Military Medicine on the Western Front

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BATTERED, BUT VICTORIOUS

A typical scene on the Western Front. Though casualties were severe our men never lost heart; but struggled grimly on to final victory

INDEX

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Sources

This account takes as its chief source *Medical Services - Casualties & Medical Statistics*, the final volume of the *Official Medical History of the War*, originally published in 1931 and reprinted by The Imperial War Museum [ISBN: 1 870423 23 8]. All quotations are from that book, unless otherwise acknowledged.

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I am also most grateful to Pete Starling, Curator of the Army Medical Services Museum in Aldershot, for help and advice. Any remaining errors are entirely my own.

All statistics are for the Western Front in France & Flanders 1914 - 1918 unless otherwise stated.

Military Medicine on the Western Front

Medicine at War

War is a thoroughly unhealthy activity. Is there any practical or moral purpose in medical involvement, with death and destruction all around?

The dead are dead and nothing can be done for them but if nothing more, it is bad for morale, at the front and at home, to leave the wounded untended. Public sentiment at least demands that provision should be made for their treatment. It may willingly accept the sacrifice of lives but it will balk at the neglect of those who survive.

Crucially also, military medical services can contribute to military strength and efficiency. Men restored to health can return to the line. Otherwise they are lost, just as much as if they had been killed, or captured by the enemy and made prisoners-of-war.

As illustration, by 1918 there were almost 2,000,000 British & Dominion troops on the ration strength in France & Flanders of whom non-effectives including sick and wounded comprised 6%, almost 120,000 men. Reducing that non-effective proportion by just ½% could release over 10,000 men to the front.

Equally, a medical service consumes resources, diminishing fighting efficiency. Doctors and nurses with their supporting personnel in field ambulances and military hospitals and back along the lines of supply make no direct contribution in battle, but they still need food and accommodation and they and their equipment need transport. Casualties too need accommodation and transport. All of that might otherwise be available to support the efforts of the fighting troops; with the additional support they might achieve more in battle, and more quickly, which is the whole point of the enterprise. They might also sustain less casualties.

Front line medical personnel are themselves at risk, potentially increasing the casualty rate. Fighting troops may be required to protect the medical facilities themselves. Stretcher bearers coming down the support trenches get in the way of reinforcements going up to the front line.

So decisions whether and how far to provide medical services are bound to be determined at least as much by military economics as by any humanitarian considerations.

Human affairs are never dictated solely by logic, in war any more than in peace, but having crossed the moral Rubicon and accepted that lives are expendable in pursuit of military and political objectives, it is illogical then to draw much distinction between modes of dying. A death is a death, whether a man is allowed to die of his wounds through military necessity whom better medical treatment might have saved, or that same necessity sends another into battle where he is killed outright. Marshal Joffre believed it took 10-15,000 deaths to train a major-general.

Some Statistics

Medical statistics were collected according to systems set up in haste early in the War, in the realisation that they could eventually be of military and historical as well as medical value. A straightforward analysis of casualties based on individual service records was made and published after the South African war, and the statistical unit then disbanded, but nothing along these more ambitious, pre-emptive lines had been attempted previously. It is hardly surprising that later, in the face of unprecedented events, the statistical systems with the military medical records system as a whole sometimes descended into chaos, as the *Official History* itself concedes. Nonetheless, much was achieved and the figures, painstakingly collated afterwards, shed fascinating and sometimes unexpected light on many aspects of the War beyond the purely medical. They also re-emphasise its terrible human cost.

In the British Expeditionary Forces as a whole, at home and in all theatres of the War, there were over 11,000,000 casualties from all causes, dead or wounded in battle, otherwise injured or sick, missing and prisoners of war. [In total there were just over 190,000 prisoners of war of whom 8.5% died in captivity.] It is important to appreciate that those who were killed outright or died before reaching medical attention do not feature as *medical* statistics, also that a man might be wounded or take sick more than once, featuring as a fresh statistic on each occasion.

The approximate average ration strength of the British Expeditionary Force in France & Flanders rose from 220,000 in 1914 to 1,990,000 in 1917 & 1918, including Dominion troops, camp followers and labour. [These figures do not include French or American troops.]

[During the Napoleonic Wars, about 200,000 British soldiers were under arms & in the Crimean War about 400,000 British & French together.]

In France & Flanders 1914-18, in round figures and taking officers and other ranks together, 380,000 men were killed in battle, 150,000, died of wounds, 145,000 went missing, who must largely be assumed killed, 175,000 were taken prisoners of war, and 32,000 died from non-battle disease or injury.

