

CHAPTER IV

THE FRONT

NOWHERE was the development of Ordnance services so marked as at the front, as one fact alone will suffice to show. The establishment of the Army Ordnance Corps with six divisions at the outbreak of war comprised six officers and six clerks; while before its close a similar force required 37 officers and 336 other ranks.

The highest organization under General Headquarters of our Expeditionary Force—the Army Corps—existed only for the purpose of command, the largest administrative unit being the division. But no sooner was it realized that this force would be greatly expanded, than it became obvious that some intermediary was required betwixt G.H.Q. and the Corps for the purpose of command, or the division for that of administration. For this purpose the Corps then overseas were formed into two Armies in January 1915, a third was added in July, a fourth in April 1916, and a fifth in June of the same year.

The object of creating Armies being to decentralize both command and administration, each was given a staff similar to that at G.H.Q., with a D.D.O.S. among the representatives of Directorates.¹ No instructions were issued defining the functions of the D.D.O.S. of an Army, but very quickly, and without any written order, he passed into the same position *vis-à-vis* his D.A. and Q.M.G. as that held at G.H.Q. by the D.D.O.S. under the Q.M.G.

¹ The occupants of these posts were as follows :

1st Army. Colonel Usher Smith, until August 1917 when, being appointed D.O.S., Salonika, he was relieved by Colonel Forbes. When the latter was appointed D.O.S., Mesopotamia, in March 1918, he was succeeded by Brigadier General Scott from East Africa.

2nd Army. Colonel Hale, who went to the Italian front with his Army Headquarters in the autumn of 1917.

3rd Army. Colonel Moulton Barrett, until January 1918 when, on appointment as liaison officer with the United States Army, he was relieved by Colonel Watts. In the following May Watts went to the War Office and was succeeded by Colonel Tufnell.

4th Army. Colonel Bush.

5th Army. Colonel Hamilton.

At G.H.Q., as has been shown, the staff and departmental functions of the Corps were unfortunately separated, but here they were combined ; the D.D.O.S. being in direct communication with his Director on departmental questions, besides supervising all Ordnance establishments in the area occupied by his Army.

The next step, taken in the autumn of 1915, was due to the shortage of trained Ordnance officers of the regular army. The Ordnance officer with the division was by now a temporary officer, whose work during the first part of his career needed close supervision, and the D.D.O.S. of an Army could not spend his whole day touring from one to another to see that everything was up to the mark. Each Corps was therefore given a minute Ordnance staff under an Assistant Director, the orders being that this officer was to have as little office work as possible and be free to visit the temporary officers serving with his divisions. But no sooner did the front become static than a great change came over our organization. Instead of existing for the purpose of command, the Corps became the main administrative unit, holding semi-permanently a certain sector with a fighting front and a rest area while divisions moved to and fro according to the tactical situation ; and, in point of fact, the Q. staff officer of the Corps was only too ready to hand over to the A.D.O.S. his multifarious correspondence on Ordnance subjects, so that he soon held a position in his Corps corresponding to that of the D.D.O.S. in the Army.

At the front there were numerous " trench stores," such as periscopes, trench-stretchers and gum-boots, handed over from one relief to another ; and further back were permanently equipped billets and camps, baths, laundries and other institutions ; and the A.D.O.S. had to deal with a great variety of subjects.

At the outbreak of the war all fighting units were embodied in the division, and when siege batteries began to arrive they were at first provided for by the D.A.D.O.S. of one or other division. But the number of these non-divisional units, serving directly under the Corps Commander, rapidly increased and Corps Troops Ordnance

Officers were appointed to cater for them. The duties of these officers, under the A.D.O.S. of the Corps, were executive ; and they had charge of such Corps reserves of equipment as were formed. Seeing that Corps Troops might number some seventy units, whose technical equipment was of all kinds and conditions, the O.O. Corps Troops was an essential appointment. Later on Ordnance officers were appointed to fulfil similar duties for Army Troops, who might be even greater in number and spread over a much wider area. In fact there were often two O.O.s Army Troops, and at one time in the 1st Army as many as four, so great was the zone occupied.

