavy load, do not depend upon your brakes alone. Change to a lower gear and allow your engine to act as a brake, or air compressor. The car cannot go faster than the low gear will allow it. The brakes can be used to further retard the speed if necessary.

Should you be driving individually, that is, not with a train, it is good practice to cut off ignition and retard throttle lever, using only the compression in cylinders. As the motor will only be drawing air through it, the motor will be cooled.

(10) Inspect your gasoline, water and lubricating systems frequently when driving over rough roads. Investigate all unusual noises about your car immediately; you can never tell what it may be, or what serious damage may be done if the trouble is not remedied at once.

Do not, under any condition, race motor by coasting fast with gears in mesh. Throw out clutch and allow car to coast, but do not allow it to run beyond the prescribed governor limits. Care should be taken to see that car comes to a full stop before changing to reverse. The gears cannot turn in two directions at the same time, something *must* give way.

(11) Do not become a magneto or carburetor fiend. There are a number of other parts of a motor or its different systems that are more liable to be at fault; look them over first.

Day-dreaming is a dangerous practice. Keep your eyes to the front. Be wide awake at all times. It is up to the man behind you to watch your rear and you can save your car by watching your front.

Watch your brakes and keep them adjusted and all moving parts lubricated. Some day you may need them in a hurry and if you take the proper care of them they will respond to the treatment and "be there" when you need them.

(12) Do not drive with a slipping clutch. It causes the motor to race and heat, the clutch plates (or facing) to burn and impairs the general efficiency of the motor. Make sure that your car is equipped at all times with a fire extinguisher, fully charged and carried in a convenient place.

APPENDIX H

WINTER DRIVING.

(1) *Fluid freezing.*—(*a*) Inasmuch as a water cooled motor vehicle can be absolutely ruined in a short space of time through the freezing of the circulating fluid, freezing weather is most dangerous to truck operation and especially as military trucks are rarely, if ever, sheltered from the elements.

In zero weather water will freeze in the radiator even when the engine is running. Steps must therefore be taken to provide suitable aprons of canvas or other material to cover the radiators.

(*b*) The addition of either denatured or wood alcohol to the cooling water lowers the freezing point and has no harmful effect. The addition of glycerine is also advantageous and lowers the volatibility of the fluid. Never use calcium chloride or sodium chlorid (ordinary salt) in the cooling system on account of their corrosive action on metal.

(*c*) *When using an alcohol solution remember that alcohol is gradually lost by evaporation and hence the mixture must be tested frequently to insure that the proportion of alcohol is high enough to give ample protection against freezing.*

(*d*) In very severe weather radiators should always be drained at night, the anti-freeze solution being caught in a receptacle and preserved for morning use.

(*e*) The following table gives the proportion of alcohol and water mixtures which will freeze at the given temperature:

Percentage of Alcohol by Volume	Hydrometer Reading Specific Gravity	Freezing Point of Mixture
40 per cent.....	.947	0°
50 per cent.....	.933	5° below.
60 per cent.....	.920	20° below.

(*f*) If glycerine is obtainable, the following solutions are, owing to their greater stability, recommended as preferable to the clear alcohol solutions:

Alcohol	Glycerine	Water	Freezes at
15 per cent..	15 per cent..	70 per cent..	0°
16 per cent..	16 per cent..	68 per cent..	5° below.
20 per cent..	20 per cent..	60 per cent..	20° below.

(*g*) Coal oil may also be safely used as a cooling solution and gives good results in very cold weather. It should not, however, be left in radiators on warm days or in moderate weather.

(2) *Draining Radiators.*—When draining the radiator it is not sufficient that the draining jet cock be opened, but the engine must be run for several minutes after the flow has ceased to insure clearing the pump of standing water and thoroughly drying the cylinder walls.

(3) *Starting in Cold Weather.*—A very cold engine will be quite difficult to start because the oil congeals on the cylinder walls and in the bearings. If it cannot be turned with moderately strong pressure on the crank, the water pump is probably frozen. Thaw it out by pouring hot water over it before exerting too much force on the crank, or the coupling will be sheared or the propeller broken loose from the shaft.

If the cooling system has been drained and hot water can be obtained for refilling, it will make cranking easier and the consequent warming of cylinder walls will assist in the vaporization of the gas and make the engine start quicker.

