Transcontinental Motor Convoy

By Col. William T. Carpenter, C. A. C.

Editor's Note:—This is an extract from report of Colonel William T. Carpenter, Coast Artillery Corps, relative to his observations in connection with a transcontinental motor convoy.

The purpose of the convoy is outlined in Camp Recruiting Publicity Bulletin No. 86, A. G. O., July 2, 1919.

March Formation

The Publicity Officer preceded the convoy by several days and the Recruiting Officer by one or two days. The Supply and Mess Officers usually preceded the convoy by a few hours.

The two officers who served as guides preceded the convoy by a few hours. Each rode a solo motor cycle the entire distance. They determined the route and examined the roads carefully and put up direction markers at cross roads, turns and other places where the convoy might go astray.

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Their duties were well performed, their work of great assistance. The convoy never took the wrong road even on the desert where in many places there were several trails leading in the same general direction.

The mess trucks with kitchen trailers usually went ahead of the convoy to the point selected for the next meal or the camping place in order to expedite the preparation of meals. On a few occasions meals were missed or greatly delayed when the main body met with serious delays which were incident to road conditions.

The Engineer Detachment headed the main body and during the first part of my journey, one officer and several men with road and bridge tools and bridge materials obtained from the state and county authorities, preceded the convoy by several hours or a day, inspected the roads, bridges and crossings and made such repairs as were required. A great many bridges, crossings and culverts in Wyoming, Utah and Nevada were reenforced by them and in most of such cases the convoy passed over without accident. The dry atmosphere of these

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states is very severe on wood and most wooden bridges were greatly weakened by dry rot and in many cases the planking of the decks gave way under the wheels where they appeared amply strong enough. The leading truck of the Engineer section carried a 5-ton tractor which made a total load of 22,450 pounds. The machine shop and blacksmith shop trucks, followed immediately after. All of these trucks were 5½-ton. When this section made a bridge in safety there was no trouble for the others.

Service Park Unit 595 usually brought up the rear of the column and sent out repair men up and down the column by a Light Repair truck, a 1½-ton truck or by motorcycle. They were every where and usually made camp long after the main body and then worked late at night and some times all night to keep things going.

Communications

Except at the larger towns, there are no telephonic or telegraphic communications between Salt Lake City and Carson City, and a telephone system should be installed by the federal government between control points when the highway is built. I believe that a convoy of this size should be equipped with at least two radio sets with a working radius of 100 miles for field service of this kind. One of them for the train headquarters and the other for use of any part of the convoy that might be delayed or separated from the main body for any distance. This equipment would have been of great assistance on this occasion.

Supplies

Rations with the exception of meat and fresh bread, were drawn at Washington for the run to Chicago, at Chicago for the run to Cheyenne and at Cheyenne for the run to San Francisco. Meat and bread were purchased daily in open market when available. Considerable tonnage could have been saved if rations had been drawn more frequently. Fire wood was "salvaged" enroute and there seemed to be an abundance of it laying around.

Gas, oils and water were obtained daily when practicable and in open market and all vehicles and tanks were filled at night for the run of the next forenoon. During the stops for lunch, all vehicles were gassed, oiled and watered from local supply when available and when not, from the tank trucks

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which were then filled from the first supply. The daily consumption of gasoline was between 1150 and 1200 gallons. On several occasions the cost was considerably increased by necessary drayage. In this connection, I believe that the convoy should have had another gasoline tank truck and one other water tank truck or perhaps better still, a few gasoline and water trailers of about 100 gals. capacity for emergency purposes. Once or twice when serious road trouble was encountered and the convoy widely separated, sections of the convoy were stranded for want of gasoline and water for periods which caused considerable delay.

Messing

Only one mess was operated for the 34 officers and 245 men of the convoy. An officer was in charge and he had one graduate mess sergeant to assist him and a total of five or six cooks. There were two Trailmobile, 4-wheel and one Liberty, 2-wheel, kitchen trailers with the convoy when I joined. Six 3-ton trucks were used for carrying rations, kitchen equipment and personnel and for towing the kitchen trailers and one other was used for gathering and hauling wood.