Another new establishment was the Officers' shop established during the summer of 1916 in each army area, where stocks of every requisite, from collar studs to field boots, were held. These small Ordnance depots sold goods over the counter ; and most popular they were, dispensing many thousands of pounds worth each in the course of the month. In fact it was always difficult to keep a sufficient stock, so great was the demand.

In the division, the Deputy Assistant Director of Ordnance Services (a cumbrous title always abbreviated into the coined word *Dados*) combined administrative with executive functions ; and the position of these temporary officers, entirely new to the work, depended largely on their own fibre and that of their general and his staff. In most divisions D.A.D.O.S. was as much a member of the Q. Staff as in higher formations, in others little more than an executant ; and it was very noticeable and natural that, wherever the former was the case, Ordnance services would be the more efficiently administered. Two illustrations will exemplify this contrast in attitude.

The first refers to an inspection by a divisional general who noticed that certain accoutrements were deficient. The explanation given was the stereotyped one that they could not be got from the Ordnance, a reply that would usually pass muster without further enquiry and have no result except to create an impression that D.A.D.O.S. was slack. In this case, however, the G.O.C. adopted the

unexpected course of asking that the indents might be produced for his inspection after the parade. One battalion then discovered that it had forgotten to demand, while in the other two, so-called copies of the indents appeared after some delay. The next day the G.O.C. paid a visit to his Ordnance officer's dump, where he saw a number of the items that were wanting ; he then asked to see what indents were outstanding and found there were none. The documents produced for his inspection the previous day had been forged, and the Quartermasters of the battalions concerned were sent home. Here is a case where the general himself took an interest in matters. Where this was so there would be effective checks against extravagance and waste. An excellent plan sometimes adopted was to have weekly conferences of Quartermasters attended by the Q. staff and Ordnance officer to discuss and smooth out any difficulty.

The next case relates to the refitting of a division which took part in the battle of Loos in September 1915. At midnight a telegram reached Colonel Usher Smith, D.D.O.S. 1st Army, saying that the division had lost *the whole of its equipment* which was to be instantly replaced "without the formality of indents and vouchers." No doubt the officer who sent this telegram thought to over-ride red tape ; but he should have known better. Regimental accounts with their vouchers were abolished on service and indents were nothing more than lists of what was wanted. Usher Smith at once sent off Major Routh Jones, his assistant, to discover the real situation. By routing out the Q. Staff officer of the division and the D.A.D.O.S., and visiting each brigade and unit in turn, it was possible to obtain the true picture by nine o'clock the next morning. And the only important deficiencies proved to be 26 machine guns, 76 bicycles and 5 pontoon wagons, all of which were fetched from Calais by lorry in a few hours. Here was a case of a division with an ignorant staff and a D.A.D.O.S. acting merely as an executant, a result probably due to his own character and want of experience.

Later on such a refitment as this would have proceeded

as a matter of routine. Units had learnt better how to look after themselves and the staff and Ordnance officer had also profited by experience, so that refitments proceeded with a minimum of time and friction.¹

Turning next to the executive side of the work. A special feature was the dump, which, should the division be in a quiet part of the line, might reach substantial dimensions. The dump was the inevitable outcome of stationary warfare, it came into existence automatically and in the circumstances was very useful. Especially owing to the bulk issue system, stocks were bound to accumulate through items being asked for and then, for some reason such as a move or casualty, not wanted. In mobile warfare anything of this sort must have been promptly returned to the base, but now it was kept to meet the next demand. There was consequently always a floating stock of articles of which there was a regular consumption; and some divisions encouraged the expansion of this dump to such an extent that it was very cumbersome to move.

There were different modes of making issue to meet different conditions. Sometimes what arrived from the base would be first distributed to the warrant officers, of whom there was one per brigade and one for divisional troops, and the warrant officer then issued each unit with its share; but where the division was concentrated the whole process might take place at the dump, a refinement sometimes adopted being to allot hours for drawing equipment to each unit.

Although Ordnance officers with formations kept no ledger account, they were required to maintain a record of all the more important items issued or of what was sent up in bulk from the base for distribution, including the floating stock held at the dump.²

¹ Instruction on the subject, issued in the autumn of 1916, are given in Appendix IV.

