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THE ABOLITION OF HORSE TRANSPORT IN THE ADMINISTRATIVE SERVICES.

By BREVET MAJOR O. W. WHITE, D.S.O. Dorsetshire Regiment.

IT is felt that the very title of this brief essay will raise a chorus of anathema from a very large proportion of officers in all ranks.

It is submitted, however, that the horse-drawn vehicles for administrative work are no longer sufficiently economical from a finance point of view or satisfactory from a military one to justify their retention. The retention of the horse for the actual fighting troops is not touched upon at all. These are points which will certainly be hotly debated, and are not points on which the author feels he has any right to express an opinion.

I think that anyone who has served on the Western Front during the War must have realized the horse wastage and all the troubles attending on the use of horse transport behind the fighting troops.

It is maintained that, by the abolition of horse transport and its substitution by special mechanical transport, operations could have been facilitated, money saved, and at all times mobility increased.

It is proposed to first compare the relative advantages of horse and mechanical transport generally, then put forward a specific recommendation, and, lastly, taking certain operations compare what was actually done with the existing transport with what could have been done with the proposed scale. Examples are specially chosen from phases of moving warfare as, if the advantages of mechanical transport can be proved for such operations, it is considered these advantages are obviously greater during a period of trench or semi-siege warfare.

The unit dealt with in considering operations is the division, as being the smallest unit of all arms, and the scheme proposed is based on the requirements of a division. If a change such as is advocated were ever adopted, the requirements in mechanical transport for corps and army troops could easily be worked out.

Now to consider the relative advantages and disadvantages.

GENERAL FACTORS.

Expense.—It is assumed that a draught horse by the time it has been purchased and reaches the unit has cost the Government at least £100. This is rather under-estimating the charge, but it is especially desired not to minimise the horse's advantages in any way. The average life of a horse with a Divisional Administrative Unit, under normal all season weather conditions, allowing for casualties due to shell fire and bombs, and replacing battery casualties from the D.A.C., may be taken

as eight to ten months. Of course a large number were merely debilitated or wounded and so were only temporarily lost, but for draught horses of a division it is considered this is a fair average. It is taken that fifty per cent. of the casualties recovered and were available for and returned to the line again in six or seven months.

The establishments given below are taken from my notes as to what actually was with the division after the middle of June, 1918, and of course slightly less than the numbers given in war establishments.

Riding horses are not counted or considered.

D.A.C.

Headquarters (excluding attached)	28 draught horses	..	{ 1 cart, Maltese. 3 carts, water. 4 wagons, G.S.
No. 1 and 3 Sections	384 draught horses	..	{ 22 wagons, G.S. 48 artillery wagons, limbered.
S.A.A. Section	180 draught horses	..	{ 26 wagons, G.S. 15 wagons, L.G.S.

Train.

Headquarters	0 draught horses	..	
No. 1 (Headquarter) Company	{ 16 draught horses 134 heavy draught	..	{ 1 cart, water. 64 wagons, G.S. 5 wagons, L.G.S.
No. 2, 3 and 4 Companies {	{ 18 draught horses 150 heavy draught	..	{ 3 carts, water. 69 wagons, G.S. 6 wagons, L.G.S.

Three Field Ambulances.

Each	{ 18 draught horses 19 heavy draught	..	{ 3 carts, water. 1 cart, Maltese. 1 wagon, L.G.S. 3 wagons, G.S. 3 ambulances 6 wagons, G.S.
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This gives a grand total of 1,021 horses employed on purely administrative work, or taking it in round figures, 1,000.

Every ten months a fresh 500 will be required, but after the first period, 500 are again available from horses that have been cured or rested. I assume, therefore, that with a 50 per cent. reinforcement every twelve months everything but the most abnormal wastage will be covered.

Therefore for one year we have :—

1,000 horses doing administrative work in a division.

500 horses at base or on lines of communication in remount depots.

1,500

These 1,500 horses, taking round figures, cost £150,000, exclusive of food, to purchase and get up to the unit.

F.S.R. II, 1914, reprint 1916, does not lay down the reinforcements in horses required as is done in Chap. 5, Sec. 28, for personnel; figures are estimated on figures available from notes taken during operations.

LOADS.

These 1,000 horses move various vehicles, G.S., L.G.S. wagons, artillery ammunition limbered wagons and ambulances.

Recapitulating from above that there are 4 carts, 16 water carts, 212 G.S. wagons, 29 L.G.S. wagons, 48 artillery wagons, 9 ambulances, the nominal loads and total weights carried are as follows:—

	Tons
4 carts, 15-cwt.	3
16 water carts (abolished and superseded by trailers)	—
212 G.S. wagons, averaging 30-cwt. (maximum)	318
29 L.G.S. wagons, 20-cwt. (not allowing for variation in bulk, etc.)	29
48 Wagons, 30-cwt., artillery limbered	72
3 Ambulances	negligible.
	<hr/>
	422

On the average each animal requires 22 lbs. of food a day, so that we have 293 vehicles, drawn by 1,000 animals, carrying a load of 422 tons, less 8 tons 3 cwt. 4 lbs. food they consume, which gives useful load (not allowing for bulk) as 413 tons 16 cwt. 48 lbs. Allow roughly for bulk and take the useful load carried as 410 tons.

Radius of Action.—One cannot count on more than twenty miles a day, and if fifteen miles a day is to be covered regularly a reduction should be made in the load.

Road Space.—The distance covered by the administrative horse transport on the road is difficult to estimate, but there is no doubt if a vehicle can be provided which can easily and continually move off the roads, road space will be saved.

At the same time, though normally divided over several roads, the road space actually remains the same, so I give the figures below. These are exclusive of distances between units, so as to compare more easily with suggested formation:—

	Yards
4 Carts at 10 yards	40
16 Water carts at 10 yards	160
160 Two-horse G.S. wagons at 10 yards	1,600
52 Four-horse G.S. wagons at 15 yards	780
48 Six-horse artillery wagons at 20 yards	960
29 One-horse L.G.S. at 10 yards	290
9 Two-horse ambulances at 10 yards	90
	<hr/>
	3,920

This compares satisfactorily with a scale issued for the moves after the Armistice by the Fourth Army, which allowed 4,680 yards for the unit, on which these calculations have been based, including an unspecified distance between the baggage and supply sections of the train and certain vehicles, riders, etc., which have not been allowed for in the 3,920 yards.