Officers were significantly more likely than other ranks to be killed or to die of wounds; 14% compared with 9% of total respective ration strength overall. Otherwise, casualty statistics for officers and other ranks were broadly similar although other ranks were more likely to suffer disease or non-battle injury and more likely than officers to die from those causes.

The medical services in France & Flanders treated a total of just under 2,000,000 battle casualties and just over 3,500,000 non-battle casualties, a total of about 5,500,000 and a ratio of non-battle to battle of a little under 2:1.

[In the Napoleonic Wars about eight times more men died of disease than of injuries sustained in battle. In the Crimean War the ratio was three to one.]

By comparison, in East Africa from 1916, before which there are no statistics, there were about 340,000 non-battle casualties but only 8,000 battle casualties, a ratio of non-battle to battle of over 40:1.

Of course, not all of those treated returned to the front. Some died, some were invalided home. Overall, about 3% died and about 55% returned to war service.

The Military Medical Establishment

In August 1914 the RAMC numbered 1,279 officers and 3,811 other ranks of the regular army, with 1,889 officers and 12,520 other ranks in the territorials. By August 1918 there were 10,178 officers and 100,176 other ranks of the regular army with 2,885 officers and 30,923 of the territorials. 637,746 hospital beds were maintained in the UK and in the different theatres of war. By then, over half the nation's doctors were serving with the forces, mostly in France & Flanders, with a very significant impact on civilian medical care.

It can be argued that too many doctors were recruited and certainly by 1918 there seems to have been a considerable safety margin. Against that, there were still felt to be shortages in many areas so that had the War continued, more would have been required. The medical services had their share of casualties; during the Somme campaign alone, 400 RAMC doctors were themselves killed or wounded. Also, a significant proportion of some RAMC doctors' time was spent treating French & Belgian civilians, partly for humanitarian reasons but partly to control infectious disease which might otherwise be transmitted to British troops.

What are the Chief Tasks of Military Medical Services?

Most obviously, military medical personnel deal with battle casualties of all types, but in any extended campaign non-battle casualties are almost always more numerous. Medical services are also required for recruits in training, away from the battle front. Medical analysis may contribute to military intelligence. Prevention is better than cure and properly deployed, medical expertise can play an important rôle in reducing the incidence and severity of wounds and illness.

Battle Casualties

In one analysis of a series of battle casualties early in the War there were 39% bullet wounds, 58% wounded by shells, trench mortars etc. 2% by bombs & grenades and 1% by bayonet. The high proportion of shell and mortar wounds

reflects the reality of everyday life in the trenches, as described by eyewitnesses such as Edmund Blunden; this was preponderantly an artillery war.

Later, gas became important. In France & Flanders, from 1915 when it was first used until the end of the War in 1918, there were 186,000 admissions with gas injury of whom 5,900 died; these were almost 10% of the total wounded. There were certainly many more gas casualties amongst those killed in action but no attempt was made to collect statistics.

'Shell-shock'

It is popularly supposed that no-one during the Great War had any conception of shell-shock or battle fatigue, that sufferers were uniformly badly treated and that at worst they might be 'shot at dawn'. There is some truth in that view, but it is not the whole truth. Battle related nervous disorders were recognised as such, although they were poorly understood and managed, particularly in the earlier years of the War, and there was much misunderstanding and lack of sympathy. It is said that fighting generals, with first-hand experience of battlefield conditions, were more sympathetic than some MO's. Unsympathetic too were the physically wounded on general hospital wards who were prone to mock and taunt the nervous cases.

'The modern bullet wound has not been difficult to cure, and we have the authority of Parliament for the statement that some 60% of British wounded have been rendered fit to return to the firing line. With the nerve-wrecking effects of modern shell fire it was different, and strong hale men who never knew what fear was were reduced to a pitiable condition in many cases.' [The History of the Great War, Volume III, describing the 1st Battle of Ypres]

Cases of 'nervous and mental shock' were arising in the British Expeditionary Force in sufficient numbers to arouse official concern as early as December 1914. Medical experts, in particular Dr. Charles Myers a Cambridge psychologist, were sent to investigate and to develop treatments. By early 1916 they had made good progress, Myers had been promoted to the rank of Lt.-Colonel and specialist treatment facilities had been established in Boulogne. They were already abandoning the term 'shell-shock' as they came to appreciate that the condition had nothing specifically to do with the concussion of exploding shells, but by now both term and concept were well embedded in the popular vocabulary and imagination and the Army was determined to retain them. It was determined too to maintain the strictest distinction between battle-related nervous disorders, however defined, as acceptable medical diagnoses perhaps even meriting a pension, and cowardice in the face of the enemy, insubordination and suchlike which remained serious military crimes.

