

Section 8
Envelop 7

LIBRARY^s.

TRANSPORTATION OF TROOPS AND MATERIEL

321

BY

RAIL.

-----oOo-----

BY

MAJOR CHAUNCEY B. BAKER,

QUARTERMASTER'S DEPARTMENT, UNITED STATES ARMY.

-----oOo-----

Read before the Naval War College,

Newport, R.I.,

August 17, 1904.

Transportation.

TRANSPORTATION OF TROOPS AND MATERIEL

BY

RAIL.

-----oOo-----

BY

MAJOR CHAUNCEY B. BAKER,

QUARTERMASTER'S DEPARTMENT, UNITED STATES ARMY.

-----oOo-----

Read before the Naval War College,

Newport, R.I.,

August 17, 1904.

TRANSPORT OF TROOPS AND MATERIEL

BY RAIL.

- I. History of Military Use of Railways.
- II. Organization and Operation of Railways.
- III. Forwarding and Terminal Stations.
- IV. Railway Equipment.
- V. Providing for the Movement.
- VI. Details of Arranging for Movement.
- VII. Loading the Impedimenta.
- VIII. Entraining.
- IX. Conduct on Board.
- X. Detraining.
- XI. Entraining and Dispatch of Large Bodies.
- XII. Construction and Repair of Railroads.
- XIII. Conclusion.

TRANSPORT OF TROOPS AND MATERIEL BY RAIL.

I.

HISTORY OF MILITARY USE OF RAILWAYS.

The first use of railways for military purposes was had in the Crimean War.

After a period of great suffering for the troops engaged in the siege of Sebastopol owing to the difficulty of communicating with the base at Boloklora, a single track railroad was finally constructed. The railroad, however, never had sufficient capacity to carry the supplies required by the army engaged in the siege and it was very evident that any shifting of the scene of operations would render the railway entirely useless.

It was not until the war between Austria and Prussia that the power of the railroad as an auxiliary means of transportation for troops and supplies was pronounced by military men to be effective.

Again in the Franco-Prussian War, and the Russo-Turkish War they were used to the limit of their capacity.

The most extensive use made, however, of railroads for the supply of armies was during the Civil War, when the Union armies, both in the east and west, as well as the Confederate armies, made every possible use of this means of transport and directed the best efforts of their most energetic commanders at raiding and destroying this means of communication.

The operations of the great Siberian Railway are exploited daily in the press and constitute the topic of daily discussion.

It is interesting to note in passing that the first intimation of any military use to be made of railroads, so far as known, was made in an official report rendered in August, 1836, by General E. P. Gaines of the United States Army, six years after the first railroad in the United States was put in operation, and at a time when there were scarce a thousand miles of road built.

General Gaines in his report proposes that the Government construct railroads from a central point in our domain for the rapid transport of men and munitions of war to such points as might be threatened by an invading army. In his argument he offers the following:

"Against the loss of a fleet at sea, or the loss of several fleets in succession added to the loss of our foreign commerce whilst threatened by victorious foreign fleets and armies arrayed against us from without, having our railroads held ready for action from within, we should find perfect security and retain the sure elements of prosperity throughout our national domain. Whereas if we give up the proposed system of railroads the loss of our fleets would, in effect, be nothing less than the loss of our national existence."

The most powerful auxiliary transport that will be avail-

able for military operations within our boundaries are the railways of our country. Their value is so great that one turns instantly to them upon any order for mobilization. No other means away from water routes are thought of. Fortunately the system of railroads in our own country forms such a network that it is a comparatively easy matter to effect a concentration at almost any desired point by their use.

The vast advantage that rail transport possesses over wheeled vehicles can be no more strongly emphasized than in quoting the following recent statistics:

"In 1860 only thirty-six million pounds of freight were carried by caravan westward over the old Santa Fe Trail, but it required over eleven thousand men, eight hundred horses, nearly seven thousand wagons, seven thousand mules and sixty-eight thousand oxen to do the work.

"The freight charges amounted to \$5,400,000.

"Today a single freight train with consolidation engine and a crew of seven men takes fifty loads more than three million pounds of freight over this same old Santa Fe trail, from the river to the mountain.

"Running sixty minutes apart, twelve hours will see all the freight moved over Rotton Pass that the army of freighters in 1860 took twelve months to carry."

The manner of using railroads for an expeditionary force

is materially different from the manner of using ocean going vessels, which are brought more or less under the complete control of Government authority, either by purchase or charter. And again it differs from the land transport as the latter is usually also subject completely to military control.

The railroads of the country will not likely, however, in time of stress be placed under military control, though during the Civil War, under the Act of January 31, 1862, the President was authorized to take military possession of all railroads in the United States. A general order was issued by the War Department technically assuming this military possession, thereby rendering the railroads of the country subject to direct military authority. The railway service, however, was performed so zealously and satisfactorily by the railroads of the loyal States that it was never necessary actually to exercise this military authority over any road not within the limits of an insurgent State.

During the early part of the Civil War the railway service for the Army, though promptly performed, suffered from the complaints and rivalry of the various transportation companies, and especially for the want of a fixed and uniform basis of compensation. This was later corrected by publication of an order by the Secretary of War providing a uniform basis of

settlement. This was not wholly satisfactory, however, and in the spring of '62 a convention of managers was called and a uniform tariff for military service was adopted and accepted by all but two of the roads operating in the loyal States.

As the army advanced southward the Quartermaster's Department took possession of and repaired railways abandoned by their owners and managers, furnished equipment for them and operated them in some instances until the close of the war.

Nearly all of the then existing roads in Northern Virginia were operated in this way. In the West the roads leading to the theatre of operations were taken possession of, repaired, equipped and operated in the same way. In a few instances, notably the Baltimore & Ohio, Louisville & Nashville, and Missouri Railroad, the roads made their own repairs, kept up their operations and were paid for their services by the Department.

All the Continental powers of the first class either own, or control, the railroads of the country, and have it in their power to assume entire control for military purposes on the outbreak of war, whether within the field of operations or not. In Great Britain the railroads are in the hands of private companies; provision is made by law however that gives the military a quasi control of the railroad systems of the Empire in time of war. There can be no doubt of the desirability of

the Government's having a hand in the maintenance and operation of railroads in war times. Whilst no provision of law exists for such action on the part of our Government, yet the war power presumes the authority to assume charge of railroads within the theatre of war or adjacent thereto, as far as may be necessary for military purposes.

II.

ORGANIZATION AND OPERATION OF RAILROADS.

In order to effect a proper division of duties and to provide a method of management for railroads the following classification of the principal duties is made:

1. The physical care of the road and property connected therewith.
2. The operation of the road which includes all functions concerned in the handling of trains and maintenance of equipment.
3. The commercial feature of getting business and making rates.
4. The collection of revenue, bookkeeping and auditing.
5. The custody and disbursement of revenue.

The general officers who care for these functions of the road constitute the staff of the president or general manager and they are usually--

1. The chief engineer.

- 2. The general superintendent.
- 3. The traffic manager.
- 4. The comptroller.
- 5. The treasurer.

There are in addition to these functions other necessary duties such as those of the legal department, purchase of supplies, hospital service, etc., which do not however concern the special subject discussed in this paper.

In order that movements may take place expeditiously and harmoniously it is necessary that a complete understanding may be had between the railroad authorities and the military. In order that this result can be attained it is essential that the military authorities charged with arranging the transport know the powers and the limitations of the railroad, including all its features, both physical and organic. On the other hand, it is equally important that the railroad officials fully understand the requirements and needs of the military service and comprehend the means by which they are to be met.

In all matters pertaining to the operation of railroads those skilled in such operations should have full authority and under no circumstances should the military undertake to interfere unless the circumstances are such as to demand that the military take charge of the road and its operation, and the law provides for such action; in which case none but skilled operatives will be made use of in the service.

In no service of any character is it necessary to pay such close attention to details as in railway operations - a misplaced switch - a forgotten signal - a mistake in color - a figure concealed in a puff of smoke - may be the precursor of dire disaster. None know this so well as the railway operatives themselves. When it is said that the operation of the road must be left to those skilled in its methods it is not to be understood that the military officer in charge of movements shall have nothing to say as to provisions to be made so far as relates to troops, impedimenta and stores concerned. In fact, in complicated movements it is wholly impossible to effect a smooth dispatch of the business without the most complete understanding between the operating department of the road and the officer charged with the movement.