² A point worth mention is that for long there was no recognized way of keeping this record. Each A.D.O.S. had his own ideas, and every time the unfortunate D.A.D.O.S. moved into a new Corps, he was likely to be told to revise his system. Eventually printed forms were employed, saving much time and trouble.

This record enabled a rough and ready comparison to be made between the care or extravagance of different units, and it was very striking how invariably a high state of efficiency and discipline was accompanied by economy. The smarter the regiment the more care it took of its clothing and equipment.

As time went on and the conservation of materials became so important, records of issues was more carefully scrutinized and made to show what proportion of the articles replaced was returned. To encourage a spirit of emulation, divisions published comparative statistics in their orders of what had been drawn and handed in by each unit, and Armies similar statements to show the degree of care exercised by each of their divisions.¹

The last effort at economy, introduced in the summer of 1918, was to give each formation a weekly ration of clothing and certain other articles. This plan had been tried for three months in one division and found to answer admirably. It gave units an indication of what was a reasonable allowance, and if this fell short a special application could be made; but it was adopted too late in the day to be fully effective.²

Closely connected with this branch of Ordnance work were the repair establishments which, though not officially

¹ As an example of rough-and-ready justice the following order of the Canadian Corps Commander is worth quoting: "In future, indents on Ordnance for mess-tins and puttees will be forwarded to the Base and when the stores are received by the D.A.D.O.S., Units will be notified. Issues will, however, not be made until 90 per cent of the old mess-tins or puttees are turned in. A certificate signed by the Paymaster of the Unit, showing that the value of mess-tins or puttees lost by the men has been deducted from their pay, will be accepted in lieu of the mess-tins or puttees so lost."

² The monthly allowance was as follows:

<i>Per 100 dismounted Men.</i>	<i>Per 100 mounted Men.</i>
Jackets . . . 12	12
Trousers . . . 15	—
Pantaloon . . . —	20
Puttees . . . 12	12
Caps . . . 5	5
Mess-tins . . . 5	5
Ground sheets . . . 4	4

recognized, existed in every formation that took any interest in self-help, sometimes on a Corps, brigade or even unit basis, though more usually as divisional organizations supervised by D.A.D.O.S.

Of these the most important and universal was the armourer's shop. When a battalion was in the line there was very little its armourer could do, and he was apt to be employed on any odd job; one, who was a champion grenade thrower, was employed as instructor, while another was recommended for mention in despatches on account of his pluck in carrying forward rations to exposed trenches. But by concentrating all the armourers, or it might be all except one per brigade, in a central shop, very valuable work could be done. A good supply of tools would be collected, and components accumulated automatically from the rifles of casualties. From these a pool of serviceable weapons would be formed and the division would become practically self-supporting. It was only a very light class of work that the individual armourer could carry out when working in his regimental lines, but in a central shop repairs of a heavier sort could be made. All the Lewis and Vickers guns, and the whole of the bicycles of the formation would be periodically overhauled, broken rivets in steel helmets renewed, and other equipment mended, manufacturing work being even sometimes attempted on a small scale.

Other shops were staffed by allowing men from regiments to work at their trades or by engaging French labour. A very useful institution often to be found was the bootmaker's shop. If there was anywhere where a stitch in time saved nine it was here. A boot which had adjusted itself to the foot was so much more comfortable than a new one that, by the time it was discarded, it was often too far gone to be profitably repaired; and there was a prejudice against getting "dead men's shoes" from the base. At the divisional boot-shop the soldier would get his own boots back after resoling or heeling, and a substantial saving of railway transport between the front and rear resulted. In one division, D.A.D.O.S. dealt with 630 pairs a week, and where the boot was too

bad to mend it was given a wooden sole and used as a clog in muddy lines. Some also had tailor's, saddler's, carpenter's, blacksmith's and farrier's shops, where new horse-shoes would be forged out of old or from iron procurable locally. One division employed three tailors in sewing together the best pieces of worn-out puttees to make new, while another manufactured all its own nose-bags. Not only did those commanders, with their staff and Ordnance officers, who interested themselves in such matters reduce substantially the consumption of materials at a time when there was a such a dearth, they helped to lessen the immense burden of debt with which the country has been since saddled.