Pace and Time on March.—Following on road space is pace and time spent on the march. Horse transport can only be counted on to do three and a half miles per hour, including halts, by themselves, or three miles per hour with infantry, or when large bodies of troops are moving, two and a half miles per hour (F.S.R. Part 1 reprint 1916).

Mechanical transport can be counted on to move at eight to ten miles per hour in convoy formation.

It was found in the moves by the IVth Corps, after the Armistice, when marching from Le Quesnoy to Namur-Gembloux area that the marches could be easily carried out by keeping the mechanical transport off the roads until the infantry and mounted troops had completed their day's march, and no inconvenience was caused even when railheads were much farther off than had been the case during actual operations. This ability to move fast is one of the great advantages of mechanical transport. To do twenty miles, horse transport, marching with other troops, will take at least seven hours, mechanical transport will not take more than two and a half hours, and also frees the road if required for succeeding columns.

With regard to other points of comparison:

Ration.—The horse's ration consists of corn and hay, and, when issued, straw. The daily weight is just over 20 lbs., taking the average all kinds of draught, for this we get a twenty mile radius of action. The mechanical vehicle requires petrol and lubricating oil. Except in very heavy or highly powered vehicles the weight of fuel required for an internal combustion engine for a twenty mile radius is less than the weight of ration for a horse, and the draught power greater.

As regards the bulk of the ration for animals it is of interest to consider the amount of lorry transport in the Divisional Supply Column allotted to forage. These numbers varied slightly in 1917-1918, owing to the conversion of D.S.C's in Divisional Mechanical Transport Companies. Twenty-nine 3-ton lorries and fourteen 30-cwt. lorries were allotted for supply work. Of these the fourteen 30-cwt. lorries were for hay and oats.

This gives a proportion of practically one to four, or one-fourth of the supply transport was required for forage. Now, until the reduction of divisions from thirteen to ten battalions (including pioneers) the proportion of animals to men was 5,781 animals to 19,658 all ranks (1915 war establishments), which is practically a proportion of one to three, which apparently indicates the horse as an economical unit of transport.

Now considering mechanical transport. The whole of this transport would not be available, of course, as I have only taken 1,000 animals as being employed on purely administrative work. Taking the nearest whole thousand this represents one-sixth of the horses with a division. Therefore take one-sixth of twenty-one tons, which is 3 tons 10 cwt., or two-and-a-third 30-cwt. lorries. Taking whole figures, two 30-cwt. lorries can, allowing for small bulk compared with weight of fuel and oil, carry practically their indicated load, therefore we have three tons or 6,720 lbs. available.

If we replace horses by mechanical transport vehicles we have, allowing for weight of tins, etc., 600 gallons fuel, including lubricating oil. These 600 gallons fuel, etc., should produce 4,500 miles in a vehicle doing eight miles to the gallon. Such a vehicle should transport three tons. We have seen above the 1,000 horses draw 410 tons for maximum of twenty miles. This would require 134 3-ton mechanical transport vehicles, and of the available 600 gallons each vehicle could receive a fraction over four gallons, or four gallons plus lubricating oil. At eight miles to the gallon this would enable the required load to be moved thirty-two miles.

This argument is only very roughly worked out and is perhaps too academic for practical purposes.

There is also the provision of the ration and fuel. The great advantage of the horse is that a very large portion of the forage can be obtained locally, in the theatre of operations, and grazing can be arranged to supplement or even take the place of a portion of the ration. On the other hand, except in very rare instances, oils cannot be obtained locally.

It must be realized, however, with the increase of use of motors by the civil populations, stores of petrol will become larger and more widely available, and what is more important, substitutes for petrol (benzol for example) will come more into use and local production of these substitutes increase. It cannot be imagined that we have reached any finality as regards fuel for internal combustion engines. Every year will tend to lessen the present advantage obtained by horses, owing to their ability to be fed on local produce.

There is one definite disadvantage about forage obtained from local sources. The collection, purchase and disposal of forage in bulk entails the use of very large numbers of either soldier or civilian labour.

Oils, not having the same bulk and being fluid and suitable for pipe supply, do not require such large numbers to collect, handle and issue.

Spares.—A horse's only spares worth considering are his shoes. Harness replacements are small and I am for the moment ruling out wastage of "spares" and vehicles by enemy action.

Mechanical transport, on the other hand, requires a large and cumbersome store of spares, including tyres.

Under this heading the balance is somewhat in favour of the horse.

Vulnerability of the Horse compared with Mechanical Transport.—Ruling out a direct hit on the engine of a mechanical vehicle, or on a

horse by any bomb or shell, the horse is infinitely more vulnerable and harder to protect than the mechanical transport vehicle. Anyone who had anything to do with horses will remember the heavy casualties we suffered from long range shelling and bombing in 1917 and 1918.

The amount of work in trying to erect satisfactory splinter proof banks round horse lines was enormous and never ending. Then, in moving warfare, the necessity for scattering horses in small bodies wasted ground one could have used otherwise. How small, on the other hand, were the casualties to mechanical transport units, even though they nearly always parked on the main roads.

It should be quite easy to render the engines and other vitals of a vehicle safe against most splinters and yet retain its mobility unimpaired. One can never hope to armour a horse and retain its pace and power.

Cover from view is as important as cover from fire, and one cannot increase the horse's load by camouflage nets, whereas the motor vehicle can easily carry netting and light supports, so that by the abolition of shadow it can rest unseen.

Liability to Stampede.—This point is obvious, a motor cannot stampede from its park of its own volition.

Sick Wastage.—Iron and other metals are, in the long run and supposing equal care to be taken, stronger and more lasting than muscles and sinews. With increasing simplicity of internal combustion engines this advantage becomes more pronounced.

It is not considered profitable to analyze the wastage, insufficient figures are in possession of the writer. As far as mechanical transport is concerned wastage is reduced by simplification and standardization of vehicles in military use.