As the War progressed through and beyond the Battle of the Somme, Myers and his fellow experts became increasingly frustrated by official slowness to accept their findings, which tended both to deny sufferers effective treatment and to increase

the military wastage rate. Now that nervous disorders had earned themselves some measure of official recognition, there was an increasing readiness amongst ordinary soldiers to claim 'shell-shock' as a means to get themselves out of harm's way, when they were not suffering from anything of the sort, however defined. Some officers and MO's felt under an obligation to give them the benefit of the doubt. In badly affected units men were dropping out 'shell-shocked' in considerable numbers, and the tendency was infectious.

During the Battle of the Somme, one MO declared a group of 100 exhausted, demoralised soldiers unfit for front-line duty through shell-shock. His recommendation was ignored and he was dismissed the service on grounds of showing 'undue sympathy with the men'. The men themselves were reprimanded for cowardice and sent up the line once more.

The statistics are particularly sketchy but as example, in 1915 there were about 20,000 admissions with nervous disorders, almost 4% of total admissions with disease and non-battle injury but over 9% of battle casualty admissions. These cases are not otherwise categorised and not all would have been suffering from 'shell-shock'. Other mental illnesses must also have arisen, but on ordinary, peacetime expectations these are unlikely to have been more than a small proportion of the whole. The figures speak for themselves. No wonder the generals were concerned. Their dilemma, the difficulty in drawing a firm line between involuntary psychological incapacity and lack of proper commitment, remains unresolved, not merely in war but in everyday life. It is surely unresolvable, and the greater the urgency the greater the temptation, and maybe the need, to deal in terms of black and white rather than struggle with shades of grey.

At first, there was official reluctance to permit knowledge of shell-shock to become widespread, for fear too many cases would be diagnosed, impairing military efficiency. The Director General of Medical Services felt it inadvisable for articles on the subject to be published in medical journals. Eventually the RAMC established separate sorting centres staffed by experts. Ordinary MO's were discouraged from making an immediate diagnosis and instructed to send cases in under the label NYDN [Not Yet Diagnosed Nervous]. There were too few experts and over the last 2 years of the War a training course in psychiatric principles was established by the RAMC; 65 Doctors passed through. Meanwhile, knowledge amongst MO's in the field remained limited. Some were required to testify at courts martial of men accused of cowardice after they had quit their posts, perhaps due to shell-shock. Even those who accepted the reality of the condition found themselves in difficulties due to their inexperience.

Myers was eventually sidelined and to the end of the War the army persisted in its determination to draw a distinction between men shocked by shellbursts and those, equally shocked, who could not claim that explanation. From 1917, front line officers were required to complete a form providing details in each case and MO's were instructed to treat according to category. This bureaucratic imposition

appears to have achieved only muddle and delay, but pragmatic management improved with experience and there was less reported shell-shock at Passchendaele than at the Somme. The inadequacy of the term eventually came to be recognised but it was not officially dropped until September 1918.

Morale was bound to be at particular risk in a hard fought war of attrition, and it is difficult to be too judgmental of men who were seeking an easy-out from hardship and mortal danger, but it is equally difficult to blame senior commanders for feeling alarmed and for a determination to 'stop the rot'. They had battles to fight, they needed every man. Inevitably, when they took vigorous measures some genuine cases were caught up with the malingerers and badly treated. A few who broke down in the wrong place at the wrong time were court-martialled, and shot.

Beyond doubt, injustices were done, although that cannot be taken automatically to imply that every man who was put before a firing squad was a misdiagnosed innocent. Nonetheless, leaving aside all other issues, it seems a tragic aberration that men were condemned to death for failing to bear their part, no matter how or why, in a war undertaken by free peoples against tyranny.

The statistics suggest that the proportion of officers with nervous disorders to overall officer casualties was higher than the proportion for other ranks, by about 80%. Officers with nervous disorders were substantially less likely than other ranks to be returned direct to active service. Perhaps as members of the educated classes they were better able to articulate their feelings, perhaps their MO's were more sympathetic, perhaps being in positions of responsibility for their men or for other reasons, they were more vulnerable.

The most famous officer casualty was the soldier poet, Siegfried Sassoon who was treated by the pioneering psychiatrist Dr. William Rivers before returning once more to the trenches, although the reality of Sassoon's 'nervous disorder' is in some doubt. He was certainly in a state of furious rebellion against the futility he saw in the War and if we accept his own account, he was persuaded to accept a psychiatric diagnosis rather than risk court martial for insubordination.