The Liberty trailer was used only for boiling water and cooking breakfast foods in camp. It apparently cannot be used as a cooker while in motion as no place is provided for personnel to ride. The two trailmobile kitchen trailers have room for one or possibly two men to ride on them but at the speed of this convoy over the rough roads encountered, it was impossible to cook enroute and they were used only for boiling water and coffee when on the move and were not used very often for that. One of these trailers will only hold enough coffee for 125 men when the cans are filled but, at the end of a half days run, half of the coffee would be spilled out. Consequently all real meals had to be cooked in camp. The noon meals when on the march usually consisted of canned goods, coffee and bread and were not very satisfactory after a hard mornings work. The breakfasts and suppers were very well cooked and very satisfactory.

The facilities afforded by these trailers for washing mess kits, mess equipment, etc., are inadequate. It usually required one hour to clean up after each meal.

The trailmobile kitchens have one big oven and two smaller side ovens and they should have one big pan for the big oven instead of two small ones which by the way, are suitable for

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the side ovens. The fireless cookers pertaining to these trailers were carried on trucks. They were not suitable as they spilled their contents along the road.

Neither of the two types of rolling kitchens appeared to me to be suitable for such field work. They were more trouble than they were worth. Both types are impossible for cooking enroute, both are inconvenient and structurally weak.

I would recommend that a kitchen truck of 2 or 3-ton capacity and with a large body be supplied for such work and equipped with a large soup boiler such as the French use in their many types of rolling kitchens and with a large coffee boiler, both containers to be provided with water tight lids and of sufficient capacity for a mess of 150 or 200 men. Soup and coffee could be prepared enroute and served promptly after the halt. Grate bars, kettles and pans should be provided with such a truck, for cooking at the halts.

I believe it would have been better to have had two company messes for the main body and a separate mess operated by the Service Park Unit 595, for their work was of such a nature that they could not keep up with the convoy and were often separated from the main body by hours and they missed several meals due to the repair work required and the strenuous rate of travel over these poor roads as well as to poor management on the part of some one. Then again the mess section got too far ahead of the train a few times when difficulties were encountered and many meals were served late after the arrival of the convoy in camp and no food was available for the main body after the mess section got ahead.

Engineer Service

The work of the Engineer Detachment is described in a general way under March formation. This detachment consisted of 2 officers and 34 men. In addition to their road and bridge work, this detachment operated the 60-inch anti-aircraft searchlight at all towns and at other times when used on the road. The detachment also made all repairs to the motor equipment assigned to its use. This equipment consisted of 5, 5½-ton, 2, 3-ton and 1 searchlight trucks and several touring cars and light trucks.

I was particularly interested in the many types of small bridges over which we passed and the methods used in strengthening them for passage of the convoy. This was of special interest from the standpoint of the heavy artillery. The

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Engineer equipment carried for this work was simple but adequate for the purpose and is given in Appendix "A." A small detachment with similar equipment should lead any column of heavy artillery when operating under similar field conditions. The heaviest load of the convoy was the 5½-ton truck of this detachment which carried the 5-ton tractor and which was run off on to the ground when required for towing vehicles out of difficult situations.

The woodwork of most bridges on the desert was in a state of dry rot and their decking was usually 1½ inch to 3 inch pine and sometimes of two layers of 1½ inch material. It was usually necessary to lay two runways of 3 inch by 12 inch timbers across these bridges for the wheels to pass over. These pieces were 12 feet long and materially strengthened the bridges as the loads were more evenly distributed. In several cases where the decking looked good this precaution was neglected and the leading truck cut through and in one case the right rear wheel of the machineshop truck, weight 18,700 pounds, slipped off this runway and cut thru 16, 3 inch by 10 inch deck planks that looked very good.