Arising out of this, however, comes the provision of veterinary hospitals, remount depots and convalescent horse depots at the base. These require enormous acreage and heavy cost in upkeep and hire of ground. For an equivalent amount of draught power, it would be of interest to compare the cost of these installations with what would be necessary for an equivalent draught power in mechanical transport.

Upkeep of Communications.—All forms of horse transport can move across country, but except under ideal conditions, loads or length of march have to be less than on any kind of road. Further, constant and heavy mechanical transport undoubtedly breaks up a road surface more quickly than horse transport, and the majority of mechanical transport is absolutely confined to roads.

The upkeep of roads in modern warfare is enormous, and a vitally important subject, and one which has affected the success or failure of operations since the beginning of military history. With the advance of science and the improvement of "pedrail" or "caterpillar" vehicles it ought to be possible to lighten the burden roads have to carry, and so lengthen their life. I think this is a definite object to seek to obtain. This is considered in the scheme proposed.

It is hoped it will be seen therefore, that from the arguments produced the balance of advantage rests with mechanical transport.

Now to consider some definite disadvantages. A motor deficient of some portion of its ration becomes immobile. An engine without lubricating oil is as useless as if it had no fuel. A horse, on the other hand, can, in emergency, struggle on without portion of its ration, or even for a short time unfed. Water is vital, of course, to both horse and water cooled engine, but a time may conceivably come when water cooled engines are relics of the past.

Mechanical transport is liable to be ditched and is seriously handicapped by a greasy surface or ice on the road. The latter affects the horse, but frost cogs are more reliable than anti-skid devices.

Deep snow or mud may immobilise a motor vehicle altogether when a horse could struggle through.

There are of course certain areas which are impossible for mechanical transport, liquid and deep mud, either as a natural condition or produced by excessive shelling and bad weather, and very mountainous districts.

As regards mud produced by rain or bad shelling this must be granted, I fear, but natural mud I maintain can be dealt with. As far as mountains are concerned pack animals will always be required for the advanced work and for use on tracks, but to wage a successful war in the mountains one or more roads will always be required, and where roads are made, mechanical transport again assumes its superiority over animal transport.

The operations in the mountains in Italy give many examples of this.

Provision of Personnel.—Trained personnel, when heavy casualties are being suffered, is always difficult to replace, and it may be argued that it is easier to replace men trained in horse management than in mechanical knowledge.

To get the best out of horses, save their strength and keep them fit, requires a very considerable knowledge and experience, not only amongst the officers but amongst all ranks. That the requisite standard of knowledge was hard to maintain during the late War is very evident and the appointment of "horse masters" with corps and lower formations was a war time measure made necessary by the inefficiency of the personnel using horses. On the other hand, although considerable difficulties had to be overcome, the pinch apparently was never felt so severely amongst the mechanical transport.

To recapitulate, it is suggested :—

Firstly.—That under modern conditions the use of animal transport in rear of the fighting troops is no longer advantageous from a military point of view.

Secondly.—That animal transport is less economical than mechanical transport, considering the radius of action for the ration consumed.

Thirdly.—That granted an initial outlay to provide the means of transport, the draught power (tonnage carried) by mechanical transport will be greater and more economical.

Fourthly.—That the time taken to carry out any specified march will be less when using mechanical transport, and consequently the road wear, and wear and tear of the transport involved will be less.

Fifthly.—That the total personnel required for administrative services will be less and the proportion of senior (and expensive) officers considerably less.

Sixthly.—That having fewer units to deal with, the work of the administrative staff will become easier and greater efficiency will result.

Seventhly.—That mobility will be increased and operations thereby facilitated.

Eighthly.—That the roads in rear will be less crowded and that the pursuit of a defeated enemy will be facilitated.

Ninthly.—That troops relieved in action can be made more comfortable.

Having made these points, and it is hoped made the case against horse transport, the form of the suggested alteration is now dealt with.

PROPOSED SCHEME.

Detailed establishments for purposes of comparison are attached in the Appendices.

From the figures given hitherto it is taken that the following are required :—

1. To transport 410 tons useful load, or what is now carried.
2. To be able to carry that at least twenty miles a day.
3. To travel over roads, tracks, or across country.
4. To maintain the unit which does this work in light repairs.
5. To do this cheaply, and for initial outlay to keep, if possible, within £100,000, and to require less than £50,000 worth of replacements in vehicles every year.

To do this it is proposed to :—

1. Abolish the divisional ammunition column.
2. Abolish the divisional train.
3. Withdraw all wagons used for medical stores, baggage and tentage by field ambulances.
4. Substitute water carts by water tank trailers or water lorries.
5. In place of the above two units and portions of the three field ambulances transport, to substitute one mechanical transport company, to be called the — Divisional Mechanical Transport (Light) Company.

This unit would consist of headquarters and :—

- 1 Headquarter section.
- 1 Repair workshop.
- 3 Sections of light lorries of special construction.

The detailed establishment is given in Appendix 2.

Broadly it will be as follows :—

Headquarters.—To be commanded by a Lieut.-Colonel, whose position as regards all transport in the division will be comparable to the position of S.M.T.O. in a corps.

The senior supply officer, at present on the strength of the train headquarters, being transferred to divisional headquarters and graded as a D.A.D. supplies. The officer commanding Light Mechanical Transport Company would be assisted by a major as his second in command. An adjutant, with the rank of captain, and two subalterns, one as quarter-master and one as orderly officer. Part of the headquarters, although complete in itself, would be the repair workshops of the company. This would consist of a captain in command, a captain as second in command and four subalterns, each of whom would be primarily responsible for the repairs of one of the sections of the company.

The necessary personnel of all ranks is given in the Appendix.

All the cars and other mechanical transport on the strength of divisional headquarters itself would be attached to the Mechanical Transport Company Headquarters Section for maintenance, repairs and upkeep of personnel.

The sections would consist of the following :—

No. 1 Section (Ammunition Section), consisting of :—

- (a) Sub-section, artillery ammunition.
- (b) Sub-section, infantry ammunition, fireworks, Very lights and explosives for Royal Engineers.