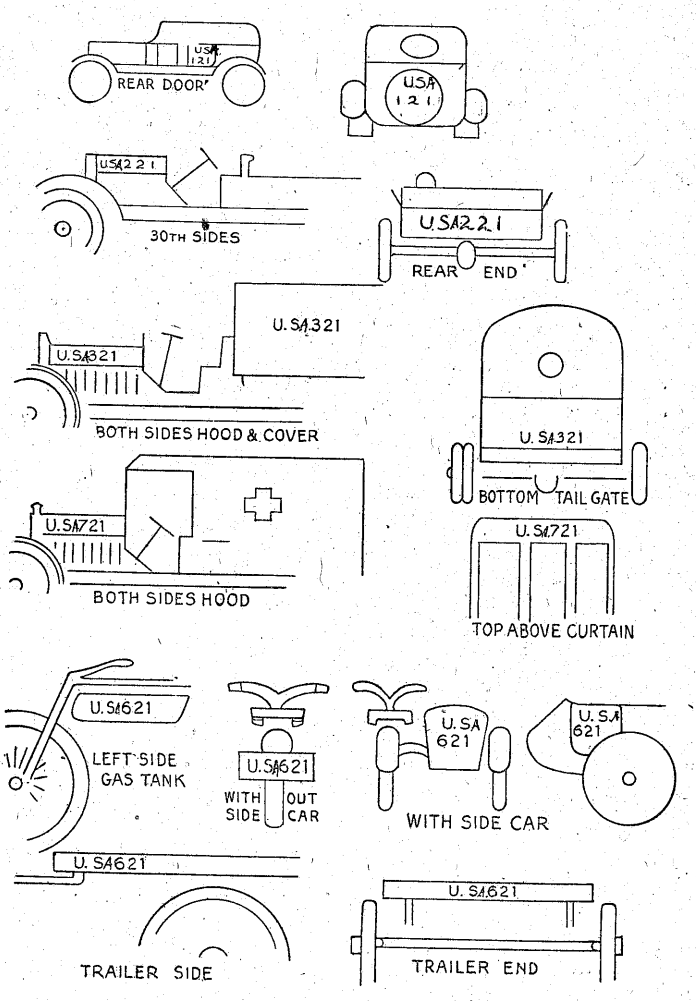
Warming the intake manifold, flooding the carburetor and pouring a small quantity of gasoline into the cylinders through the priming cocks are all helpful in getting a cold engine started.

The engine runs best and works most efficiently when operating at approximately the same temperature as in summer weather. Hence part of the draft through the radiator must be cut off by keeping the radiator shutters in place and, in very cold weather, it may be advisable to remove the belt also.

If the wheels are "frozen in" deeply, loosen them up with a jack before attempting to start the truck or severe strain will be thrown upon all of the driving mechanism.

When necessary to use chains, put a complete set on both wheels. One or two chains will make the truck jerk forward every time the chains come around, which racks the engine driving system.

(4) *Lubrication.*—In cold weather it will generally be necessary to use a thinner lubricating oil than is used in summer. Any change of this nature should be regulated by the company commander.


REAR DOOR
U.S.A. 121
U.S.A. 121
U.S.A. 2 2 1
30TH SIDES
U.S.A. 2 2 1
REAR END
U.S.A. 321
U.S.A. 321
BOTH SIDES HOOD & COVER
U.S.A. 321
BOTTOM TAIL GATE
U.S.A. 721
BOTH SIDES HOOD
U.S.A. 721
TOP ABOVE CURTAIN
U.S.A. 621
LEFT SIDE GAS TANK
U.S.A. 621
WITH SIDE
OUT CAR
U.S.A. 621
U.S.A. 621
WITH SIDE CAR
U.S.A. 621
TRAILER SIDE
U.S.A. 621
TRAILER END

APPENDIX I

NUMBERING AND MARKING MOTOR VEHICLES. SYSTEM OF CLASSIFICATION.

(1) All motor vehicles will be classified according to type as follows:

	Type
Passenger cars (regardless of size or body)	1
Light delivery trucks (1 ton or less capacity)	2
One and one-half and two ton trucks	3
Three and four ton trucks	4
Five ton trucks, or over	5
Motorcycles (with or without side cars)	6
Bicycles	B
Motor ambulances (all sizes and makes)	7
Tractors (except caterpillars)	8
Caterpillars	9
Trailers (cargo)	0
Machine shop trucks (regardless of repairing equipment)	00
Kitchen trailers	10
Omnibus cars	20
Balloon winch trucks	30
Service cars (light repair)	40
Disinfectors and fire engines	50
Laboratories (dental trucks, medical laboratories, photo-laboratories, sterilizing trucks, etc	60
Machine shop trailers	70

SYSTEM OF NUMBERING

(2) The first numeral will indicate the type. The succeeding numerals, 4" high, will indicate the number of the machine of that type in service or awaiting assignment. (Type-1), Machine No. 685 would be a U. S. A. No. 1685).