The equipment of the Engineer machine shop truck was as follows: Winton D. C. generating unit, motor driven drill press, 8 inch lathe, and emery wheel, oxyacetylene welding set and complete set of machine shop tools and repair materials.

The equipment of the blacksmith shop truck was as follows: Winton, D. C. generating unit, a power driven drill press, forge, anvil, work bench, vise, oxyacetylene welding set and complete set of smith tools and materials.

One truck carried road and bridge tools and timbers for strengthening bridges.

General Remarks

As explained in Camp Recruiting publicity Bulletin, No. 86, A. G. O., W. D., July 2, 1919, pages 2 and 3, the purposes of the Transcontinental Motor Convoy were many and among them was an extended service or performance test of the several types of vehicles of the convoy. While the convoy afforded good opportunity for a general practical comparison of the various types of vehicles used, their performances cannot be compared from a strictly engineering standpoint because an engineering test was not made and no data was kept with that purpose in view.

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No accurate record was kept of repairs, spare parts and materials used, so no comparison is possible from the costs per ton-mile basis. Again as I was informed by several officers and noncommissioned officers, about half the personnel were untrained recruits and the officer in charge of the repair unit told me that all the troubles of a serious nature were due to inexperience, carelessness or neglect on the part of drivers and I believe his statement was correct. The manufacturers of certain trucks had their skilled mechanics along to look after their own products which gave them a great advantage from the maintenance standpoint.

A strictly engineering test would have taken considerable time and the itinerary ordered by the War Department would not have permitted of this on the western half of the journey except that portion of the route from Carson City to the Coast where the road conditions were from good to excellent. However the other missions of the convoy were accomplished and made the effort well worth while, particularly the demonstration of the practical value of the Lincoln Highway as a commercial and military asset and the increased interest of the country in the good roads movement as well as the education of the people enroute in regard to the various types of motor vehicles used in the war.

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Maintenance

The maintenance and repair work of the convoy was undoubtedly reduced by the system of inspections in force during the western half of the journey. The Maintenance Officer and Inspector with two commissioned assistants, made a careful inspection of all vehicles each morning before the start and in the evening after the days run, and when opportunity afforded, another inspection was made during the noon stop. Drivers were questioned and the inspectors saw that vehicles were properly gassed, oiled and watered before the start. In this connection motor vehicles for military purposes, should be provided with convenient means for such inspections. The trucks were the most convenient in this respect. They had petcocks in their oiling systems for showing the height of oil.

The repair work of the main body was done by the Service Park Unit 595, which consisted of 1 officer and 43 men. The officer in charge and his men are deserving of the greatest com-

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mendation for their faithful and untiring devotion to their work and the excellence of the same. They were constantly on the move from one end of the convoy to the other and worked early and late under most trying conditions. They usually made camp long after the main body and usually worked until midnight and sometimes all night.

There should have been at least two officers with this detachment, one a detachment commander and records man and the other the mechanical officer and perhaps a third one in charge of matériel. The detachment should have a first sergeant also and a first class clerk to keep maintenance and property records. I feel sure that the written reports of repairs do not record one half of the work done by this detachment.

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The machineshop truck of this detachment was 3-ton capacity and its gross weight was 20,635 pounds. The equipment consisted of a Winton D. C. generator, motor driven drill press, 8 inch lathe and an emery wheel, work benches with five 4 inch vises, oxyacetylene welding outfit and complete set of machine shop tools and materials. This shop did not seem to be as convenient as the Artillery Repair Truck of the Ordnance Department nor as well equipped with tools. The generator is inaccessible in its present central position and should be in the back of the body. I was unable to get a list of the stock and spare parts carried but a great deal of surplus material was carried. Trouble was experienced with the wrenches most of which were of cast iron or a poor grade of tool steel. They should be of high carbon steel of Billings and Spencer make or equal. Trouble was also experienced with drills and lathe tools made of tool steel which should also be made of high grade carbon steel. This shop should have one heavy blacksmith 8 inch vise. The top of this truck as well as that of the Engineer machine shop truck was of the heavy fixed type and was too high it should not be over 10 feet-4 inches above the ground and often proved an obstruction in passing low bridges and branches of trees. The general scheme of bows and paulins is better.