No. 2 Section (Baggage Section), consisting of :—

- (a) Sub-section, brigade group, baggage vehicles.
- (b) " " " " "
- (c) " " " " "

No. 3 Section (Supply Section), consisting of :—

- (a) Sub-section, brigade group, supply vehicles.
- (b) " " " "
- (c) " " " "

Note.—A brigade group to consist of one infantry brigade, one artillery brigade, one field company and one field ambulance.

In both No. 2 and 3 Sections the vehicles are so allotted that any brigade group's allotment can be increased rapidly if more than the above troops are with the brigade group, or if all the divisional troops are marching separately, the whole of their vehicles can be detached and move as a unit by themselves. From the experience of the War, both in France and in Italy, it is considered the brigade group is more frequently used than the alternative sub-division within the division.

The Mobile Veterinary Section, D.A.D.O.S. lorries and any other specialists are included in the allotment for divisional headquarters, and so part of the Headquarters Section of the Mechanical Transport (Light) Company.

Now as to the type of vehicles employed.

Vehicles for the Mechanical Transport Company should be of standardized pattern, and carry a load of three tons for the baggage and supply vehicles, and two tons for the ammunition ones. The heavier vehicle to be a lorry having a pedrail attachment which can be lowered and put in use or raised out of action easily. When travelling on roads the wheels and ordinary drive to be used; when off the roads or moving over much damaged surface, the pedrail.

When it is desired to use the pedrail this must be so placed as to be a "one man" job. This is mechanically possible, but details of design cannot be dealt with in this paper.

A composite vehicle or mechanism, it is granted, is often weak and generally bad, but the saving in wear and tear of the roads should justify this in the above. It is believed a composite vehicle like this was in use in Italy.

The engine and all vital portions of the mechanism, including the petrol supply tubes from the tank and the tank itself, should be armoured against bomb splinters.

These additions will of course materially increase the weight, but not enough to affect its utility.

The pace should be up to fifteen miles per hour on roads and six miles per hour when the pedrail is in use. The only exception to this for the heavy lorries are the Delouser lorries, which should be of ordinary commercial type and be merely the means of transporting the Delousing cylinders, the clothing store, etc., which must be taken off and put together on the ground for use.

The lighter 2-ton ammunition lorries should be of "supply tank" type, entirely pedrail and capable of passing anywhere where guns or infantry ammunition echelons can go. The loads should be carried on top and between the pedrails and the drivers, placed in a splinter proofed "box" in front.

A vehicle on the lines of the French light Renault tank, adopted for carrying, appears a suitable type. The engines and the drivers should be protected by armour against splinters.

Its pace should be up to eight miles per hour off the roads and on roads up to fifteen.

The question of the relative advantages of 3-ton, 2-ton and 30-cwt. lorries is, of course, debatable.

The sizes above have been selected as being economical of personnel.

There is, of course, a very great deal to be said for the *light* 30-cwt. lorry, particularly if of Fiat type. It is considered, however, having accepted the proviso that the lorries can move across country, the sizes given are the best.

OPERATIONS AND DEDUCTIONS

To proceed now to the more interesting consideration of actual operations. The episodes selected cover a period from the 17th March to 14th April, 1917, and the 18th August to 3rd September, 1918.

They both deal with an advance, one under winter and the other under summer conditions, and the area of operations, owing to old trenches and devastation produced by war, particularly unfavourable for mechanical transport.

Early in 1917 the 48th Division, as part of the IIIrd Corps, took over from the French south of the Somme.

The divisional front extended from the Somme, where it bends at Omnicourt (south of Clerys—Somme), through Biaches to Barleux, the Germans still having a hold on the west of the Somme at and between these latter villages. The high ground at La Maisonette, occupied by the enemy, overlooking the plateau westwards for a considerable distance.

Divisional headquarters was at Cappy, and the main communications in the divisional area were the :—

1. Cappy—Herbecourt road, with a daylight limit at Herbecourt. This road crossed the trench area and eventually reached Biaches. A branch road ran from the Herbecourt—Biaches road, through Flaucourt to Barleux.
2. The Cappy—Dompierre—Assevillers road with branch running north to Herbecourt.
3. The Cappy—Eclusier—Frise Feuilleres, along the Somme, with a branch south, from the latter place to Herbecourt.
4. The actual towpath, alongside Somme Canal, which crossed the Omnicourt Peninsula.

There were no wide ditches or other obstacles dividing the roads from the fields alongside, which were of neglected cultivation typical of the Somme area.

The whole area, being an old battle field, had been well shelled, but except in the actual patches round the villages of Frise, Feuilleres, Biaches and Barleux was not as cut up as the country north of the Somme.

East of the Somme the ground was in much better condition, and except for the actual neighbourhood of trenches, passable everywhere by all arms during dry weather.

The roads eastward from the Somme on the divisional front all radiated from Peronne, and except for mine craters were in fair condition. The country tracks were not metalled or made into "pukka" roads as on our side of the line.

The divisional railhead was at Chuignes, south of Cappy, and had been advanced there from Merignolles shortly before the advance began. Refilling points at Cappy, where the divisional train was quartered; divisional A.R.P. was 2,000 yards west of Herbecourt, and divisional

Royal Engineers' dump not far from the divisional A.R.P. The transport and wagon lines of the division were grouped along the river and canal, at Cappy, Eclusier and their vicinity.

The winter, 1916, was exceptionally hard. There had been a continuous frost from early in December right on till the end of February, and in the middle of March, when the advance took place, the roads and ground had only partially recovered from the thaw. In fact, the condition of the roads, from a mechanical transport point of view, was appalling.

On 17th March the advance was commenced by an attack on La Maisonnette Farm, which was captured and a small German rearguard here captured. Our advance was pushed vigorously.

Within forty-eight hours our advanced troops had pushed beyond Peronne, and by the 22nd practically the whole division was east of the river, with divisional headquarters at Quinconce, just outside Peronne. The outposts were in the east end of Tincourt. One crossing (pontoon) had been made over the Somme, at Bazincourt Farm. For clearness the distances referred to are tabulated below:—

Chuignes—Herbecourt	..	7½ miles fair road.
Herbecourt—Peronne	..	6 miles very bad road.
Peronne—St. Denis	..	1 mile fair road.
Peronne—Doingt	..	3 miles fair road, cratered.
Peronne—Tincourt	..	6 miles fair to good road, but narrow and badly cratered.