It is not only necessary that all the small details be understood on both sides, but also that all of the minor provisions for entraining and detraining, loading and unloading, shall have been understood and provided for in advance; and not only is it necessary that those in charge have a complete understanding but all subordinates must be equally well informed so far as their duties extend.

Where the line of road is a single line and the necessity exists to keep it continuously open, extra care must be taken that a complete understanding in all respects exists, otherwise

blockades of a serious character are sure to occur which will result at least in delay if not in disaster. The causes of such blockades are many. The primary ones are to be noted in an ill-advised dispatch of large quantities of stores, material and supplies of all sorts before a sufficient means has been provided for unloading them and placing them under cover.

There have been cases where a twelve months' supply for sixty thousand men has been furnished, whereas one-third that number of troops has actually gone forward with excellent opportunities of replenishing their stores within thirty days. The sending, therefore, of an equivalent of stores for 720,000 men for 30 days when 20,000 men were actually sent forward; and stores for that number and period would have been ample, would seem to indicate a serious error in calculation. The result was that all transportation facilities were overstrained in taking care of an enormous and unnecessary accumulation of stores.

In addition, it resulted in deterioration, and further still it was necessary to subsequently reship and store again a large part of the stores in question.

Whilst we are all more or less familiar with shortcomings of this character at the beginning of the war it is unfair to wholly blame the supply departments for the evil. They simply furnished the articles in such quantities as directed. Again when we admit our own shortcomings it is not to be supposed that

we alone have been guilty in this particular. I daresay there has never been a campaign in which there has not been an accumulation of more or less surplus stores, or some shortage of others, and without exception there has existed the same sort of blockade of railway lines whenever they have been made use of. This was true of the campaign between Prussia and Austria in 1866 when we read in an official report that only 50 carts were available for the removal of the stores from the railroad station.

This of course was at a period when railroad development was very primitive compared with what we now have.

Again in 1870 similar conditions are complained of by both the French and the Prussians.

The movement of French materiel and stores by rail on this occasion was perhaps the most unfortunate episode of its class recorded.

They not only forwarded great masses of inexplicably mixed materiel, but supplies that had no relation to one another.

Trains bound for one part of the frontier carried the rations for the men. Trains for another destination bound in almost an opposite direction carried the means of cooking these rations.

The Germans, in spite of their experience of only four years previous in the war with Austria, were, in the beginning, little

better off in this respect than the French. This was due to the method of furnishing supplies to the German Army.

The contractors at this period as a rule made their contracts for delivery to the army and made separately their own private agreements with the railway companies for transportation and delivery. As a result stores, supplies and munitions of war poured in from all directions and it was beyond the pale of possibility to forward the stores with the means at hand. As a result the railway became congested and serious loss of time was experienced in the movement of trains.

In the Russo-Turkish war a repetition of these scenes occurred.

In the early days of August, '77, forty loaded trains blocked the single line of road on the Roman-Bucharest line at Bucharest for days and the effect of it was felt for hundreds of miles, and crippled the army for weeks.

The customary method of procedure under circumstances related above is to find fault with the transportation companies.

As a matter of fact the true explanation is that no complete understanding has been had between the railway people and the officials in charge of movements.

III.

FORWARDING AND TERMINAL STATIONS.

FORWARDING STATION. - The forwarding station should be provided with spurs, sidetracks and switches, to permit of setting in the cars to be loaded, also for receiving cars that are coming in loaded with supplies, stores, etc.

TERMINAL STATION. - The terminal station must be similarly provided with the necessary yard trackage to accommodate incoming loaded cars until they can be unloaded, and the empties dispatched. The terminal station will always be provided with suitable platforms and other devices for detraining. This station will be as near the troops as possible and as the army pushes forward or changes its position, the terminal station will also be changed, and a new one established at a more convenient location. This is expensive but essential, and is not too expensive as to provide the amount of wheel transportation necessary to accommodate the traffic.

YARDS, SPURS, SWITCHES, SIDINGS AND YARDS. - It is necessary that both the forwarding and terminal stations be so equipped with additional yards, spurs, switches and sidings as will accommodate the traffic without blocking the way at the time of dispatch nor again at the terminal station.

The general rule for accomplishing this purpose is to keep the traffic on any one track always moving in the same direction.

In other words, lines of traffic should be permitted to cross as little as possible within the yards. Trains arriving at a detraining station should leave by continuing by the same track, to be withdrawn after clearing the yard.

Separate points for detraining troops, unloading baggage and impedimenta, and supplies and munitions of war should be provided, all so located as not to interfere with one another.

All the supply depots should be located adjacent to the station for unloading stores and supplies.

IV.

RAILWAY EQUIPMENT.

In calling for equipment for any movement the various classes of equipment usually required for military purposes will be found to consist briefly as follows:

1. PASSENGER CARS--

(a) Day coach - ordinarily for day travel only; full seating capacity from 60 to 65 persons. Seating capacity for 46 men allowing 3 to every two seats. Except for very short distances to be provided with special water supply.

(b) Standard sleepers - For officers and sick. Contain from 12 to 16 sections, with drawing room and state room, each containing two double berths, accommodating ordinarily from 28 to 36 persons.

(c) Tourist sleepers - Ordinarily furnished for night

travel of enlisted men. Differ from standard sleeper mainly in that furnishings and upholstery are not so elaborate.

2. FREIGHT CARS--

(a) Baggage. For free transportation of 150 pounds of baggage for each person carried; to carry travel rations not distributed to enlisted men, and to provide for messing enroute. To be furnished open end where so required. Average baggage capacity, 40,000 to 60,000 pounds.

(b) Box. Average capacity 40,000 to 60,000 pounds. For transportation of impedimenta, general supplies, etc., liable to damage by exposure, or subject to loss by theft.

(c) Refrigerator. Average capacity 30,000 pounds. For carriage of meats and perishable supplies.

(d) Flat and Gondola cars for movement of heavy or bulky freight not liable to injury by weather and incapable of being loaded on box cars. Capacity 40,000 to 60,000 pounds.

3. STOCK CARS.--

(a) Ordinary. Slatted without stalls. Accommodated 16 to 20 animals. Fitted for feeding hay but not grain. Animals must be unloaded every 24 hours for rest, feed and water.

(b) Palace - are fitted with stalls. Accommodations usually for from 16 to 24 animals and for man in charge. Stock can be fed and watered enroute without unloading. Extra charge for these cars in addition to freight.

TRACK CAPACITY FOR CARS.--In order to afford a basis for calculating trackage required in terminal and forwarding station yards, etc., the following table of lengths of standard cars will be useful:

Locomotive and tender,
 Day coach,
 Standard sleeper,
 Tourist sleeper,
 Baggage car,
 Box car,
 Refrigerator car,
 Flat car,
 Gondola car,
 Stock car, ordinary,
 Stock car, palace,

PASSENGER EQUIPMENT REQUIRED FOR 1000 OFFICERS AND
 MEN.--

(a) Sleeping car equipment:

42 officers 1 standard sleeper,	75 feet long.		
958 men, 24 tourist sleepers,	<u>1748</u>	"	"
Total,	1823	"	

NOTE: This allowance includes one foot additional for each sleeper for couplings, etc.

(b) Day coach equipment:

22 cars - 46 men each - 1610 feet.

It is to be understood that the assembling of the army and its concentration, preliminary to an active campaign, and the supply of such an army during the campaign, are two distinct operations. In the concentration of the troops it is important that all the energy of the service be given to accomplishing it in the shortest possible space of time, and with the least degree of hardship. The second object of supplying the army should be so provided for that a continual stream of traffic is kept moving forward carrying stores, supplies and munitions of war and taking to the rear the sick, and wounded, and surplus and broken materiel. Only the closest attention to all the details will effect this desired result.

V.

PROVIDING FOR THE MOVEMENT.

In any movements of troops whether in large numbers, few, or as individuals, the basis for furnishing the transportation is the order providing for it. Acting under this order the quartermaster enters into agreements with the railroads inviting them to offer bids for the movement, giving such particulars as to numbers, pounds of impedimenta, animals, wagons, etc., as may be necessary to enable the transportation company to form a proper judgment as to the extent of the service required.

When time is limited, when no competition is to be had, and

when single individuals or small numbers are to be transported the public tariffs of the roads may be used. In any case the transportation request issued by the quartermaster will be exchanged for the necessary tickets covering the route. Individuals and small parties will travel on the regular trains. Special coaches may be furnished for the trip if justified by the number to be transported.

If the body of troops is larger than one company of infantry at war strength, with camp equipage and impedimenta, a special train will be required.