The spare parts were carried in two 3-ton trucks, * *

This detachment had one truck for baggage, one motor cycle with side car and trucks for repairs and service. The latter carried from 7 to 10 men with a pick up equipment from the shop truck. A reconnaissance car would make a splendid service car for such field work. It has ample seats, lockers,

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towing capacity for light vehicles for short distances and provisions for defense if alone in hostile country. Any such service car or truck should have 4 flood lights with long extension cords for night work. The convoy was poorly equipped in this respect for night work along the road.

Passenger Cars

All of the types of passenger cars gave satisfaction on this convoy though all had carburetor troubles. They are all well adapted to military needs. There were very few punctures or blowouts of tires.

Motorcycles

The motorcycles gave good service * * * The motorcycle undoubtedly has its place as an article of equipment, but I think it is put to too much use. A motorcycle should not be used when road conditions are so bad that a touring car * * can be used with greater reliability and safety to machine and driver. The motorcycles, both solo and with side cars were run at all times and from coast to coast. In general there was no need for motorcycles in the convoy except for the two guides, yet every one was run as long as it would keep going and while there was chain and tire trouble about 5 of them made the entire journey. It is thought that each battery of motorized artillery should have about six motorcycles without side cars and that two 5-passenger cars should be issued each battery instead of the motorcycles shown on organization tables and in equipment manuals in excess of that number.

Militor

The Militor is a four wheel drive tractor developed by the Ordnance Department. It is very powerful, more so than any other truck or the Renault tractor. At Greensburg it towed 5 trucks including the machine shop truck "B," over the Allegheny Mountains. When provided with a truck body it is rated at 5-tons. It is believed that every service park unit in the field should have one of them for wrecking work and towing. Up to the time it was left behind at Salt Lake City it had towed nearly every other truck in the convoy at some time or other. The radiator support stud broke three times on the trip to Salt Lake, due to crystalization. It was not made of proper material. This was corrected at Salt Lake City. No. 4 bearing pounded loose and the carburetor

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and governor got out of order at Salt Lake City. The fan belt broke three times during the journey to Salt Lake City. When sent back to Salt Lake City from a point 37 miles west of that place, the bearing and fan belt were the only things out of order and the Militor could have made 500 miles more with the bearing in that condition and without injury.

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The equipment of the Militor was as follows: 1 tackle, consisting of 1 double and 1 single block 8 inch, with endless chain about 12 feet working length. This was never required; 125 feet of ½ inch half steel and half copper cable; 250 feet of 1½ inch rope which broke several times and which was used with winch; 2, 10 inch x 10 inch x 2 feet wooden blocks; 5, 3 inch x 3 inch oak stakes; 8 tow chains; the blocks were used to put behind the wheels. The spade is too short and too small and lifts the militor off the ground. The equipment should have included two picks; 3 shovels; 1 triple and 1 double block for the 1½ inch rope. Should have some 2 inch and 3 inch diam. rope with blocks. Should have a derrick of about 5-ton capacity. Should have two additional corner spades and the reel for the cable or rope should be placed in rear and below the winch. The spades should be of the type used on field guns and of sufficient length to prevent lifting the rear end off the ground.

Wheels

The prolonged heat and dryness of the desert brought to mind the advantages of the cast steel spoke wheels of some of the trucks over the wooden wheels for trucks. All wooden truck and kitchen trailer wheels dried out and in some cases spokes came loose and a few had to be changed. They suffered from the jolting and bumping over the rough roads. This condition could have been prevented in part had the wheels been given an occasional wetting. The wheels of the touring cars did not suffer very much in this respect. The wood was probably better seasoned and was painted much better—then their loads were relatively light. In general I believe it would be better to have all military cars equipped with wheels of the heavy wire or light steel disc type.