The total depth of the advance from old front line to outpost line of new position was 25,000 yards. Administrative arrangements to meet the requirements of the advance were as follows:—

On 19th March two companies divisional train were moved to vicinity of new refilling point in Herbecourt. On 21st, one company was moved to Bazincourt. From here, though certainly hard work owing to state of roads, the train was able to deliver to units at Peronne and Doingt, using the Bazincourt bridge.

On the 24th the infantry of the division with "Ward's Column," which was a column of all arms, under Brig.-General Ward, in front had reached a line north and south through the east end of Tincourt.

It was obvious the divisional train, strained as it was to deliver as far as Doingt, could not keep up with the infantry at this pace.

Refilling point could not be advanced, as on account of the state of the roads no lorries could be allowed east of Herbecourt.

As it was the road in Biaches was almost blocked to all traffic, owing to the misguided keenness of an anti-aircraft section, which after forcing a traffic control post, had dropped a lorry through the roadway into a dugout extending under the road at the entrance to Biaches. The situation was further complicated by the presence of the 5th Cavalry Division, whose supplies had to use the same road to Herbecourt. An appeal to Brig.-General Hambro, IIIrd Corps (Q), had effect, and thirty

wagons of the 1st Divisional Train, then at rest, were attached to the 48th Divisional Train. Permission was also granted to move eight empty 3-ton lorries of the 48th Divisional Supply Column by roads outside the divisional area into Peronne and park them there.

The divisional train was then moved into St. Denis.

A staging system with these means was then organized.

Supplies were delivered by the supply column (mechanical transport) to Herbecourt, thence to Peronne by the attached wagons and a portion of the 48th Divisional Train.

At Peronne the supplies were re-allotted to the train and the eight lorries, and so delivered to units then on the line Templeux La Fosse—Tincourt.

This system of supply lasted to the 7th April, i.e., three weeks after the advance started.

On the 8th lorries were allowed through to Peronne.

The refilling point was moved to Buire and normal system again taken into use.

The wagons 1st Divisional Train returned to their own unit.

For the whole of these three weeks the strain on all administrative units was severe and continuous. The 1st Line Transport also had a heavy task taking up the supplies and water to the advanced troops and outpost line.

Owing to the "cratering" of roads considerable repairs had to be effected, "divergencies" made and metalled and debris cleared. All this work had to be done by the horse vehicles of the train, D.A.C. and pioneer battalions, in addition to their normal duties.

The actual wastage in draught horses in these three weeks was as follows :—

Artillery, Gun and Battery.

Wagon teams, killed, died or destroyed	..	17
Wounded and evacuated at once..	..	11
Debilitated, resting or awaiting evacuation	..	100
		<hr/>
		128

Infantry, D.A.C. and Train (Administrative Transport).

Killed, died or destroyed..	..	38
Debilitated, resting or awaiting evacuation	..	50
		<hr/>
		88

As far as the animals were concerned water, especially for gun teams and infantry transport after the 28th March, was very difficult, as all wells and water points had been destroyed and fouled by manure and excreta by the Germans.

The discovery of a large reservoir at the Sucrerie at St. Emilie on the 7th April, however, solved the difficulty, and with the solidifying of the front, trench warfare conditions rapidly returned. Ammunition and Royal Engineer stores had all to be transported by horse transport or sent round a very long distance to permit of lorry transport when the lorries were allowed into Peronne.

The moves of the Divisional A.R.P. were as follows:—

Moving to Peronne between 25th March and 28th March by horse transport. On the 3rd April it was again moved forward to Hamel, and this time some lorries were made available from the advanced section.

Ordnance stores were sent direct to units when lorries were available. Nothing was sent forward till then, except of the most urgent nature, on account of the necessity for making the wagon loads as light as possible.

It must be remembered, in addition to other troubles, that we had to feed and evacuate a very considerable number of refugees, whom the Germans had concentrated and left behind.

This evacuation was co-ordinated by the IIIrd Corps and commenced very early, but it still added materially to our early difficulties.

Now, assuming the same conditions, I will consider what could have been done if the Administrative Horse Transport had been replaced by the Divisional Light Mechanical Transport Company suggested.

For clearness this is put in the shape of administrative instructions suitable to the situation.

"Administrative Instructions for the Advance," dated 16th March, 1917.

1. The roads for supply and baggage lorries using pedrails, already reconnoitred by the Officer Commanding Divisional Mechanical Transport (Light) Company will be "flagged" as arranged: red for up traffic, blue for back traffic. (*Note.*—These routes would probably have been along Canal and lower slopes of the bluffs lining the river to Bazincourt and back up (Bois de l'epée) Sword Wood Valley to Herbecourt.) No infantry or other transport to use these tracks.

2. The Baggage Section will off load baggage at company lines, and Officer Commanding Section will report to C.R.E. for orders. This section will be used till further orders for the conveyance of R.E. stores.

3. The command of the Ammunition Section, less Infantry Sub-Section, will pass to the C.R.A. at 20.00 hours to-day, who will issue such orders as are necessary for opening new A.R.P. east of the Somme. These lorries will conform to the traffic routes west of the Somme, shewn in (1) above.

4. The heavy pontoon bridge at Bazincourt will not be open for lorries and ammunition tractors till 09.00 on 19th.

5. *Supplies.*—Refilling point moves to Herbecourt on 18th. Rations for 20th, for Ward's Column, will be dumped in the field south of Sormont Farm, whence first line transport of Ward's Column will draw on the 19th.

On the 19th refilling point moves to Quinconce for all troops east of the Somme.

6. *Infantry Ammunition.*—One refill for infantry reserves will be dumped at supply refilling point at Sormont Farm (see 5 above) by 10.00 hours on 18th. On 19th an infantry A.R.P. will be opened at Peronne.

It is not worth while going into further detail. It is only desired to indicate what might have been done.