Examples:

Machine No. 1, passenger car, will be.....U. S. A. 11
Machine No. 1, light delivery truck, will be...U. S. A. 21
Machine No. 1, one and one-half ton truck, will be .....U. S. A. 31

ADDITIONAL MARKINGS FOR MOTOR VEHICLES.

(3) In addition to the above, every passenger-carrying motor vehicle will have stenciled on the doors on both sides, one and one-half inches below the number—"FOR OFFICIAL USE ONLY"—in letters one inch high, with two inch capitals. This applies to the rear doors of touring cars and to both doors of roadsters. Motorcycle side cars will be marked on the front right side, in smybols the same size as that prescribed for other vehicles. Motor busses and similar vehicles will be marked with this phrase on the body beneath the seat arm rest.

(4) Each motor truck shall have the manufacturer's serial number and the motor number stenciled on each side member of the frame of the chassis in a plainly visible location, with symbols one inch high, as follows:

S. 123,456.
N. 789,012.

(5) All trucks without sufficient length of hood to allow of prescribed system of marking will be conspicuously stenciled on the front part of the body or other superstructure and, in addition, as on Quads and F. W. D., will be stenciled with the symbols vertically, to read downwards with U. S. A. on the side of the radiator and the numerals on the metal bend between the dash and radiator.

(6) Each motor truck cover will bear the same U. S. A. number as the truck to which it belongs. This number will be stenciled on both sides in the center, bottom of symbols 24 inches from hem to cover, in symbols 4 inches high, so as to be plainly visible from the sides.

The storm curtains should be numbered in accordance with the directions for numbering top and rear covers.

(7) For motorcycles, number preceded by U. S. A. shall be stenciled in symbols, minimum of one inch high on both sides of gas tank and on a plate firmly attached to rear mud guard. Side cars to have the same number as motorcycle to which attached stenciled on door and rear in symbols, minimum one inch high. Bicycles shall be stenciled in symbols, minimum one inch high, on plate firmly attached to the rear mud guard or back of seat, if no mud guard.

(8) All stenciling to be done in black.

(9) Many of the states and municipalities provide for registration of motor vehicles operated within their limits and impose a special tax upon such vehicles through fees for licenses, or for identification tags. By decision of the United States Supreme Court it is held to be well-established law that the property of the United States and the instrumentalities whereby it performs its proper governmental functions can not be taxed. All officers of the Army are, therefore, instructed as follows, upon this subject:

(*a*) It is not necessary to procure such license to cover the use of a motor vehicle owned by the Government or operated exclusively by officers or employees of the Government for official purposes only. The use of public funds for the procurement of any license for a motor vehicle, or for purchase of indentification tags supplied by civil authorities, is hereby prohibited. If, for their own convenience, local officials are willing to grant a license and furnish suitable State identification tags or plates, without charge, in no way involving an expenditure, the same will be accepted and placed in use with the vehicle for which issued, along with the plates furnished by the Government.

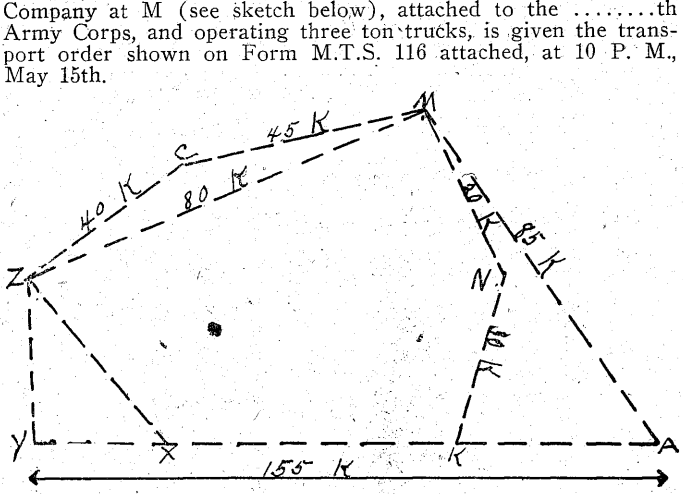
(*b*) If, while in use on official business, a motor vehicle be stopped by a police officer, or if otherwise there be interference by State or other local authorities because of failure to make registration and pay special tax, the officer or employee should give full information as to the ownership and use of the vehicle and the instructions under which operated and shall courteously request that there be no further interference. In case measures are then resorted to by State or local authorities to obstruct or prevent the proper use of such agencies of the United States, full report will at once be made to the Adjutant General of the Army.