Tires

No comparison can properly be made of the relative merits of the several makes of tires used on the convoy since accurate

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data was not at hand. Some were new at the start and others had given considerable mileage and others were replaced during the journey which were not worn out completely. No attempt was made to repair damages and loose and frayed ends were not trimmed off and in several cases I saw long pieces of rubber 8 or 10 inches in length whipping the air until the tires had to be changed.

This experience demonstrated the advantages of the pneumatic tire for such rough work as far as speed and protection of the chassis and cargo are concerned. I doubt if the convoy could have made much progress however, if every vehicle had been equipped with the pneumatic tire in its present state of development for there would have been a constant and never ending lot of punctures. Two big trucks belonging to the Firestone Tire and Rubber Co., one a 2-ton Packard and the other a 2-ton White and both were equipped with giant cord (Pneumatic) tires, and loaded with stock tires, accompanied the convoy * * * * .
They easily made thirty miles per hour at times when the condition of the road required slow speed for the solid tired vehicles. The rear tires * * were 44 inch x 10 inch and the front tires 38 inch x 7 inch. These tires suffered from the narrow wheel ruts of the desert and mountain roads made by passenger vehicles and the side walls of some were badly chafed and had to be replaced. The touring cars of the convoy had very little of this trouble. The ambulances showed a little more of such wear. These trucks suffered practically no mechanical troubles.

All broad tires suffered from the narrow tread of the ruts and usually the broad rear wheel tires of trucks rode on either half of the tire. The outer halves of the duals suffered particularly from this cause.

The * * tires stood the trip particularly well and all front tires much better than the rear ones. A considerable number of tires were changed enroute at Omaha, Ogden, Salt Lake City, Carson City and I believe a few at Sacremento but I have been unable to date to get the exact figures on this subject. The dealers enroute were naturally anxious to supply new tires and have their own types make a good showing.

Lessons of the Transcontinental Motor Convoy

My experience with this convoy has impressed me with the necessity or advantages of the following points in con-

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nection with the care and operation of motor transportation in the field and in general under similar conditions:

(1) A minimum number of types of vehicles in any one convoy or organization, and the standardization of parts with a view to the reduction of spare parts required and labor in maintenance.

(2) Thorough training of drivers in the care, operation and repair of their motor vehicles.

(3) Careful daily inspection of all vehicles in the field by competent officers.

(4) Thoroughly disciplined personnel in all grades and positions in the operation of motor transportation. No soldier should be put at such work until he has been thoroughly drilled and instructed in the school of the infantry soldier. The recruit depot is the best place for this instruction.

(5) Good roads or highways and control points with supplies and minor repair facilities along any line of communications used by motor transportation.

(6) The 5-ton cargo truck with a body of commercial size as the maximum size for motor vehicles for general field work.

(7) The four wheel drive principle for military trucks in the field.

(8) The caterpillar tractor for drawing heavy military loads over poor roads.

(9) A powerful wrecking machine such as the Militor as a part of the equipment of large convoys in the field.

(10) A suitable truck kitchen for field use.

(11) Careful inspection of roads, bridges, culverts and crossings well in advance of such a convoy in strange territory, and trained personnel, tools and equipment to strengthen and repair structures and roads.

(12) Marking of routes at all turns, branch roads, cross roads, etc. The organization designation to be printed on the form.

(13) Liberal policy in the authorization of expenditures for supplies.

(14) Electric lights for all motor vehicles or an adequate carbide system with two searchlights on each truck.

(15) An improved mechanical starting device such as a rachet and wheel operated from the driver's seat. A convenient arrangement of this kind would soon pay for itself in the saving of gas by any truck on which used.

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(16) Strong radiator guard, bumpers fore and aft and a central towing pintel on the front and rear ends of all cargo trucks.

(17) Speedometers for all motor vehicles.

(18) Dust proof and fool proof carburetors.