As far as practicable the breaking of military units will be avoided, but as the size of the trains will necessarily be left to the railroad officials, it will not always be possible to prevent it and in case units are broken, it is essential that the commanding officers know in advance how their troops are to be carried in order that full provision can be made for provisioning the troops in each section.

The Quartermaster's Department has never made annual contracts with railroad companies for the transportation of either troops or supplies, but as a rule uses the tariff rates for individuals for movements in considerable numbers. By the annual contract the Government would be limited to a single road between points, and would be excluded from inviting competition for the business in moving large bodies of troops. It is

believed that the present method is in the end the less cumbersome and more economical. Within the last year contracts for the movement of large bodies of troops have been made for as low as seven-tenths of a cent per mile.

In addition, in war times especially, it is not considered advantageous for the department to limit its business to a single line between terminal points, as it may frequently happen that all available lines will be required to satisfactorily effect the traffic.

BAGGAGE. - A certain portion of the personal baggage of men and officers is carried free by the railroads. This free baggage allowance, however, does not extend to camp equipment and impedimenta or Government stores. The usual method and the most expeditious one is to load the baggage into special baggage or freight cars and place it under charge of responsible privates or noncommissioned officers. The baggage thus carried is not listed on the bill of lading, but shown in bulk; nor is it checked by the railroad officials and the sole responsibility for its safety rests with the men in charge.

FREIGHT. - Freight as distinguished from impedimenta in the hands of the troops includes all supplies, stores, and materiel not yet in the hands of the troops, but intended for the depots at destination. Such property is usually shipped independently of the troop trains and when a matter of sufficient consequence, and the time is limited, the freight should

be traced by wire so that its locality may be constantly known.

In war times it is essential that a paper giving the contents of each car be tacked upon the door; it is not sufficient to send a list of car numbers, or to rely upon the bill of lading. The latter may be delayed and the former will almost certainly not be at hand when needed. If the list is nailed to the door no mistake can be made. In addition, the duplicate of the loading ticket for each car should be placed inside the door - this gives a complete history of the car and even in the absence of the bill of lading the car can be safely and intelligently unloaded and the contents disposed of and checked against the bill of lading later. This can only be attained, however, by furnishing the necessary instructions to the consignor in advance.

ANIMALS. - As a rule if the shipment of animals is large the only equipment will be the ordinary stock cars; these permit of the animals being fed hay, but not grain, nor can they be watered. They will be unloaded once in every twenty-four hours to be watered and fed. If the palace cars are furnished the animals need not be unloaded, as they can be watered and fed without removal. In case the animals are to be unloaded for rest and water the roads should state in advance at what points such stops will be made in order that the quartermaster of the troops can make such special arrangements as may be deemed necessary.

VI.

DETAILS OF ARRANGING FOR MOVEMENT.

CALLING FOR EQUIPMENT. - As soon as the quartermaster receives the orders directing the furnishing of the necessary transportation to convey the troops and impedimenta, he will at once call upon the commanding officer to furnish a return showing the strength and composition of the command, together with the amount of property and lists thereof to be shipped, including impedimenta, camp equipage, animals, vehicles, if any, and upon these figures will be based his estimate of the number and kind of cars to be furnished by the railroad. The orders of the commanding officer should specify with particularity the amount of equipment to be taken on the expedition, e. g. the number and kinds of tents, means of cooking, transportation and other light camp equipage, tools, etc. Lockers, trunks, etc., for the field should be prohibited, except mess chests and field desks not to exceed one for each company.

The officer will then call upon the railroads to furnish the necessary equipment at a stated time and designated point. In estimating for the passenger coaches, he will allow two double seats for three men. In estimating for tourist sleepers he will estimate two double berths for three men. And for each officer one double berth in standard sleeper.

He will call for the exact number of flat cars, box cars, stock cars, baggage cars, passenger coaches or tourist sleepers

and standard sleepers needed to accommodate the command.

The instructions to the railroad company should not only give the exact number of cars of different kinds but should also indicate the order in which they are to be placed from front to rear, but also in case of considerable movements the direction in which the train is to head. Thus:

Two flat cars.

Three box cars,

Five stock cars - 90 animals.

One box car with forage.

One baggage car, open ends. Provision for making coffee.

Eight passenger coaches - 40 men - 3 men to each two seats.

One Pullman sleeper, standard.

Headed east.

To be placed at named siding at 8 a. m.

Date, August 1st.

There is nothing so discouraging to railroad men as to be disappointed in matters of schedule or to find that details given are incorrect and must be changed. It often happens that no attempt is made to give the exact amount of freight equipment but a rough estimate is made which "it is thought will be sufficient," and in most cases must be changed. There is no real necessity for this and it is always a sure indication of neglect. The freight and baggage equipment should be called

for in ample time in advance to allow careful and methodical loading without hurry or confusion and to allow leeway between the conclusion of the loading of freight and baggage and the time fixed for the entraining of the troops.

As a rule the railroads will have little difficulty in furnishing the freight and baggage equipment in advance of the passenger equipment, though when the command is small or the amount of freight and baggage is small it is found simpler to set in the entire equipment at one time. Where there are several trains to be moved, however, this is undesirable, as they occupy too much trackage and if made up entire the freight and baggage cars are likely to be inconveniently placed for loading.

These details may appear to be minute, yet the neglect of them is the cause of confusion and will result in delay and loss. These details should be in the hands of one man. Any attempt at direction by superior authority after the details have been worked out can result only to disadvantage. The commanding officer, if he has left matters to his staff officers, should give detailed orders with caution unless he has kept himself constantly in touch with the details.

Above everything else avoid changing the scheme in the midst of its accomplishment as such a change will disturb the free operations of the railroad, and result in disjointed and

unsatisfactory service and most annoying delays.

In case the railroad has but a single track it is essential that all the movements in the process of concentration be completed from one direction before they are taken up from the opposite direction, otherwise the road is certain to become blocked by movement of an unusual traffic in opposite directions at the same time. This is a matter that can be provided for in the orders given by the commanding general, directing the concentration of the troops. Similarly in dispersing troops from a point of concentration those going in the same direction should be dispatched together, leaving those going in the opposite direction to be dispatched together.

VII.

LOADING THE IMPEDIMENTA.

The impedimenta, baggage, and rations should be so loaded that no difficulty will be had in unloading and separating them and distributing them to the proper owners.

All such property, except the light hand baggage of officers and blanket rolls or knapsacks of enlisted men, will be placed in the baggage cars prior to entraining the troops, leaving nothing to go into the passenger coaches and sleepers except that which will be carried on the backs of the men and in the hand, so that as the troops are detrained the coaches will be left entirely free of any form of impedimenta, and can at once

be carried away by the railroad company to some convenient place of storage.

The property and baggage of each company will be stored separately as far as possible. When practicable a car is given to each two companies, which will enable each company to avail itself of the end of a car. For light camp equipment this will be a too liberal allowance, and a single car for each battalion should suffice.

Every article of baggage and property and every package should be plainly marked or labeled. It is not practicable to furnish checks for this class of property.

The travel rations for the journey, unless distributed to the troops, should be placed in an open end baggage or freight car next the leading coach. This car for long journeys should be provided with the means of making coffee. If not already so provided one of the field ranges can be set up in an improvised manner for the purpose, care being taken to guard against danger from fire.

TRANSPORTATION OF WAGONS, HORSES, ETC. - In loading the field transportation for carriage by rail the first essential particular and one never to be lost sight of, is the necessity of keeping the parts to be used so marked and located that they can be at once identified and parts belonging to the same vehicle on the same train can be put together without delay.

This may seem a very simple statement; as simple as saying to the storekeeper "You must not put your nails in the box with your sugar," yet I have often seen inexperienced troops in moving unable to find a bolt, perhaps essential to hold the wagon together; a tongue misplaced - a harness of the small lead mule being placed where one expects to find the harness of the big wheeler, and dozens of other similar annoying details out of joint.

These things seem small, yet delays, inconvenience, humiliating predicaments, discomfort, and not infrequently, absolute disaster, result on account of just such altogether unnecessary oversights or omissions.

It will not be undertaken in this paper to indicate where the nuts, bolts, lynch pins or wrenches belonging to each vehicle should be put, further than to say that they should be placed in a bag for the purpose where the wagonmaster, or other official, or the teamster, if he accompanies the expedition, can be held accountable.

It is not sufficient that the teamster alone should know where the various articles belonging to his wagon and team are to be found, but it is essential that there be one place for all such articles, and that they are always placed there. The wagonmaster or noncommissioned officer in charge should have oversight of all these details, and be responsible that they are carried out. Each wagon will have a separate number and

the detachable parts will have corresponding numbers to provide for ready assembly on unloading.