(*c*) The foregoing instructions do not apply to automobiles owned by officers and others in the military service which are used for private purposes. Such vehicles come strictly within the laws and regulations as established by State or local authorities and the use thereon of tags marked "U. S. A." or "U. S. Army" is prohibited. (451.1 A. G. O.)

CONVOY PROBLEM.

(10) The followng problem with remarks on its solution is given as a practical example of conditions to be found and situations to be met in the transport service at the front.

(11) The Commander of the————————Motor Transport Company at M (see sketch below), attached to the .....th Army Corps, and operating three ton trucks, is given the transport order shown on Form M.T.S. 116 attached, at 10 P. M., May 15th.



SOLUTION OF PROBLEM

(12) Upon receiving this order the company commander must first consider just what the present status of his company is, *i.e.,* how much gasoline and oil he has; how many of his trucks are under repair; the status of his personnel, and his supply of rations. He must then study his map with the view to prescribing the itinerary to be followed and calculating distances between points, so as to be able to determine his hours of departure, his speed and such other matters as are outlined below. He must then calculate the distance he can go on the amount of gasoline and oil he has on hand and where he must replenish his supply.

(13) The company commander must then issue definite and written orders to his non-commissioned officers, prescribing that the convoy shall leave at 6 A. M. (this being the hour of departure he determines upon as necessary in order to arrive at the loading point on time) and showing the itinerary to be followed and the times and places of loading and unloading and must direct that the men take all their personal equipment. Supposing that one of his cargo trucks is in the repair shop, he will

calculate that, at a rate of 20 men per truck, he will have but one empty truck. He will direct that this truck be placed in the rear of the convoy just in front of the file closer's truck.

(14) Supposing that the amount of gasoline and oil in the cargo trucks and in one of the two tank trucks will safely carry the convoy to the point "K" via "A," but not to the unloading points, he will direct that at 8 A. M. the other tank truck shall proceed to "N," fill up and join the convoy at the point "K," where the convoy will be halted to replenish with gasoline and oil, to rest the men and to provide the men with their supper on the evening of May 16th. Eight A. M. is set as a convenient hour of departure for tank truck, which will allow the men to assist in breaking camp, and to arrive at point "K" on time.

(15) The company commander will direct the cooks to prepare breakfast for all the men at 5 A. M., May 16th, to furnish all men with the necessary rations for one meal to be taken by them in their trucks and to attach the kitchen trailmobile, with all equipment, to the gasoline supply truck going at 8 A. M. to "N." The cooks will furthermore be instructed to furnish the men with hot meal at the point "K," with hot coffee after final unloading just beyond "Z" and with breakfast on the morning of May 17th.

(16) The company commander will direct his lieutenant to remain behind with the motorcycle side-car, a responsible non-commissioned officer and sufficient personnel to break camp. As soon as possible after the departure of the gasoline supply tank truck and the kitchen trailmobile at 8 A. M., the lieutenant will proceed with all remaining camp equipment (loaded in company supply truck) to the town "C" where he will make all necessary arrangements with the commander of the fifteenth supply train for the establishment of a permanent camp. The driver and assistant driver of the disabled truck will be directed to proceed to "C" as soon as their truck is repaired.

(17) On the road the company commander will act as prescribed in the manual under "Road Rules and Convoy Discipline."

(18) The commander will be at the loading and unloading points well in advance of his convoy, in order to make all necessary arrangements and will designate a point just above Z on the road to C, where the first section of his convoy, which unloads at Z, will wait for the second sections, which unloads at Y and hot coffee will be served. On the route M to Z the convoy will be run as single unit.

(19) En route, the commander will pay particular attention to maintaining the unity and the necessary speed of his convoy and to the comfort of his men.

(20) On his arrival at the new camp at C he must immediately pay particular attention to two important duties; 1st, to put his company in readiness to take the road again immediately; 2nd, to rest his men.

MOTOR TRANSPORT ORDER.

Order No. 53. Date, May 15, 1918. Date of Execution of Order, May 16, 1918.

FROM Capt. James Smith..... TO 1st Lieut. G. Brown.....