Supplies both of food and fighting stores could have kept pace with the fighting troops.

The craters in the roads could have been avoided till repaired, and there would have been transport available to do it.

The pace of the whole advance would not have depended so largely on the roads behind, and the disadvantages of having the Cavalry Division fed on the same roads greatly minimized. Water troubles would have been much less.

Now, to take the second operations, in which the weather conditions and the number of troops involved is very different. In the case just referred to only one division and one cavalry division was actively affected, the front was comparatively small and the period of advance was, even from the first, obviously limited.

The weather was cold and bad and the ground was in process of recovery from the severe frost.

Speed of movement was essential, however, if any great advantage was to be torn from the enemy rear guards.

From this I turn to the opposite.

In August, 1918, although the splendid advance started by the Fourth Army on 8th August had touched the imagination, yet there was no sign of enemy withdrawal. We had not yet gained the benefit of continual victories and most people regarded an advance into the devastated area as merely a prelude to an extremely uncomfortable winter, and although the confidence of victory had not left us, there was a feeling that the War would drag on for many years yet.

The 5th Division, whose operations it is proposed to follow, had just been transferred to the IVth Corps, and after a night concentration by 'bus and march, were bivouacked and billeted in the IVth Corps area, behind the 37th Division, and relieving the 63rd Division in that corps.

The general idea of the operations was that the 5th Division, leap-frogging over the 37th Division, was to advance on Achiet, this advance being part of the general offensive by the Fourth, Third and First Armies.

The weather was fine and hot and had held for some time.

The going was good everywhere and, except where blocked by trenches, transport of all sorts and even lorries could move off the road.

The area of concentration was still largely under cultivation, as this district had been a back area before the German advance in March and April.

The roads were generally good, even in front, wherever they had been kept up by us before, but the side roads and country tracks were ull of holes.

Two divisions had to be administered on a one division front, and that, in view of the approaching battle, a limited one.

Operations were carried on practically continually from the 21st August to the 2nd September, during which period the division advanced from west of Bucquoy, where concentration had been completed on the night of 20th-21st August, to east of Beugny, where the division was relieved by the 37th Division passing through on the 3rd September.

These operations fall into four phases:—

- (a) Concentration and attacks on 21st to 23rd August. Advance Bucquoy to Loupart Wood.
- (b) Attacks 26th and 29th. Capture and advance through Beugnatre.
- (c) Attack 30th August on Beugny—Ypres line.
- (d) Attack on Beugny on 2nd-3rd September.

Each of these, apart from brigade reliefs, etc., necessitated complicated and vitally important administrative arrangements.

The guns were constantly moving forward and their ammunition supply, especially for the advanced sections, required much attention.

The country fought over was typical Somme devastated country and destitute of water.

Supply in battle was facilitated by the use of supply tanks and by ammunition dropped by aeroplanes.

Both these auxiliaries were operated by "Q" in accordance with the fluctuating requirements. Water was the greatest difficulty, after that came the necessity for constant supervision to prevent the blocking of roads by lack of traffic control and the evacuation of the wounded during the first phase.

Divisional Train.—

Railhead was at Authieuvle at first.

Baggage Section was at Henu.

Supply Section was at Souastre.

Refilling Points at and near Souastre.

These places are eight and a half miles in rear of Bucquoy, and this was necessitated entirely by water shortage. Infantry first line transport, including that of machine gun companies, were sub-divided into "A" or fighting echelons, and "B" or administrative echelons.

All efforts were concentrated on water. "A" echelon horses were supplied with water wherever they were, the other horses had to march to the nearest water points available, and these were always some distance away.

The Corps provided three Garford water lorries to assist and G.S. wagons were converted into water carriers.

Ammunition Supply.—No dumps were made. Supply was entirely by normal D.A.C. methods. Whenever lorries were available they were used to supplement this, and tanks were also used on occasions for artillery ammunition.

R.E. Stores.—Being an old battle area, no large demands were made and the division was fortunate in finding two "pioneer parks" in the area taken over from the enemy, where tools were available.

Medical Arrangements.—There was at one time a block at the M.D.S. owing to shortage of transport to clear the wounded.

The principal lessons noted as a result of these operations were :—

1. The importance of water supply being under divisional arrangements, and a mobile reserve available which could be operated like the D.A.C., i.e., supplies to refill units' vehicles sent up as required.

2. That baggage should be with the unit, even if the horses had to go back and live near water, so that the maximum available comfort could be given to men directly a brigade was out of the actual fighting.

3. That a repair workshop (M.T.) is required, under divisional control, to keep the motor ambulances functioning to the utmost.

4. That a division requires more mechanical transport for use where horses are too slow or the distances too great.

5. That auxiliaries, such as tanks and aeroplanes, even in small numbers, could materially affect the success of the operations.

Turning now to the changes that the provision of a Divisional Mechanical Transport (Light) Company would have effected.

As the period covered several distinct operations, the answers to the difficulties and lessons explained will only be dealt with broadly.

To begin with: shortage of water. The work of "Q" during August would have lost half its terrors with no train, no D.A.C., and no ambulance wagon horses to supply. Much more could have been done in taking water to artillery horses and "B" echelons.

The infantry "A" echelons were kept going as it was.

The refilling points could have been kept close up, and time saved and congestion of the roads enormously reduced.

The fighting troops were never held up owing to the difficulties, but there is no doubt they would have been more comfortable.

The baggage, packs and greatcoats could have been brought to them at the shortest notice, and a brigade out of the battle for even one night could have had its coats and a change of clothing far more easily.

The ambulances could have been served by an advanced section of the workshops and many repairs, which sent an ambulance far back to the Mechanical Transport Company under corps control, done in the divisional area.

Those invaluable helpers, the tanks, could have been far more often used, because loads then could have been brought up as often as required and put on the ground beside them, regardless of roads.

There are hundreds of ways in which a mechanical transport company, such as is suggested, could have helped matters and could have performed the duties only carried out by horse transport, with much expense of time and strain.

It is not desired to labour the point too far. We were successful.