The first occasion when any special steps were taken to collect stray goods abandoned by the troops was at the end of September 1914 when a party, including two A.O.C. sergeants, was sent to scour the ground covered in our retreat to the Marne and collect anything to be found; this resulted in the recovery of a substantial quantity of goods, including 500 great-coats and other equipment discovered in a church at Coulommiers.¹ But the credit for setting up regularly organized salvage operations belongs to the 4th Division which, during the second battle of Ypres in May 1915, used to send up at daybreak every morning a party under its D.A.D.O.S. or some other officer from its headquarter staff to collect anything on which it could lay hands. Infantry passing back to rest were also instructed to dump in Ypres what they might find, which was brought back by the salvage party, D.A.D.O.S. making use of anything he required and sending the rest back to railhead. Among other items, 10,000 rifles were collected in five weeks.

The good work was continued by others and extended elsewhere, especially in areas that had been covered by operations. Statistical records would be published of

¹ The German Emperor in his book gives as one reason why England and not Germany was responsible for the war, that we had for years past stored reserves of clothing in the north of France! This illusion is based solely on the great-coats and other articles abandoned during the retreat and found by the Germans.

what had been collected by different units ; and rivalry became so keen that one Australian division, in its efforts to beat the New Zealanders, stole a lot of copper pans and pots from a derelict brewery to acquire merit. Nevertheless the progress of the war led to the presence of large zones of territory, the scene of successive engagements, in which the amount of derelict material lying about was very great.

It was to cope with this that a Salvage Section was attached to each main formation, aided by men from the Employment Companies formed of those unfit for the trenches. The method of conducting operations varied, and though the Ordnance was not actually responsible for the work, the great bulk of what was retrieved comprised Ordnance stores, so that success was impaired unless the Salvage officer worked in close harmony with the Ordnance officer.

In normal times a divisional organization was adopted, and here the harvest was in inverse ratio to the efficiency of unit administration. If much was found lying about the obvious reason was that equipment was not properly cared for. In those formations that had well-planned schemes the salvage dump was close by that of the D.A.D.O.S. who collected therefrom what he might need, and who would see that anything else of value was properly treated, and rubbish destroyed before the residue went to the base.

During periods of heavy fighting a Corps organization answered better, for then one division after another would enter and leave the battle. At such times the divisional salvage staff would be merged and everything brought into a Corps dump, in which the A.D.O.S. would be equally interested. When the fight was over whole battalions might have to be told off to collect the litter with which the scene of battle would be strewn.

The third form of salvage scheme was that adopted on the southern portion of our front, where successive tides of advance and retreat left immense masses of materials stranded. Here the organization was by areas, the whole in charge of the Army Salvage Officer. But

whether the organization was one of the Army, Corps or Division, the measure of its success, apart from the manual work of collection, depended upon the extent to which operations were supervised by the D.D.O.S., A.D.O.S., or D.A.D.O.S., as the case might be.

Readers of the earlier part of this book may recollect that the War Office had reluctantly agreed to the presence of a small Ordnance staff at the front, when the keeping of regimental equipment and clothing accounts was abolished on service after the South African campaign, solely because in no other way could the interests of economy be safeguarded; and it is indisputable that on these grounds alone the innovation was amply justified in the Great War, when the resources of the Empire were so strained.

But, when all is said and done, economy was only a secondary aspect of the work of a branch whose business it was to supply the troops with almost all they needed besides food. And, over and beyond the daily routine of furnishing their wants, the shifting kaleidoscope of the war continually revealed some fresh pattern. There was always some new problem to be solved.

Every autumn there would be the whole of the winter clothing and blankets to be got up and distributed, an enormous bulk which might entail arrangements for special trains to special centres. Six months later this would all have to be collected and returned, and other items worn in summer obtained instead. Fresh groupings and reorganizations which affected scales of equipment were constant occurrences, and to keep the list of each unit's equipment up to date was in itself an arduous labour. One day there would be a new camp to be formed in a rest area or a new bombing school to be furnished, a laundry to be stocked, its consumption of clothing to be checked or a complaint as to the soap provided for its use investigated; another day special arrangements perhaps to supply dry socks in waterproof bags to a bad section of trenches or to mend and dry trench gum-boots. Hardly a week would pass without some novel article