(Officer issuing order.) (Officer who will execute order.)

Fourteenth supply train.

YOU WILL FURNISH MOTOR TRANSPORTATION AS FOLLOWS:

Number of Vehicles	Report for Loading			To Transport	Tons	Report for Unloading			Route and Remarks
	To (Place)	At (Time)	To (Officer)			To (Place)	At (Time)	To (Officer)	
26	A	1 P. M.	Major Blank	500 men and baggage		Y and Z See remarks	6 A. M. May 17		Route to load M-A. Route to unload A-Y, except that vehicles for Z will use X-Z to unloading point. All vehicles via Y-Z-C to new permanent camp at C, which will be established under Capt. Doe, 15th Supply Train. Gasoline and oil can be obtained at N. Major Blank at A will advise destination of troops for Y and Z.

Total No. of Vehicles, 26.

Order Received at (Place).....M.....

(Time)..... ....10 P. M.....

(Date).....May 15, 1918.....

Signed.....G. Brown .....

Rank.....1st Lieut., Q. M. C. N. A.....

Signed.....Jas. Smith (Signed).....

(By officer issuing order.)

Rank.....Capt., Q. M. R. C.....

(*a*) This form is filled out by an officer or other person who directs the movement of companies, sections, or individual trucks. The order is made out in a single copy and, when delivered to the officer, or other person who is to carry out the order, it is required that the officer or other person who receives said order, shall enter place, time and date of receipt of the order and sign said statement. The order will then be given to the officer or other person who is to carry out the order. After the order has been carried out and the date entered, as to truck numbers, tonnage, etc., it will be signed by the officer or enlisted man who has carried out the order and return to the officer or other person who issued same.

(*b*) The space below is to be filled out by commanders of companies, sections and by individual truck drivers after they have carried out this order.

Individual Truck Nos.	Individual Truck Tonnage	Estimated Mileage		Hour of Return
		Empty	Loaded	

(*c*) State below any changes that were made in this order with regard to cargo, loading or unloading places, route or time and by whose authority.

(*d*) Give below a report of general conditions during the day making special mention of any accidents, delays, vehicles repaired on road, conditions of road, conditions at loading and unloading places, and any suggestions that will make for the betterment of the service.

G. BROWN (Signed)

Signed.....1st Lt., Q. M. C., N. A. Rank.....

(Officer or enlisted man who carries out orders.)

FORM FOR FIRE ORDERS.

(21) The following regulations for the government of a motor supply train in case of fire are published and will be duly observed by all concerned.

FIRE ORDERS.

(22) In case of fire the alarm will be given by the sounding of auto horns in each company, men being at once designated for this purpose in each company, by an officer or truckmaster on the ground at the time.

(23) The company on guard at the time is designated as pyrene extinguisher company. The men actually on post will be used to alarm the camp by the sounding or horns. The other members of the guard and all members of the guard company will at once secure extinguishers and fall in in the company park

unless directed to the point of fire. Each company will keep its extra extinguishers at a designated and well known place, ready for instant use in case of alarm. In the absence of the commanding officer, the guard will be under the orders of the fire marshal.

(24) Truck companies A and B are designated as special guard companies. In case of alarm these companies, or the one not on guard at the time, will fall in in their company streets and throw a guard around the entire camp. This guard will prevent the entrance of unauthorized parties into camp, prevent theft and guard against disorder generally. They will receive orders from the commanding officer or the fire marshal.

(25) Truck companies C and D are designated as tool companies. In case of alarm all members of these companies, or of the one not on guard at the time, will at once secure picks, spades and axes, fall in in their company street and await the orders of the commanding officer or the fire marshal.

(26) Truck companies E and F are designated as sand and gunnysack companies. These companies will provide themselves with a full complement of sacks for smothering of fire and buckets filled with sand. In case of alarm they, or the ones not on guard at the time, will fall in on their company parades and report to the commanding officer or fire marshal.

(27) Each organization of the command will provide itself with two piles of sand of at least four cubic yards each in the company park. The sand will be kept sufficiently moistened to avoid loss from the wind. It will also keep on hand twenty-four sacks, to be used for smothering fire.

(28) In case of alarm of fire in the post all organizations will fall in and await orders.

(29) The adjutant or supply officer is appointed fire marshal. The officer of the day on duty will act as assistant fire marshal. In case of alarm, organizations will not be dismissed until reported to the commanding officer, fire marshal or assistant fire marshal.

(30) In the absence of the fire marshal the senior officer present will perform his functions.