What is desired is to express the opinion of an individual who had the privilege of learning a little of administrative work under war conditions, and who feels that too much stress cannot be laid on the lessons of the late War before the memories of actual conditions have passed away.

The horse is a noble animal, but there are lots of things a motor vehicle can do which he is unfortunately unable to carry out.

APPENDIX I.
Establishment at End of Late War. All figures excluding attached.

Unit.	Personnel.					Animals.		Bicycles, Vehicles, etc.						Ammunition.					Remarks.			
	Officers.	Warrant Offs.	Sergeants and	Artificers.	Other Ranks	Total.	Riding.	Draught.	Total.	Bicycles.	Carts, Maltese.	Carts, Water.	Wagons, G.S.	Wagons, L.G.S.	Wagons, Limbered Art.	Total.	18-Pounder.	4' 5 in. Howtz.		S.A.A.	Grenades.	Total Rounds.
D.A.C. H.Qrs. and 2 Sections	11	3	15	22	416	467	53	412	465	8	1	3	26	—	48	78	3,600	1,368	—	—	4,968 Rounds	Varied somewhat if 6 in. T.M. ammunition was carried as well. Replaced by Artillery Sub-Section M.T. Light Company.
S.A.A. Section	4	1	5	9	149	168	20	180	200	3	—	—	26	15	—	41	—	—	1,080,000	5,520	1,080,000 S.A.A. 5,520 Grenades	These 4 wagons were sometimes emptied of grenades and 6 in. T.M. taken in place of unloading gun ammunition. Replaced by S.A.A. Sub-Section M.T. Light Company.
Divisional Train.	22	8	21	48	323*	439*	44	321	365	43	1	4	134	11	—	150†	—	—	—	—	Not counting carts 209 tons.	*Includes 16 clerks. †Three motor cars as well. Replaced by Supply and Baggage Sections M.T. Light Company.
3 Field Ambulances	30	3	39	6†	524	602	33	117	150	3	3	3	9	30	—	42	—	—	—	—	45 tons.	Not counting purely medical vehicles such as ambulances. †Attached. Replaced by medical vehicles of a section of M.T. Light Company.

APPENDIX II.

*Establishment of a Divisional Light M.T. Company.**Personnel in Detail.*

Detail.	Officers.	Warrant Offs.	Sergeants and S/Sergeants.	Artificers.	Rank and File.	TOTAL. All Ranks.	Remarks.
Headquarters :—							
Lieut.-Colonel	1	—	—	—	—	1	<i>a</i> Temporary or Acting Rank whilst performing duties of
Major	1	—	—	—	—	1	Adjutant.
Captains	<i>a</i> 1	—	—	—	—	1	<i>b</i> 1 Quartermaster.
Subalterns	<i>b</i> 2	—	—	—	—	2	<i>c</i> Attached from a Field Ambulance.
Medical Officer (attached)	<i>c</i> 1	—	—	—	—	1	<i>g</i> Batman of W.O's.
Coy. Sergt.-Major	—	1	—	—	1 <i>g</i>	3	<i>d</i> Corporal.
Coy. Q.-Mr.-Sergt.	—	1	—	—	—		<i>e</i> Spare man to be Mess Cook.
Orderly Room Clerk	—	—	—	—	1 <i>d</i>		<i>f</i> Found on mobilization by Employment Company.
Clerks	—	—	—	—	5	5	
Batmen	—	—	—	—	7 <i>e</i>	7	
Sanitary Orderlies and General Duties	—	—	—	—	4 <i>f</i>	4	
Total Headquarters ..	6	2	—	—	18	26	
Headquarters Section :—							
Captains	<i>h</i> 1	—	—	—	—	1	<i>h</i> O.C. H.Q. Section.
2nd Lieutenants	2	—	—	—	—	2	<i>k</i> Corporals and paid L/Corporals.
Section Sergeants	—	—	1	—	—	1	<i>l</i> Detail of duties under transport, in detail.
Duty Sergeants (Qual. Drivers)	—	—	2	—	—	2	<i>m</i> 10 of these to be provided on mobilization from Employment Company.
Duty N.C.O's.	—	—	—	—	<i>k</i> 4	4	<i>n</i> Includes 8 Spare Car Drivers.
Lorry Drivers	—	—	—	—	32	32	
Car Drivers	—	—	—	—	12	12	
Cleaners	—	—	—	—	15	15	
Spare	—	—	—	—	20	20	
Total H.Q. Section ..	3	—	3	—	85	91	
Repair Workshop :—							
Captains	<i>o</i> 2	—	—	—	—	2	<i>o</i> 1 O.C., 1 Second in Command.
Lieutenants	4	—	—	—	—	4	<i>p</i> Included 4 Sergeants, 8 Corporals and L/Corporals.
Foremen	—	—	—	2	—	2	<i>u</i> 50 per cent. of these to be Fitters.
Fitters and Turners	—	—	—	20	—	20	<i>s</i> 1 trained as Officers' Mess Cook.
Blacksmiths	—	—	—	6	—	6	<i>t</i> 2 of these for D.H.Q. Electric Light Lorry.
Wheelers	—	—	—	6	—	6	<i>u</i> Includes Drivers for Workshop Lorries and Stores Lorries.
Electricians	—	—	—	8	—	8	
Batmen	—	—	—	—	5	5	
Spares	—	—	—	15	—	15	
Total Workshops ..	6	—	—	57	5	68	

APPENDIX II—continued.

Personnel in Detail.