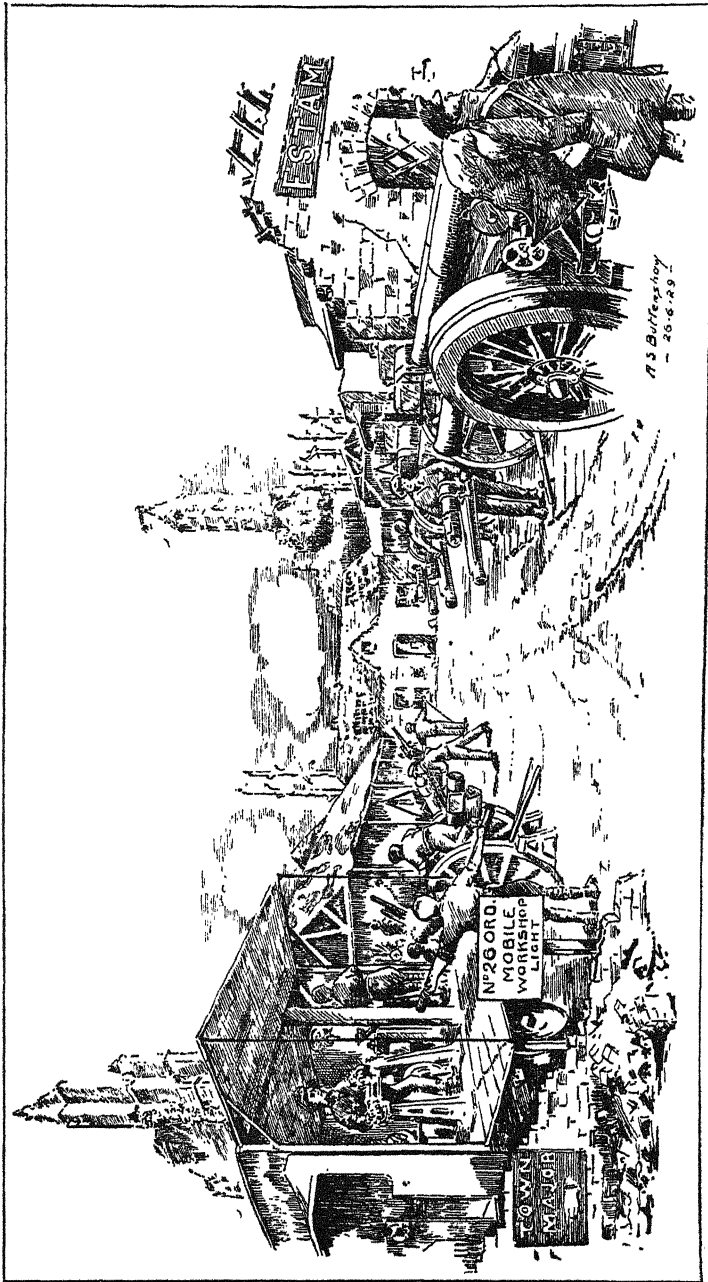
being wanted for a trench raid or some other special purpose ; and hardly a week without some invention having to be tested or an application for extra equipment investigated. In such cases there was rarely any precedent. Each had to be examined on its merits ; and though many were unconsidered fads, the grain had to be scrupulously sifted from the chaff, and great tact displayed when turning down even the wildest suggestion, to avoid a feeling of grievance.

When operations on a grand scale were in contemplation the Ordnance was kept busy for a month or more beforehand. Plans would be drawn up for collecting trench and area stores to be left behind in case of a substantial success, when these would have to be taken over by the lines of communication. There would be heavy calls for many special battle stores to be used during the fighting, and for pack transport wanted during an advance over an area strewn with shell craters ; and with whatever care plans were framed there was invariably something extra found wanting at the eleventh hour. Next, during the progress of the operation, there would be insistent and incessant demands to replace battle casualties ; and lastly the refitment of every unit that had passed through the furnace, with the collection of captured guns to be earmarked as trophies and the equipment of cages for prisoners of war.

Altogether the work was of great variety and interest, especially when it is borne in mind that certain major services which absorbed a large proportion of the energies of the Corps remain to be described—those, to wit, connected with the maintenance in action of the guns of which such enormous use was made in this form of siege war.