The wagon as a rule for long journeys will be knocked down - lynch pins, nuts, bolts, wrenches, etc., will be placed in a bag and secured in the jockey box.

The harness will be placed in gunny sacks and each sack tagged with the number of the team. The harness is usually loaded into the car with the forage.

The halter straps should be taken charge of by the wagon-master, and should be immediately available on disembarkation. They should be placed in the car carrying the forage for the teams.

TRANSPORTATION OF TROOPS. - In calling for the equipment to accommodate the troops the quartermaster will furnish both the number of troops and the class of equipment desired.

In case the movement is a short one and to be made entirely by day or before midnight day coaches will be used. The quartermaster, in calling for the equipment, will figure three men for each double seat, unless the day coaches are to be used through the night, in which case one man will be figured for each double seat. Day coaches will be used at night, however, only when it is impossible to provide tourist sleepers, which latter will be provided whenever the journey is of a length of twenty-four hours.

In furnishing tourist sleepers two double berths will be

furnished for every three men. Under the same circumstances standard sleepers will be furnished for the officers, one double berth to each officer.

Should the command be a small one insufficient in size to warrant the use of a standard sleeper for the officers, each officer will be furnished with one full section in the tourist sleeper curtained off from the sections used by the men.

The coaches or tourist sleepers will come immediately after the ration car. The standard sleeper for officers will follow the tourist sleepers or coaches.

MOVEMENT OF FREIGHT. - The heavy freight, surplus ammunition, surplus rations, etc., will be separately loaded into freight cars and may accompany the troops or may be billed independently of the troop train. The desirable method, however, when troops are assembling in camps of instruction or moving to a point of concentration, is to have all freight as well as baggage and camp equipage, move with the troop train.

TRANSPORTATION OF ANIMALS. - Animals will be led into the cars facing alternately head and tail, and the tighter they can be packed into the cars the better. Ordinarily there is no difficulty in inducing animals to entrain. The head halters should be left on animals and straps removed. Teams of mules should be unloaded and stand in the cars as they are driven together in the team. Horses used to service together should be loaded together into the cars.

The forage for the animals will be carried in a freight car attached to train next to stock cars. Buckets for watering animals will also be placed in this car.

In calling for the equipment the number of animals should be given and it should be stated whether they are mules or horses; as a rule from one to three more mules than horses can be placed in a common stock car. It is not unusual to furnish the Arms Palace Car for the movement of horses belonging to officers.

Usually when animals are transported by rail in large numbers the ordinary common stock is used. A suitable ramp will be provided, preferably a platform ramp. If such platform is not available, however, ordinary chutes will answer the purpose; as many should be provided as necessary to load the train with dispatch.

The floor of the car should be coated with an inch or two of sand, earth or sawdust, to prevent the animals from slipping when the floors become wet.

Sometimes hay is used as a substitute; this, however, is not good practice on account of the danger from fire. The animals may be shipped either shod or unshod. If they are to be used immediately upon landing they should be shod.

Animals as a rule stand long journeys best if not in high condition; they should be fed and watered before entraining. They should be detrained once every 24 hours, at which time

they should be watered and fed.

In leading the animals aboard they should be led quietly and gently, and in a continuous string without interruption. The first to go aboard should be a gentle animal; should any refuse the ramp they should be blindfolded and if need be urged forward with a rope passed in rear of the haunches.

Ordinarily there will be one of two attendants for each carload, unless the animals belong to an artillery or cavalry command, or a wagon train, when a detail of one or more troopers will be told off for the animals.

Animals traveling on board train will be fed hay and a limited quantity of oats when practicable.

HOSPITAL TRAINS. - In times of war when troops are encamped in large bodies over the country it has been found very desirable to relieve the troops in camp of their sick; in our service this has been done by providing a hospital train which removed the sick from the base hospitals as fast as the medical officer in charge pronounced them convalescent, and suitable subjects for sick leaves for recuperation at some central hospital, or at their homes. These trains were solid Pullman trains with a corps of doctors and nurses and all necessary provisions for taking care of the sick and wounded.

VIII.

ENTRAINING.

The commanding officer of the troops should detail an officer as assistant to the quartermaster to proceed to the point of entraining in advance of the arrival of the command, to arrange, in conjunction with the quartermaster, for the proper assignment of the cars to the command.

The commanding officer will cause the staff officer who visits the train to inspect it and to assign the space to make a reconnoissance of the approaches so that the entraining can take place without confusion or delay and without interruption to other traffic.

The troops will be marched to the entraining point, not more than fifteen minutes before the time fixed for the departure of the train.

If necessary a guard will be established in the vicinity of the point of entraining, the necessity of which will be determined by the staff officer sent to reconnoiter the route. If a guard is required about the approaches it will precede the troops and as soon as the latter are entrained it will quickly follow.

The entraining officer will, as the command approaches, indicate to each company commander the car or cars he is to occupy, and the company commander will march his command directly

aboard, using both ends of the car when he is to occupy the entire car. The men in the lead will be directed to proceed at once to their places in the car so as not to block the aisles.

The cars of each train should be marked on or near the forward step on the side toward the entraining station in chalk with the designating number of the train; also each car should be similarly marked with its number in the train, fixing the order of precedence, and each car should also be marked with the name of the organization.

It is the duty of the entraining officer to effect this marking; he will furnish each organization with a written memorandum showing the number of the train, number and kind of cars, the direction, headed, the point where located on the tracks, the point for entraining and the hour for entraining and dispatch.

The men as soon as entrained will at once be cautioned in the economical use of water, as few cars are equipped to furnish more than a meager supply of water. A supplementary supply can be provided by requiring the railroad companies to place a barrel filled with water on the platform.

Commanding officers will be held responsible that no unauthorized person or baggage is permitted on board the train.

It is the duty of the quartermaster in charge of entraining to see that proper facilities are furnished for entraining the animals, and to see that skids are provided for running wagons

and trucks aboard flat cars.

If facilities are not at hand it will be necessary to improvise such ramps as the means at hand will afford, making use of any planks, rails, railroad ties, bales of hay, sod, earth, etc., as may be required.

Wagons as a rule will be shipped knocked down. If, however, the run by rail is a short one and they are required for immediate use on arrival at destination and delay in detrainning will occasion delay in combinations, the vehicles may be run on flat cars and shipped by merely removing the wheels, when the latter should be placed in the beds of the wagons. Only great emergencies will justify the shipment of vehicles without removing wheels, in which case the wheels should be thoroughly chocked and tied with rope so as to prevent them from changing position.

Artillery carriages are moved on flat cars and in a manner similar to the movement of wheeled transportation. The harness, saddles, bridles, etc., are cared for in a manner similar to the care bestowed upon the harness for the wagon trains.

IX.

CONDUCT ON BOARD.

DUTIES ON BOARD. - All officers and noncommissioned officers are required to give close attention the police and cleanliness of the coaches occupied by their men.

The commanding officer will provide such regulations as will

prevent damage to the coaches and secure the orderly conduct of the troops.

A noncommissioned officer will be in charge of each coach and will at all times be present and alert and will be responsible for the conduct of the men in the coach.

The commanding officer is responsible for the discipline of the troops on board, and will establish such guards and take such other steps as will secure proper discipline amongst the troops, and prevent interference or annoyance in the operation of the train.

The commanding officer accompanied by the officer of the day and the quartermaster should make frequent inspections of the train.

If the transportation company has failed to furnish transportation as provided in the contract the commanding officer will report the deficiencies to the quartermaster furnishing the transportation.

POLICE. - The commanding officer will designate an officer, preferable the officer of the day, as police officer, whose duty it will be to have general charge of the police of all parts of the train occupied by troops. He will see that seats, floors, closets, and washrooms are kept clean, and that there is no waste of water. A noncommissioned officer should be detailed to assist the police officer and he will have immediate charge of

the general police, and particularly of the closets, washrooms, etc.

The noncommissioned officer in charge of each car will be subject to the orders of the police officer in all that affects the police of the car.

THE COMMISSARY. - The subsistence officer will have charge of the mess arrangements for the enlisted men. If an open end baggage or freight car provided with facilities for making coffee is available the problem will be greatly simplified.

The commissary officer will prepare a scheme for the service of meals so that there will be the least confusion and discomfort possible.

INSPECTIONS. - Inspections without arms should be held twice daily.