APPENDIX "A"

Special Engineer Equipment Carried by the Engineer Detachment. Transcontinental Motor Convoy, M. T. C.

2 Augers, ship, 1¾ inch.
2 Mallets, wood.
6 Hammers, claw.
30 Films, dozen.
2 Acetylene Lanterns No.10 Justulight.
1 Scale, Engineer.
1 Slide rule, Kne.
4 Coal, bags.
2 Bits, expansive.
30 Nuts, assorted, lbs.
1 Marline, ball of 10 lbs.
100 Carbide, lbs.
1 Box, pressed steel.
1 Electrical engineer handbook.
1 Architect and Builders Guide.
1 Auto Hand Book.
1 Builders estimate book.
1 Handbook, Chemistry and Physics.
1 C. E. Handbook.
1 Dictionary, English.
1 Formulas and Tables for Engineers.
1 Handbook of Construction plant.
1 Highway Engineers Handbook.
1 Manual, R. R. Assn.
1 Mechanical Engineers Handbook.
1 Metric Conversion Tables.
1 Modern Gas Automobile.
1 Ready Reference Tables.
1 Steam Power Plant.
1 Surveying.
44 Shovels, RP-DH (wood handles).
6 Shovels, RP-DH (iron handles).
36 Axes, S. B. hdld.
4 Jacks, screw 10 ton.
12 Bars, pinch, large.
10 Saws, C. C., 2 man hold.
6 Hammers, sledge, 8 lb., hdld.
6 Hammers, sledge, 10 lb., hdld.
4 Blocks, No. 8 double, steel.
4 Blocks, No. 8 single, steel.
6 Blocks, No. 8 snatch, steel.
2 Jacks, Barret, track, 15 ton.
24 Picks, R. R., hdld.
12 Hammers, claw.
3 Wrenches, Monkey, split wood handle, No. 12.
3 Wrenches, Monkey, split wood handle, No. 18.
2 Bits, screwdriver, 3/8 inch.
4 Sets Swedges Top and Bottom, ¼ x ½, ¾ x1.
1 Flatter, 2½ hdld.
1 Tongs, pr., lip flare, 14 lb.

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1 Tongs, pr., Straight shoeing, 22 lb.
2 Rasps, shoeing, 16 inch.
1 Punch, round, ¾ hdld.
1 Punch, round, 3/8 hdld.
1 Punch, square, ¾ hdld.
1 Punch, square, 3/8 hdld.
1 Hammer, turning double face, 2 inch.
1 Drift bolts, keg, ½ inch.
1 Drift bolts, keg, ¾ inch.
6 Bars, W. C. & Gosseneck.
1 Steel, bar, 1 inch × 2 inch × 12 inch.
1 Steel, bar, 1 inch × 14 inch.
1 Rod, Surveyor.
2 Climbers, lineman, prs.
2 Chests, Carpenters.
2 Oilers, ½ pint.
2 Saws, rip.
4 Saws, C. C.
2 Knives, drawer.
2 Sets, saw, compass.
2 Sets, saw.
2 Plumbbobs.
2 Chisels, framing, sets.
2 Bits, sets.
12 Files, 6 inch taper.
10 Hatchets, 4½ inch.
6 Pliers, 8 inch.
2 Stones, oil.
2 Levels, carpenters.
2 Planes, jack.
2 Squares, try.
2 Bevels, T.
2 Squares, carpenters, 24 inch steel.
2 Chisels, cold.
2 Dividers, wing.
2 Braces, ratchet.
2 Pliers, linesmans.
2 Chalk lines.
2 Screwdrivers, 5 inch.
6 Blades, hacksaw, doz.
4 Rules, 2 foot.
2 Tapes, metallic, 50 ft.
12 Pencils, carpenters.
2 Augers, ship, 7/16 inch.
2 Augers, ship, 11/16 inch.

HENCEFORTH

EVERY OFFICER MUST EFFICIENTLY BE ABLE TO SUPERVISE THE OPERATION OF

MOTOR TRANSPORTATION

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