Ammunition supply will be dealt with as a whole in a subsequent chapter ; while in the following pages the methods of repair and replacement of artillery equipments will be described.

So fully did the mobile gun workshops sent to France in 1914 justify their existence that in May 1915 the scale was increased to two per Corps. The establishment was



A Typical Mobile Workshop

one Ordnance Mechanical Engineering Officer and 21 other ranks, the whole equipment being carried on two lorries ; one fitted up as a workshop with machine tools, and the other as a store for materials ; though a third lorry was later added and the equipment of machinery increased.

But these light workshops, conspicuously successful though they were, could not retain their quality of mobility if they were to carry the machinery required for much of the heavy class of work entailed in the repair of the large calibre siege howitzers that were beginning to arrive ; and, in March 1915, sanction was given for the creation of Heavy Ordnance Mobile Workshops on the scale of one per Army. Unlike the light shops which, though Corps organizations, were allotted according to gun strength and were therefore frequently on the move, the heavy stayed with the Army, acting as a feeder by making fittings or half-wrought stores, and undertaking jobs beyond the capacity of the light shop. It had a very full complement of machine tools from a steam hammer downwards and its establishment, two engineering officers and 89 other ranks, embraced every variety of trade. Here also was stationed the Assistant Inspector of Armourers, a grade created during the war, who supervised small-arm work and carried out experiments connected with machine gun equipments.

Armies were very quick to appreciate the advantage of an organization capable of providing any special store of a non-service character and the heavy shop was called on to undertake a great amount of manufacturing and experimental work, developing into a very large and unwieldy establishment—so that to call it mobile was really a misnomer. More and more machine tools would be asked for, artisans in the ranks of the army would be employed besides a large body of civilians, and from a hundred to two hundred hands would be constantly at work. During stationary warfare with masses of heavy siege howitzers the establishment was undoubtedly very useful, but in any other conditions it could not have

existed except further to the rear on the lines of communication.

In 1916, heavy artillery arrived in far greater numbers and a third type, the Medium Ordnance Mobile Workshop, was added on a scale of one per Corps, but distributed according to gun strength. This, like the light shop, was intended to be really mobile, its more substantial equipment requiring five lorries; though both tended to take root, especially when on a fairly quiet part of the front. Whenever possible a site would be found in some manufacturing works or a garage having useful machinery would be hired, and more materials accumulated than could be carried on the lorries; though here, unlike the heavy shop, expansion was in some degree checked by moves due to changes in the tactical situation.

The allotment was approximately one light shop per 100 guns and one medium per 90. The population of these institutions fluctuated with the number of extra hands, the following being a rough approximation of the eventual numbers, civil plus military.

Heavy	5 shops	900 employees
Medium	20 "	800 "
Light	40 "	1300 "
	<i>Total</i>	<u>3000</u> ¹

Co-ordination in methods and procedure was ensured by Section Inspectors who supervised the work over a large area, and, with the assistance of the workshop officers, carried out inspections at gun positions and took measurements of bores; the final technical responsibility for the work in the Army resting with the Chief Ordnance Mechanical Engineer who formed part of the staff of its D.D.O.S.

The last new establishment formed to deal with artillery materiel was the Ordnance Gun Park, first sanctioned in March 1917. By that time spare guns and components

¹ In addition, when Tanks arrived, a special gun workshop was established at Tank Corps Headquarters, with branches at the front, a total personnel of 160 being employed.

were more plentiful, so that it was no longer essential to hold the entire reserve in one central pool at the base, available to reinforce any part of the line. To reduce to the utmost the time taken in replacing casualties, each Army in turn was given a gun park to hold a stock of the guns and carriages in most common use together with their adjuncts, trench mortars and machine guns. These institutions were regular Ordnance depots in charge of an officer, with a fixed stock and keeping ledger accounts; and they were usually situated alongside the heavy workshop. The two were of mutual assistance, the park by providing materials for the shop, and the shop by making some fitting urgently wanted by the park. By this means also they could make use of a combined lorry service to those they served.