THE GUARD. - The detail for the guard will consist of an officer of the day and such other officer and noncommissioned officer and privates as in the opinion of the commanding officer may be necessary for good discipline and to insure the carrying out of his orders.

The guard will be given a separate place on the train. The guard will be used to preserve order, to protect property, to deny egress from the train and to enforce the orders of the commanding officer.

The officer of the day will establish such posts and will

make such inspections as will insure the accomplishment of the purpose of these regulations. He will especially be on his guard against the introduction of intoxicating liquor aboard the train.

The officer of the day may also act as police officer.

X.

DETRAINING.

PHYSICAL FEATURE OF ROADS, YARD, ETC. - If the detraining is to take place at a concentration camp or in its vicinity it will be necessary that provision be made for sidetracks, spurs, and switches, to facilitate and expedite movements, and to place freight, baggage, stock and flat cars in such positions that they can be unloaded more or less at leisure, and without blocking the road at points where the passengers are to be detrained.

The temporary yards should be so located as to readily accessible to the camp site, and they should be level if possible, especially where it is expected to detrain and entrain passengers and to load and unload freight. A separate location should be had for the temporary storehouses that will not interfere with shipping of cars, and the entraining and detraining of troops and materiel. Yet it should be in the near vicinity and readily accessible. Ordinarily for hasty movements the

building of platforms, for convenience in entraining and detraining the men, is not considered essential. Platforms should however be built for discharging freight and supplies, for the various supply departments. It is not considered essential on the other hand that platforms be built for the discharge of the baggage and impedimenta of the troops arriving in camp. The spurs of track on which the cars are located that carry such equipage and impedimenta should be separated sufficiently to permit baggage wagons to be brought up to the car doors and receive their loads directly from the cars.

ORDER AND METHOD. - The detraining should be in the hands of the same officer of the troops who had charge of the entraining. The labor of loading and unloading the baggage and equipage of the organizations should be performed by a detail of enlisted men, and the same detail should perform both services.

The officer of the troops in charge of their detraining should have definite instructions as to the time and place of reporting to the staff officer at destination under whose direction the detraining is to be effected.

A noncommissioned officer from each organization should be in charge of all property and supplies required in camp.

The troops upon being detrained will at once be formed at a distance not less than 30 yards from the train. The troops on

leaving the train will at once step out to such a distance as will leave the immediate vicinity of the train clear. Under no circumstances will any member of the detraining organizations be permitted to return to the passenger coaches, which should be free and released within five minutes of the time that the engine is halted, the freight, baggage and animal cars being at once detached and run on freight spurs in position for prompt unloading, the noncommissioned officer in charge remaining with the baggage and impedimenta. As soon as the troops have left the train the passenger equipment will be removed to storage tracks. The railroad authorities should be impressed in advance of the necessity of promptly removing these coaches to a point more or less remote, in order not to block the road for succeeding trains. The fatigue details should at once be made available for unloading the camp equipage, baggage and stores for immediate use.

The noncommissioned officers in charge of stores for each organization having accompanied the freight and baggage cars, will note their final location on the storage tracks and serve as a guide to the detail sent to unload the camp equipage, etc.

As soon as the troops have been detrained, the detraining officer should place in the hands of the commanding officer of the troops a copy of all necessary memoranda affording information immediately required, indicating the method of procuring needed supplies for his camp, such as food, water, provisions

for sinks, forage, bedding if any, and any other details essential to be known at the time.

REMOVAL FROM THE VICINITY OF THE RAILROAD. - The detraining officer at destination will tell off an assistant or an orderly, if no staff officer has been sent for the purpose, to guide the commanding officer with his troops to his place in camp.

The officers charged with the details of detraining should not wait until the train stops at its destination to make the arrangements for detraining, but all details should be anticipated and provided for in advance, so that the instant the signal is given to detrain every man will move as one and will know in advance just what to do, and if a member of a detail he will be previously told when to report, e. g. at the fore of the train on the detraining side, unless the fatigue details have been assembled on board the train and upon detraining will then be marched direct to the scene of their work. The location of the staff officer in charge of detraining will be indicated by the quartermaster's the guidon and any information desired may at once be had by application at that point.

Staff officers with proper instructions from the commanding general will meet the arriving command and guide the troops to their proper place in camp.

The troops will leave the train by company and will be assembled by battalion or in any other manner that the commanding

officer may direct.

If the fatigue details have been told off and assembled before the troops reach the point of detraining, they will detrain independently under the orders of the officer in charge.

The following details will be required:

One group to report to the quartermaster of the troops to unload the hand baggage of officers and carry it to camp.

One group to report to the quartermaster of the troops to unload ammunition, rations and baggage.

These details will be assembled promptly under charge of an officer and should be amply large and sufficiently provided with noncommissioned officers to accomplish expeditiously the following services simultaneously:

1. The unloading of mules, horses and wagons.
2. The unloading of baggage, camp equipage, rations and ammunition.
3. The drawing of supplies, viz: wood, forage and water, unless other provisions have been made for the above.
4. The procuring of such camp devices as are furnished by the Quartermaster's Department, viz: sink frames, barrels, lime, oil, etc., hay for bedding, etc.

The Quartermaster of the troops should inform himself in advance, if possible, whether or not he will be obliged to rely upon the wheel transportation brought with him or if he will be temporarily supplied by the depot quartermaster in camp.

XI.

ENTRAINING AND DISPATCH OF LARGE BODIES.

In providing for the dispersal of a large body of troops, the details of providing railroad equipment, entraining and dispatch of trains must be worked out with the greatest care, for details and full information must be provided to all concerned, both troops and railway officials. It is believed that these points can be most satisfactorily illustrated by a concrete example, quoting from the report of the chief quartermaster of the Maneuvers at Fort Riley last year.

"ARRANGEMENTS FOR RETURN JOURNEY. - Provisions for the return journey were made well in advance. Information showing the equipment to be furnished in each case, the number of each train, and its location on the tracks; a schedule showing time of departure and from what point each train would be dispatched; carefully prepared instructions as to where, and in what manner bills of lading for freight accompanying each movement of troops would be completed, together with other necessary instructions in detail, were furnished commanding officers and quartermasters well in advance of the date set for breaking camp. By this means oversights or errors in calling for equipment could be discovered and remedied in ample time. The make-up of trains was worked out with great care, and by reference to memoranda below it will be seen that the make-up of entire individual trains was provided for in detail.

"Quartermasters and commanding officers were requested to

notify connecting lines by wire of the hour at which their trains would arrive at junction points giving the number of men, amount of baggage, equipment, etc., in order that prompt service might be insured. Agents at such junction points were notified by the chief quartermaster of the hour of departure of all trains, but it is obvious that it would be impracticable to keep in touch with all detachments of troops dispersing to various parts of the country after their leaving camp.

"The result of the arrangements made proved gratifying in the extreme. The first embarkation of troops occurred on the morning of the 27th of October. The schedule prepared for the entraining of the various militia organizations allowed three hours and thirty minutes; the time actually consumed was three hours and twenty-five minutes, for twenty-one trains, several of which were coupled as far as Manhattan going east, and Junction City going west. These twenty-one trains distributed troops to nearly two hundred different points, and all agents of railroads at connecting points were notified by the chief quartermaster of the time of departure. The trains were dispatched at intervals of fifteen minutes, and with the exception of the Provisional Regiment from Texas, the first embarked, and which was thirty minutes late, there were no delays.

"In the movement of the regular troops similar satisfactory results were obtained, under far less advantageous circumstances. The night preceding was wet and stormy, and the morning of the

movement very disagreeable, under which circumstances all work would ordinarily have been very slow. All trains, however, were dispatched precisely on schedule time with the exception of those conveying the 10th Cavalry, which were from one hour and twenty-five minutes to two hours and thirty minutes late.

"The following circulars were published by the chief quartermaster with the view of expediting and systematizing the entraining and departure of troops:

"1. Office of the Chief Quartermaster,
 "Provisional Division,
 "Fort Riley, Kans., Oct. 25, 1903.

"The Commanding Officer,
 "-----.

"Sir:

"I have the honor to inclose herewith a memorandum showing the number of the train, and the equipment therefor which will convey your command from this encampment on the morning of November 1st, 1903. It is understood that an order will be issued by the Adjutant General of the Division directing the regiments to strike their heavy tentage, and place all heavy baggage and equipage aboard the freight trains which will be made up on the siding during the 31st inst., and to clear their camp sites, returning quartermaster's supplies and stored not needed to points from which drawn, so as to leave as little work as possible to be done on the day of breaking camp.