Detail.	Officers.	Warrant Offs.	Sergeants and S/Sergeants.	Artificers.	Rank and File.	Total. All Ranks.	Remarks.
No. 1 Ammunition Section :—							
Captains	1a	—	—	—	—	1	a O.C. Section.
Subalterns	5b	—	—	—	—	5	b 2 to each Sub-Section, 1 spare at Section H.Q.
Sect. Q.-Mr.-Sergt. ..	—	1	—	—	—	1	c 1 R.A., 1 Infantry, trained in Stokes bombs and grenades.
Sect. Office Clerks ..	—	—	—	—	3	3	d Two-thirds R.A., one-third Infantry, trained in Stokes bombs and grenades, to include 2 Corporals and 2 Bombardiers.
Sub-Sect.-Sergts. ..	—	—	2	—	—	2	e 50 per cent. of these from Employment Company on mobilization.
Drivers	—	—	—	—	124f	124	f Including Car Drivers for Section Cars.
Cleaners	—	—	—	—	40	40	h 1 trained as Officers' Cook.
Loaders and Spare ..	—	—	—	—	100e	100	
For care of Ammunition (attached).	2c	—	2	—	30d	34	
Batmen	—	—	—	—	7h	7	
Total Ammunition Section ..	8	1	4	—	304	317	
No. 2 Baggage Section :							
Captains	1a	—	—	—	—	1	a O.C. Section.
Subalterns	4b	—	—	—	—	4	b 2 to each Section, 1 spare at Section H.Q.
Sect. Q.-Mr.-Sergt. ..	—	1	—	—	—	1	c Includes Drivers for Section Cars.
Sect. Office Clerks ..	—	—	—	—	3	3	
Sub-Sect. Sergts. ..	—	—	3	—	—	3	
Drivers	—	—	—	—	54c	54	
Cleaners	—	—	—	—	18	18	
Spare	—	—	—	—	15	15	
Batmen	—	—	—	—	8	8	
Total Baggage Section ..	5	1	3	—	98	107	
No. 3 Supply Section :							
Captains	1a	—	—	—	—	1	a O.C. Section.
Subalterns	5b	—	—	—	—	5	b 2 per Section, 1 with Section H.Q.
Sect. Q.-Mr.-Sergt. ..	—	1	—	—	—	1	c 1 Requisitioning Officer, 1 Supply Duties.
Sect. Office Clerks ..	—	—	—	—	3	3	d Includes 12 Butchers and 20 Issuers. Of above 9 Corporals and L/Corporals.
Sub-Section Sergts. ..	—	—	3	—	—	3	f Supplemented by 12 men from the fighting personnel of Brigade Group on mobilization. These men to be trained Lewis gunners and be available for Anti-aircraft Lewis guns.
Supply Details	2c	—	—	—	32d	34	g Including Drivers of Section Cars.
Supply Loaders	—	—	3	—	45f	48	
Drivers	—	—	—	—	76g	76	
Cleaners	—	—	—	—	25	25	
Spare	—	—	—	—	20	20	
Batmen	—	—	—	—	6	6	
Total Supply Section ..	8	1	6	—	207	222	

APPENDIX II—*continued.**Recapitulation Personnel.*

Detail.	Officers.	Warrant Offs.	Sergeants and S/Sergeants.	Artificers.	Rank and File.	TOTAL. All Ranks.	Remarks.
Headquarters ..	6	2	—	—	18	26	Giving a saving in all ranks, not counting Field Am- bulance Drivers, etc.
Headquarter Section ..	3	—	3	—	85	91	
Repair Shop ..	6	—	—	42	20	68	
Ammunition Section ..	8	1	4	—	304	317	
Baggage Section ..	5	1	3	—	98	107	
Supply Section ..	8	1	6	—	207	222	
Grand Total ..	36	5	16	42	752	831	

APPENDIX II.

Establishment of a Divisional Light M.T. Company. Transport (in Detail.)

Detail.	Cars.	Side Car Combinations	Motor Cycles.	"Push" Bicycles.	3-ton Lorries (Com'cl.)	3-ton Pedrail Lorries.	2-ton Arm'n Lorries.	Workshop Lorries.	Stores Lorries.	150-gal. Water Lorries.	Water Trailers.	Box Cars.	Total Vehicles and Cycles.	Remarks.
Headquarters of Coy.	..	2 ^a	2	—	—	—	—	—	—	—	—	—	6	^a Drivers on Headquarters' Section strength.
Headquarters' Section	..	8 ^b	1	1	10 ^c	5 ^d	—	—	—	2 ^e	—	—	30	^b Includes Div. H.Q. 6 cars, D.A.D. of S. 1 car, Section 1 car.
Spares ..	..	—	—	—	1	1	—	—	—	1	—	—	—	^c Includes delousing lorries 2, D.A.D. O.S. 4, Post 2, Veterinary (Mob. Vet. Sec.) 1, M.T. Coy. Headqs. 1.
Repair Workshop	..	—	2	2	—	—	—	3	3 ^g	—	1	2 ^k	18	^d Includes Div. H.Q. baggage and supply, D.H.Q. electric light.
Spares ..	..	—	1	1	—	—	—	—	1	—	2	—	—	^e Includes 1 for D.H.Q.
Ammunition Section	..	2	2	3	—	—	60	—	—	—	1	—	10	^f 1 fitted for use as first-aid lorry.
Spares ..	..	—	—	—	—	—	10	—	—	—	—	—	—	^g 30-cwt. pneumatic tyres.
Baggage Section	..	2	3	3	—	41 ^m	—	—	—	—	1	—	59	^m Includes medical tentage for ambulances.
Spares ..	..	—	—	—	—	7	—	—	—	—	—	—	—	
Supply Section	..	2	3	3	—	36	—	—	—	—	1	—	53	
Spares ..	..	—	—	—	—	6	—	—	—	—	—	—	—	
TOTALS ..	..	16	14	10	11	96	70	3	4	3	6	2	246	

APPENDIX III.

Road Space.—Divisional Light Mechanical Transport Company. Omitting cars and cycles moving independently :—

- 166 large Lorries, 2 and 3 tons, special make.
- 11 3-ton Commercial Lorries.
- 3 Workshop Lorries.
- 4 Stores Lorries (3-ton).
- 3 Water Tank Lorries.
- 6 Trailers. (Allowing full distance for these trailers although only half generally required.)

193

Field Service Regulations. Part 1 (Reprint 1916). Note to page 51 gives space occupied in column of route for a lorry as six yards. In view of war teaching this would appear inadequate. Fifteen yards is taken as being more correct under present conditions for fast traffic.

193 vehicles at 15 yards is 2,895 yards ∴ } 3,295 yards.
 Distance at 100 yards between sections, 400 yards .. ∴ }

Approximately two miles. Time to cover this distance, twelve minutes.