The machine guns, mortars and appurtenances were at the disposal of the Army but the guns and carriages was controlled by G.H.Q. Casualties were wired to the Q.M.G. who, in deciding what action should be taken, had to take into account the whole gun situation in France, both at the front and on the lines of communication. The machinery was very elaborate and furnishes a striking example of the duplication of work due to the office of the D.O.S. not being incorporated in that of the Q.M.G. Both had to keep the same records, every return of stock, either at the park or the base, had to be prepared twice over and every report of a casualty or instruction for its replacement concerned both. As an almost inevitable consequence misunderstanding and the issue of conflicting orders from the two offices occurred in times of stress, when reports of casualties followed close on each other's heels.

The Park, like the Workshop, tended to expand. By degrees its stock of guns was increased, wagons, limbers and platforms were added; and it proved a convenient centre for storing reserves of all kinds of battle stores. The number of items stocked grew to some 3000, with maybe 1000 transactions in 24 hours in busy times.

It would be difficult to overrate the value of these

establishments during intense and prolonged fighting when gun casualties were so severe. Prior to an attack it was possible to reduce the guns out of action to as low a figure as 1 per cent, and by dint of exertions the number undergoing repair might be kept down to 3 per cent during its progress ; but where time was chiefly lost was in journeys between the shop or park and gun positions, which would raise this figure as high as 15 per cent out of action. To reduce this loss in efficiency, an advanced gun park would be thrown out at such times, and light shops would be pushed up with detachments working in cellars or dugouts even further forward ; so that guns might be visited in their positions and minor adjustments or replacements effected on the spot. During the progress of a battle, work would never cease day or night, and be carried on in very harassing conditions, exposed to shell fire. Altogether it would be difficult to conceive of conditions less favourable to the nicety and deliberation usually associated with mechanical engineering operations. Many acts of bravery on the part of the workshop staff and armament artificers attached to artillery brigades were recorded.¹

Apart from damage by shell fire, the greatest cause of trouble was the buffer, especially that of our field gun. Neglect to keep it full of oil, combined with leakage through glands and packings, would result in excessive recoils, imposing an undue strain on the whole equipment and in particular on the recuperator system.

¹ These obviously cannot be quoted in full, but two of which I find mention in the D.O.S.'s diary on the same day will serve as examples, the Distinguished Conduct Medal being awarded in each case.

Armament Staff Sergeant Drew. Under an intense and concentrated hostile bombardment of our battery positions, he went on his own initiative round all the batteries to see if his services were required for repairs. The shelling was so intense that all the personnel had been withdrawn, and the coolness and disregard of danger which he displayed were beyond all praise.

Armament Staff Sergeant Primrose. For conspicuous gallantry and devotion to duty in sticking to his work on one of the guns under a heavy gas-shell bombardment, until blown from the gun by a shell. Although severely shaken he resumed his job and did not leave it till the gun was in action again.

Buffers would become bulged, piston rods elongated and running out springs would acquire a permanent set and lose their temper.¹ At one period of heavy fighting in the 4th Army the consumption of springs rose to 200 inner and 200 outer a day, and it was fortunate that a firm in the north of France, was discovered capable of retempering them.

The following figures, which refer to the work of sixteen light and five medium shops during six weeks fighting in 1917, show how impossible the situation would have been without well-equipped workshops close to the front.

	Guns and carriages overhauled and re-issued.	Average rounds fired per piece during the period.
18-pr. gun	999	4720
4.5 how.	177	3096
60-pr. gun	140	3073
6-inch—30 cwt. how.	3	3560
6-inch—26 cwt. how.	260	4021
6-inch gun	2	2502
8-inch how.	58	2666
9.2-inch how.	31	2134

Besides which 450 guns and 390 carriages were condemned as unserviceable or for repair at the base, being replaced with few exceptions from the gun park.