"All freight, baggage, and stock equipment of the railroad will be set for all trains by 8:00 o'clock a. m. on the 31st

instant, when they will be available for your command to load. Each car of this equipment will be marked with the number of the train. Please send your quartermaster to the office of the chief quartermaster in case there is anything whatever in doubt as to the method by which the details of this entraining shall take place.

"It is contemplated that the first organization will leave camp at seven o'clock a. m., after which other organizations will leave until the last shall have departed, at intervals of fifteen minutes between trains.

"It is desired that nothing be left undone to be ready with the baggage loaded for the movement, as any delay will necessarily disjoint the schedule and result in multiplying the delay.

"The freight, baggage and stock equipment will be marked with the number of the train at the east end of the car, on the side towards the camp.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U. S. Army,
 "Chief Quartermaster."

"2. Headquarters Provisional Division,
 "Chief Quartermaster's Office,
 "Fort Riley, Kans., Oct. 28, 1903.

"The Quartermaster,
 "-----.

"Sir:

"You will report at the office of the Depot Quartermaster, at the end of spur No. 4, Pawnee Flats, on the morning of the

31st inst., at 9:00 o'clock, to arrange for the completing of the bills of lading for government property to be carried on the railroad, ^{equipment} transporting your command to its home station.

"A representative of the Quartermaster's Department will be at that place to arrange all details, as will also a representative of the railroad company, who will accomplish all bills of lading as each equipment is loaded.

"It is intended to complete all bills of lading on the 31st instant. All property not loaded on the 31st instant should go as baggage. Quartermasters and acting quartermasters will be expected to bill their own property and to provide necessary transportation requests.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U. S. A.,
 "Chief Quartermaster."

"3. Headquarters Provisional Division,
 "Chief Quartermaster's Office,
 "Fort Riley, Kans., Oct. 28, 1903.

"The Quartermaster,
 "-----.

"Sir:

"As soon as the freight and baggage equipment of your company shall be completely loaded and ready for the makeup of the train, on the morning of the 1st proximo, the chief quartermaster, or his representative who will be stationed at the switch on the main line, will be at once notified.

"As soon as troops are aboard their respective trains, the

chief quartermaster, or his representative at the same point, will be notified, when signal will be given for dispatch of the train.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U. S. A.,
 "Chief Quartermaster."

"4. Headquarters Provisional Division,
 "Chief Quartermaster's Office,
 "Fort Riley, Kans., Oct. 26, 1903.

"The Commanding Officer,
 "-----.

"Sir:

"Reference to the return of your command to its proper station, it is respectfully suggested that you cause your quartermaster to wire the various routes with which your organizations connect, in order that prompt service may be had from junction points.

"The Chief Quartermaster of the Division has arranged transportation for leaving this encampment, but it is obvious that it will be impossible for him to keep in touch with the movements of all the detachments of troops dispersing from this camp in order to arrange prompt connections. This should be done by the commanding officers and quartermasters whose commands are concerned.

"Railroad agents should be notified of the time to expect arrival at junction points, and the number of men and amount of equipment in each case.

"All baggage should be carefully marked so it can be promptly identified, and it should be stowed together in such a way as to avoid confusion when removed from baggage cars at destination.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U.S.A.,
 "Chief Quartermaster."

"5. Headquarters Provisional Division,
 "Chief Quartermaster's Office,
 "Fort Riley, Kans., Oct. 28, 1903.

"The Commanding Officer,
 "-----."

"Sir:

"I have the honor to request that chutes for loading stock be all placed the night of the 31st instant, and that stock be loaded at daylight, or as early thereafter as practicable, on the morning of November 1st, in order to expedite the entraining of animals.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U.S.A.,
 "Chief Quartermaster."

"6. Headquarters Provisional Division,
 "Chief Quartermaster's Office,
 "Fort Riley, Kans., Oct. 28, 1903.

"The Quartermaster,
 "-----."

"Sir:

"It is respectfully recommended in order to facilitate and expedite the labor of loading on the morning of breaking

camp, and departure of troops therefrom, that the same fatigue details used during the 31st for the loading of cars be continued for the following day, and that these details be made sufficiently substantial so that no delays can result on account of insufficiency of help.

"The ramps are not provided for every organization leaving the grounds. Care should be taken to connect so that no time will be lost in carrying ramps from one point of entrainment to another. It is expected that this matter will be adjusted amongst the quartermasters in charge of entraining.

"Very respectfully,
 "CHAUNCEY B. BAKER,
 "Captain & Quartermaster, U. S. A.,
 "Chief Quartermaster."

"In perfecting the arrangements for this movement of troops, the following forms of memoranda were made use of:

"MEMORANDA FOR
 OPERATING DEPARTMENT, UNION PACIFIC R. R. CO.

The following trains should be made up complete, and set on the siding at Pawnee Flats by 8 o'clock on the morning of October 26th, for the Texas Provisional Regiment:

To go via M. K. & T.

1st train:	3 baggage cars,)	
	6 tourist ")	Headed west.
	1 Pullman, standard))	
2nd train:	2 baggage cars)	
	6 Tourist ")	Headed west.
	1 Pullman, standard))	

To go via Rock Island Route:

3d train:	2 Freight cars)
	1 Baggage ")Headed east.
	4 Tourist ")
	1 Pullman, standard)

Also the following at the west end of Spur No. 4:

1 Vehicle car,
2 Furniture cars,
1 Stock car,
1 Flat car.

Also the following freight and baggage equipment, which will be numbered from east to west; therefore, in placing equipment, read up:

Nebraska.	4th train:	1 stock car, 4 baggage cars.
	5th "	1 " " 4 " "
	6th "	1 " " 3 " "
Iowa:	7th "	1 baggage car, 1 palace car, 16 horses.
	8th "	1 " " "
	9th "	1 vehicle " large, 1 baggage car.
Missouri:	10th "	1 stock car, palace, 17 horses, 1 baggage car.
	11th "	1 baggage car.
Kansas:	12th "	1 flat car, 2 stock cars, 1 freight car, 1 furniture car, 6 baggage cars.
	13th "	1 stock car, 6 freight or baggage cars.
	14th "	1 flat car, 2 stock cars, 2 freight cars, 1 baggage car.
	15th "	2 stock cars, 4 freight, or baggage cars.

In addition to this, it is desired to have the following passenger equipment placed upon the other spurs:

On Spur No. 2, the following:

Nebraska:	4th train:	1 Pullman, standard; 12 day coaches.
	5th "	10 day coaches.
	6th "	1 Pullman, standard; 5 day coaches.

On Spur No. 1, the following:

Iowa:	7th train:	1 Pullman, standard; 7 tourists.
	8th "	1 Pullman, standard; 6 tourists.
	9th "	1 Pullman, standard; 7 tourists.

Spur No. 3, to be used for freight and baggage.

Missouri:	10th train:	12 day coaches)To be run on to siding.)as soon as Texas is out.
	11th "	10 " "	

There should be made up as near to, and as available as possible to the Pawnee Flats, the following passenger equipment in sections as follows:

Kansas:	12th train:	8 day coaches.
	13th "	11 " "
	14th "	4 " "
	15th "	5 " "

The following trains should be made up complete, and set on the siding at Pawnee Flats by eight o'clock on the morning of October 31st.

In making up trains for the movement of these troops, it is absolutely necessary that either a baggage car with doors in ends, or a freight car similarly provided, be placed next the passenger equipment so as to admit of ingress and egress on account of travel rations to be carried therein.

2d Infantry	Via U.P.R.R. 1st train:	to Fort D. A. Russell, Wyo. 1 baggage car; 1 ordinary freight car; 2 ordinary stock cars; 2 gondola cars; headed west.
	Via U.P.R.R. 2d train:	and D. & R.G. to Fort Logan, Colo. 1 baggage car; 1 ordinary freight car; 4 ordinary stock cars. Headed west.

Via U.P.R.R. and D. & R.G., to Ft. Logan, Colo.
 3d train: 1 baggage car; 1 ordinary freight car;
 3 gondola cars.

Also the following freight and baggage equipment, which will be numbered from east to west. Therefore, in placing equipment, read up.

Equipment to be placed on spur No. 4 as far as possible, and the overflow taken up with spur No. 3.

1st Batt. & Via U.P.R.R. to Fort Douglas, Utah.
 Headquarters 4th train: 1 baggage car; 2 ordinary freight
 12th Infy. cars; 2 ordinary stock cars; 1
 palace car, 8 horses, 4 gondola
 cars.

Cos. "I" Via U.P., C.G.V., and N.P., to Fort Lincoln, N.D.
 & "M"; 21st 5th train: 1 baggage car.
 Infy.

Cos. "K" Via Union Pac., C.G.W., and N.P., to Ft. Keogh, Mont.
 & "L", 21st Also 5th train: 1 baggage car; 1 furniture car; 2
 Infy. ordinary stock cars; 2 gondola
 cars - 28 mules - 4 horses.

21st Infy. Via U.P., and C.M. & St.P., to Ft. Snelling, Minn.
 6th train: 2 ordinary freight cars (1 with
 open end, placed next passenger
 equipment); 2 ordinary stock cars.

21st Infy. Via U.P. & N.W., to Fort Snelling, Minn.
 with Hqrs. 7th train: 2 furniture cars (1 open end, placed
 next passenger equipment); 1 palace
 horse car; 1 gondola car.

25th Infy. Via U.P. & F.E. & M.V., to Ft. Niobrara, Neb.
 8th train: 1 baggage car; 4 ordinary freight
 cars; 4 gondola cars.

Via U.P. and F.E. & M.V., to Ft. Niobrara, Neb.
 9th train: 1 baggage car; 5 ordinary freight
 cars.

6th Infy. Via U.P. to Fort Leavenworth, Kans.
 10th train: 1 baggage car; 4 ordinary freight cars; 1 palace horse car - 16 horses; 1 gondola car.

Signal and Hospital Corps. Via U.P., Big Four, and C. & O. to Washington Barracks and Fort Myer, Va.
 14th train: 1 baggage car; 2 freight cars.

In addition to the above it is desired to have the following passenger equipment placed upon other spurs:

On Spur No. 2:

4th Train;	5 tourists; 1 Pullman, standard.
5th "	6 tourists; 1 Pullman, standard.
6th "	6 tourists; 1 Pullman, standard.

On Spur No. 1:

7th train:	7 tourists; 1 Pullman, standard.
8th train:	5 tourists; 1 Pullman, standard.
9th train:	5 tourists; 1 Pullman, standard.

(Buffet car desired, if possible, on 9th train. 17 officers, 25th infantry, on this train.)

10th train: 6 day coaches, one of which should be chair car. To be held as near to Pawnee Flats as possible, and run in on the first available empty spur.

The entire equipment for trains numbers 11, 12 and 13, carrying the 10th Cavalry will be made up and made available at the long spur running into the quartermaster's corral. This on account of the large number of animals to be loaded there. The complete equipment of these trains will be as follows:

10th Cavalry.	11th train:	4 ordinary freight cars; 7 ordinary stock cars; 2 palace horse cars - 31 horses; 9 gondola cars; 1 tourist.
	12th train:	1 ordinary freight car; 24 ordinary stock cars; 1 tourist sleeper.
	13th train:	2 baggage cars; 9 tourists; 2 Pullman, standard.

The first two trains should be put on this siding so that freight can be loaded morning of the 31st, not later than 8.00 o'clock; passenger equipment can be run in after freight equipment has been loaded and withdrawn. Should be held near at hand.

Train No. 14 should be held in hand ready to run to Pawnee Flats, as early as available, as follows:

14th train: 3 tourist sleepers; 1 Pullman, standard.

All tourist sleepers above enumerated to be sixteen section or equivalent.

Chauncey B. Baker,
 Captain & Quartermaster, U. S. A.,
 Chief Quartermaster."

"The following consolidated memoranda were prepared for use in Chief Quartermaster's Office, and copies were furnished for necessary use of all concerned:

Organization.	Train No.	Route.	Tourist	Pullman	Day coach	Baggage	Freight	Stock	Flat	Furniture
TEXAS	(1	U.P. & M.K.T.	6	1		3				
	(2	do	6	1		2				
	(3	W.P. & R.I.	4	1		1	2	1		
NEBRASKA	(4	U. P.		1	12	4		1		
	(5	"			10	4		1		
	(6	"		1	5	3		1		
IOWA	(7	U.P. & Burl.	7	1		1		1*		
	(8	do	6	1		1				
	(9	U.P. & R.I.	7	1		1				1**
MISSOURI	(10	U. P.			12	1		1#		
	(11	"			10	1##				
KANSAS	(12	U. P.			8	6	1	2	1	1
	(13	U.P., MKT			11		6	1		
	(14	U.P. & R.I.			4	1	2	2	1	
	(15	U.P.			5		4	2		

* Palace 16 horses.

** Vehicle.

Palace 17 horses.

Q.M.fur. car to be loaded 26th.

Organization	Train No.	Route	Destination	Tourist	16 sec	Pullman	Day coaches	Baggage	Freight	Furniture	Stock	Palace stock	Gondolas	Remarks
2d Infantry	(1	U.P.	Ft.Russell	5	1		1	1		2			2	
	(2	U.P.D&R.G.	Ft.Logan	5	1		1	1		4				
	(3	do	do	5	1		1	1					3	
12th Infantry	(4	U.P.	Ft.Douglas	5	1		1	2		2	1	4	6 horses	
21st Inf. Cos. I & M and K & L.	(5	U.P. & N.P. & C. & G.W.	Ft.Lincoln	3	1		1							
	(Ft.Keogh	3			1		1	2		2		
21st Inf. 1st & 2d Batt.	(6	U.P. & I.C. & M. & St.L.	Ft.Snelling	6	1			#2		2				*or 1 bag- gage car- open end.
	(7	U.P. & N.W.	do	7	1				2		1	1	10 horses.	
25th Inf.	(8	U.P. & F.E.		5	1		#1			4		4	*open end	
	(9	& M.V.	Ft.Niobrara	5	1		1	5					4	*open end baggage. 25th Inf. desire buf- fet car for 17 people.
6th Infantry.	(10	U.P.	Ft.Leaven- worth.				6	1	4			1	1	*1 chair car 10 horses.
10th Cavalry.	(11	U.P.to	Ft.Robinson	1					4	7	2	9	*31 horses	
	(12	(via Sidney)		1					1	24				
	(13			9	2		2							
Signal Hospital	((14	U.P., Wab. Big Four, & C. & O.	Washington	3	1		1	#2						*Air brake box cars.

The following form of schedule was prepared and distributed:

SCHEDULE OF DEPARTURE OF TRAINS
 TRANSPORTATION MILITIA TROOPS FROM PAWNEE FLATS, FORT RILEY
 RESERVATION, TUESDAY MORNING, OCT. 27, 1903.

	Train No.	
TEXAS	(1	7.00 a. m.
	(2	7.15
	(3	7.30
Nebraska	(4	7.45 a. m.
	(5	8.00
	(6	8.15
IOWA	(7	8.30 a. m.
	(8	8.45
	(9	9.00
MISSOURI	(10	9.15 a. m.
	(11	9.30
KANSAS	(12	9.45 a. m.
	(13	10.00
	(14	10.15
	(15	10.30

SCHEDULE OF DEPARTURE OF TRAINS
 TRANSPORTATION REGULAR TROOPS FROM PAWNEE FLATS, FORT RILEY
 RESERVATION, MONDAY MORNING, NOV. 1, 1903.

	Train No.	
2d Infty.	1	7.00 a. m.
	2	7.15
	3	7.30
12th Infty.	4	7.45 a. m.
21st Infty.	5	8.00 a. m.
	6	8.15
	7	8.30
25th Infty.	8	8.45 a. m.
	9	9.00
6th Infantry	10	9.15 a. m.
10th Cavalry	11	9.30 a. m.
	12	9.45
	13	10.00
Signal Corps and Hospl. Corps.	14	10.15 a. m.

In addition to the foregoing, the following detailed form of memorandum was furnished each organization, and to officials of the railroad company:

KANSAS NATIONAL GUARD.