It must be added that the efforts of these workshops were well recognized. Few periods of active hostilities but earned them special mention from Army or Corps Commanders and their artillery generals. No branch of the Corps had then to work at such high pressure, and the duties on which they were engaged were bound to strike

¹ The normal capacity of the 18-pounder buffer was 4.5 pints, and of eight carriages overhauled, where the contents were measured, the amount of oil present was as follows :

3.5 pints	2.5 pints
2 "	2.75 "
3.25 "	almost full.
1.75 "	almost empty

To fire a gun very rapidly with insufficient oil in its buffer is something like driving a car at racing speed when its crank-case is short of oil.

the eye of a commander whose force included such a mass of guns.¹

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It was not to be expected that other lines of Ordnance work should figure so conspicuously in the search-light of battle. In fact the functions of the Ordnance can in a sense be compared to those of any public utility service—say the telephone. The average Londoner is so used, in his home or business life, to having a telephone at his beck and call that he cannot appreciate its value. He may, perhaps, during the course of his life pay a visit to a large exchange, and be vaguely interested in the complex electrical machinery that enables his calls to be so promptly answered and registered, and which he will view with awe though he cannot comprehend. But should anything go wrong, incorrect numbers be called up or a bill disputed, he anathematizes the service and writes to *The Times*; and it is only one day, when he wakes up to find his line out of order, that he realizes what a boon his instrument has been and how lost he is without it. The telephone in fact is only discussed when it fails to function satisfactorily.

¹ A few examples are appended.

D.D.O.S. 1st Army.

The Army Commander wishes me to convey his thanks to all ranks of the A.O.C. in the 1st Army for the excellent work which they have done and for the great assistance which they have given to the artillery, prior to the present operations.

For an offensive under present conditions, the keeping of guns in action at rapid rates of fire for prolonged periods is absolutely essential, and puts equipments to a severe test. It is a great tribute to the excellence of the work done in overhauling guns which have arrived in this Army, in most cases in a bad condition, that the Canadian Corps artillery had a higher percentage of guns in action on the night of the 9th, after the attack, than they had at any time during the previous weeks.

D.D.O.S. 5th Army.

The Army Commander wishes you to convey to the officers, N.C.O.'S and men of the Ordnance Workshops under your command his appreciation of the excellent work done by them during the last few weeks.

Owing to the intensity of our bombardment there has been a continual flow of guns of all calibres into the shops for overhaul and repair, but the

It was much the same with the Ordnance. Regiments received equipment and clothing so regularly that they could not appreciate what an amount of work was involved in its supply. That they should get what they needed was treated as a matter of course, they troubled not about how or whence.

This point is well put in the following quotation from the History of the 9th (Scottish) Division, the first new army division to go to France. "The Unit that had perhaps most reason to complain that the worth of its labours was never fully appreciated by the Infantry was the Ordnance Department which, consisting of an officer and 13 men, had to satisfy the needs of 16,000 men, 3750 horses and mules, and numerous vehicles and bicycles, in everything except food, light and fuel. The excellence of the work performed by this branch was largely the explanation why it was so much taken for granted; if it had proved less competent in furnishing and repairing munitions, it would have been better, though less favourably known to the infantry. The Ordnance people averred that they toiled harder than any other Section in the Division; when units were in the line they were busy meeting their fighting needs, and when they were out they were busier still re-equipping them."

To the staff officer also the methods of the Ordnance men have in every case been equal to the work, and the rapidity with which these guns have again been put into action is most creditable to all concerned.

The Army Commander further wishes you to inform these officers, N.C.O.'s and men that by their untiring energy and work they have contributed in no small measure to the success of the recent operations.

The Army Commander intends to go round the Shops shortly.

A.D.O.S. IIIrd Corps.

I am directed by the Lieut. General Commanding IIIrd Corps to inform you that he considers the work which has been carried out in the Corps Workshops since June 1916 reflects great credit on all ranks, and shows that it has been carried out with zeal and energy. The extensive repairs carried out show the important part taken by the Workshops in the modern battle and the Corps Commander hopes shortly to be able to visit the Workshops and see those at work who have so materially helped towards the efficiency of the troops in the forward area.

were a sealed book at the outbreak of war ; he was apt to expect it to perform miracles and produce at a moment's notice anything that might be wanted like a conjurer from his hat, and to become impatient when difficulties were explained to him. But he could not fail to learn about a branch that played such an important part in army administration and became much more understanding and helpful as time went on.

Sometimes parties of officers and others would be taken to visit great Ordnance emporia, when they would be astounded at the magnitude of operations, interested in seeing the wheels go round, and return very impressed ; but it is the bare truth that the ordinary officer failed to realize all the Ordnance did for him and his men for the simple reason that its work proceeded smoothly and silently to the outside world.