Organization	Destination.	Route.	Cars required.					Remarks.
			Pass	Bagg	Frt	Flat	Stk.	
Train No. 12.								
Brg.Hqrs.Co.A.			2	2	1	1	1	*Furnt car.
1st Regt.Batt.B.	Topeka	U.P.						20 horses,pal.
Co.F. and Band	Hiawatha	"	2	1				
Co. G.	Sabetha	"	1	1				
Co.H.& Hqrs.	Lawrence	"	1	1			1	20 horses,pal.
Co.I.& Hos.Corps	Manhattan	"	1	1				
Co.K.	Atchison	"	1		1			
			8	6	2	1	2	
Train No. 13.								
Co.B.1st Regt.	Burlingame	U.P.MKT & S.F.	1		1/2			
Co.C.	Burlington	U.P.,MKT	1		1/2			
Co.D.	Chanute	do	1		1/2			
Co.E.	Ottawa	do	1		1/2			
Co.L.	Yates Center	U.P.& M.P.	1		1/2			
Co.M.	Predonia	MKT.,S.F.	1		1/2			
Co.C.2nd Regt.	Sterling	do	1		1/2			
Co.F.	Larned	do	1		1/2			
Co.D.,Reg.Hqrs.	Newton	do	1		1		1	
Co.I.and Band	Emporia	do	2		1			9 horses
			11		6		1	
Train No. 14.								
Co.A.& Bat.A.	Wichita	U.P.,R.I.	2	1		1	1	7 horses
Co. B.	Wellington	do	1		1			
Co. E.	Hutchinson	do	1		1		1	4 horses.
			4	1	2	1	2	
Train No. 15.								(2 horses go with baggage)
Co.G.	Osborne	U.P.	1		1			
Co.H.	Ellsworth	"	1		1/2		1	5 horses
Co.K.	Lindsborg	"	1		1			
Co.L.	Concordia	"	1		1			
Co.M.	Salina	"	1		1/2		1	
			5		4		2	

"In concluding the subject of entraining and transporting the troops on their departure from this encampment it will be noted that three distinct steps marked the arrangement of the details of the transportation feature, in order to ensure a thorough understanding of all particulars, both by the troops to be carried, and by the railroad officials furnishing the equipment and service:

"1st: Each individual organization with a separate destination was taken up in turn, and its routing fixed.

"2d: These were then consolidated, and a common routing given as far as practicable, until full trains were made up. The detailed equipment required was then tabulated as previously shown herein.

"3d. There was then furnished to the operating department of the railroad a memorandum of the make-up of each individual train, giving the order in which the cars pertaining to each train was to be placed on each track, and the direction each was to face. The necessary schedules were prepared showing hours of departure, also giving other details of the movement and furnished to all parties at interest."

XII.

CONSTRUCTION AND REPAIR OF RAILROADS.

The occasions will perhaps be rare that it will not be found necessary in the midst of an actual campaign to construct

railroads of considerable length. In the past, several notable examples exist of the construction of railroads during the progress of the campaign, the most notable of which were the roads constructed by Russia in the campaign of '77 between Bender and Galatz. The length constructed was 187 miles and the time occupied was from the middle of June until the following November.

During the Civil War very extensive railroad construction was undertaken and the systematic method with which repairs were accomplished, and destroyed portions of the roads restored, is one of the marvels of that gigantic struggle. In many cases a road that had been torn up for miles, ties burned, bridges destroyed, and rails bent out of all semblance, was again in operation before the lapse of twenty-four hours.

Not only was the material including ties, rails, spikes, switches and bridge material on hand for reconstruction, but in many instances, the bridges were actually framed and ready to be put together, and often times were loaded and waiting on cars, ready to be sent to the point of destination in case of destruction. This was notably the case with the connections with the Army of the Potomac. Every bridge between the Potomac River and the advanced position of the army was duplicated, framed, and stored, so as to be available for instant use on the line of connections, in case the original was destroyed. And the advantage of this wise foresight was many times exemplified in

the course of the campaigns.

In the second year of the war there were in operation 930 miles of railway which were repaired, equipped and managed by the Quartermaster's Department. Some of these roads were destroyed many times, and the feats of reconstruction and bridge building would be very creditable at this day with the improved facilities and appliances. Across the Chattahoochee River near Atlanta a bridge 750 feet in length and 90 feet high was placed in position in 4-1/2 days. This at a place remote from any point affording a supply of railroad materials.

As an incident showing the full development of the military railroad service the case of the Orange & Alexandria R. R., under Col. McCallum's management may be cited. It was declared by General Burnside that it was not capable of supplying a column of more than 40,000 men. After a few weeks repairs and placing of sidings and terminals its capacity was so greatly increased that it carried with ease supplies sufficient to accommodate 300,000 men.

During Sherman's march to Atlanta the railroad in his rear was constantly raided and destroyed, yet at no time was his connection interrupted for a longer period than five days. The organized forces for repairs were so complete and so perfectly equipped that even with the comparatively crude methods of forty years ago, no raiding party could create a serious check in the forwarding of supplies by destroying the roads.

It is certain that to the skill with which the railroads behind General Sherman's army were repaired is due in a large degree the success of his movements, and it is certain that no one was so much surprised as the enemy to find that his work of destruction never checked the forward movement of supplies for so long a period as five days, and checked the forward movement of the army itself not at all.

During the last year of the war, in the Department of the Cumberland 1769 miles of military railway were repaired, maintained, stocked and operated by the Quartermaster's Department.

In the repairs of railroad the Department went to the length of constructing anew rolling mills for re-rolling the rails.

As soon as peace was declared steps were taken to transfer all railroads in the hands of the Government back to their original owners as soon as loyal directors and owners could be elected to take charge.

In some cases the roads were transferred to Boards of Public Works in the States.

The Government made no charges for repairs or reconstruction of any of these roads. Nor, on the other hand, did it admit any liability for damages.

All sorts of devices for railways to be performed by lightening construction for military purposes have been considered by some of the armies abroad; none of these, however, have ever

been deemed to be practicable with us, and none of them ever for a moment has been considered in this country. There is little doubt, however, that if the necessities of war require railroad construction on the part of our Government, little time need be lost in establishing any essential roads. Such are the resources of our country and our Government that it is believed that little consideration need be given to special devices in advance to this feature of warlike enterprise, especially as in any case the conditions and location will largely control the means to be used.

Many temporary devices are made use of in the commercial world for rapid construction of tramways, which would be useful in military operations, especially at terminal military stations and on wharves, etc., but it has never been considered desirable in this country to elaborate any of them for military purposes for the reason that improvements and new designs are constantly being developed in the commercial world, and by the time no doubt we come to use such a carefully prepared military equipment, it would be more or less antiquated and unsuited to use in connection with modern railway equipment. The roads for example of two years ago would suffer greatly under the loads that are carried over them today.

XIII.

CONCLUSION.

Most writers on the subject of field equipment for foreign armies are strong advocates of some form of field railway, holding up to public view the heavy expenditures necessary in building powerful forts, equipping them with the heaviest guns, and renewing these every time that an invention is made that will increase their power, maintaining and storing great reserves of powder and projectiles, small arms, and camp equipment of every class; all awaiting the declaration of war, and the mobilization of troops. These writers hold it as neglectful not to prepare a form of field railway that can be rapidly constructed. It is thought, however, that such writers should have no weight with us when the construction of railways, both light and heavy, is progressing under the development of commercial industries, and under interests a hundred fold more concerned with securing the best devices and most modern equipment of the age; whereas in the development and improvement of the munitions of war those alone are interested who make warlike preparations a vocation. This can perhaps be no more clearly brought to your mind than to say that since the reading of this paper was begun one locomotive engine has been completed in the United States, and the second one has drawn well-nigh to its completion. Eight miles of new railroad have been completed and a good start made on eight more. Corresponding activity

exists in all the other branches of railroad construction, and this will continue for every working day throughout the year.

In addition, any attempt ~~at~~ the building of a railway into the immediate presence of active operations is likely to reduce the mobility of the army, especially as the wheel and pack transportation would be correspondingly reduced, and if the army were to delay its movements, or depend upon them for the laying of a new line of railway, it is believed that it would be too much tied to one position, and would not be possessed of the free mobility necessary to enable it to move with promptness and precision at the will of the commander.

Furthermore, when we stop to think too that all the skill, industry, and experience of the patriotic citizens who build and operate railroads will be at the disposition of the Government in time of stress, it would seem a wrong beginning to undertake to train soldiers to the building and operation of railroads; yet I do not intend to mean by this that they will have nothing to say or do with the operations. On the contrary, the closest link will connect the military with the railroad interests. The latter cannot possibly accomplish the fullest possibilities without a perfect knowledge of the precise object to be attained. And this is true no matter whether the question be a large one of policy involving the construction of a new line with terminals or the very small question of the

precedence of cars and the manner in which they are to be placed on the sidetracks.

And in concluding I wish to record it here as my experience, that a more careful, conscientious, industrious, loyal and patriotic class of men does not exist than those employed upon the great railroads of our country. I have worked with them and alongside of them all night and all day, in all kinds of weather and under the most trying conditions, but I have never seen them weaken so long as there was work to be done, no matter whether it be Pat who drives the spike home, or the high official who directs policies and regulates traffic; they are alike in their loyalty to their service, and in their desire to get the best results they are one.