Non-Battle Casualties

Causes include non-battle injuries and sickness, which may be peculiar to the conditions of the battlefield eg. trench foot, or to the area concerned, such as malaria during the Dardanelles campaign and elsewhere, or less remarkable in itself, *eg*. 'flu' or measles or TB, which was still common at the time of the Great War, or gastro-enteritis or Venereal Disease.

In France & Flanders 1914-18 and also amongst troops back in the UK, there were cases of, and some deaths from, Meningitis, Chicken-pox, Mumps, Measles, Rubella, Scarlet Fever, Smallpox, Typhoid and other gastro-intestinal infections, Pneumonia, Tuberculosis, and, above all, VD, which became a major problem.

'There can be no doubt that during war the sexual instinct is stimulated in both sexes, and gratification of the impulse is more easily obtained.'

Admissions with all VD ran around 18-32 *per* 1,000 ration strength *per* year, as compared with about 1-2 *per* 1,000 for the infectious fevers, about 2 *per* 1,000 for typhoid etc., 1-2 *per* 1,000 for pneumonia, and quite tiny numbers for TB. The situation was made worse because rather than simply make preventive measures and treatment freely available, as would be done for any other disease, 'moral' considerations were permitted to take precedence and VD was treated as a military offence. Men who reported infection lost pay and privileges, so they often preferred to suffer in silence. MO's were reluctant to provide treatment; if they did they effectively became accessories to the offence. Eventually, but not until mid-1918, they were given a free hand to distribute prophylactics and to treat cases. There was a dramatic drop in incidence, and no discernible increase in 'immorality'.

The low incidence of TB, a chronic disease still common amongst the general population at that time, probably reflects weeding-out of obvious cases at recruitment.

There were also epidemics of 'flu', some serious. The worst was in 1918. Over 24 weeks in that year there were more than 300,000 cases in France & Flanders, more than 160 admissions *per* 1,000, with a commensurate effect on military potential. Fortunately perhaps, the Germans were as badly affected.

Frost bite and trench foot were also common with almost 40 admissions *per* 1,000 in 1915, but far less later. [Trench foot is an infected, macerated condition of the skin which arises through wearing boots for long periods in cold wet conditions, such as flooded trenches. It can lead on to serious illness and there were some deaths.] Medical experimentation in the field led to better foot care, which was promoted by a general order in January 1915: a good example of preventive medicine in practice. The medical services could work out and supervise an effective program but it was largely for the military authorities and the men themselves to ensure that it was carried through.

Home Service

At home, the military medical services are also concerned in the assessment of recruits and the care of servicemen in training. I can find no statistics covering wartime recruitment but in 1926-27 roughly a third of recruits were rejected on medical grounds at first examination.

Military Intelligence

Medical statistical advice can also assist fighting generals in assessing the likely effective strength of the enemy and casualties to be expected on either side in a proposed battle.

Prevention is Better than Cure

Some of the complications of battle wounds and some non-battle casualties are medically preventable.

Medical Advice

Leave aside some forms of chemical and biological warfare, battlefield casualties cannot often be directly prevented by medical means, although medical advice can help to highlight preventable injuries. In the Great War, the RAMC was involved in the introduction of steel helmets to prevent head injuries, protective shields against flame-throwers, and anti-gas measures.

Preventive Medicine

There has been a lot of concern recently about the possible harmful effects of multiple immunisations given to servicemen before the Gulf War, but immunisation can certainly prevent infectious disease, in war as in peacetime.

Immunisation may be active or passive. Active vaccines comprise a killed preparation or extract or attenuated live form of an infectious organism. They induce the body to develop immunity of its own to that organism. Passive immunity is achieved by injecting serum from another source, animal or human, itself already immune either through natural infection or active immunisation. By the early 20th century, in western Europe including the UK, smallpox vaccination was already widespread and smallpox all-but eliminated. During the Great War two new vaccines proved impressively effective: typhoid vaccine and anti-tetanus serum.

Typhoid vaccine is an active vaccine. Immunisation against typhoid was first introduced in 1897. Typhoid and other gastro-intestinal infections are always a risk where hygiene is poor, as it is bound to be on a battlefield. All of them can seriously reduce military efficiency, Typhoid itself is a killer. In the Boer War only a fraction of British troops were immunised and at least 8,000 men died from Typhoid, the same number as died in battle. [According to another source, there were 13,000 Typhoid deaths.] Typhoid was the single commonest cause of non-battle casualties by a significant margin, followed by dysentery. Malaria caused far fewer deaths and far less long-term incapacity. Nearly 20,000 Typhoid survivors had to be invalided overseas. There were over 100 medical admissions with Typhoid *per* year *per* 1,000 ration strength, and taking Typhoid and Dysentery together, over 170 *per* 1,000. That is a staggering statistic which may go some way to explain why the Boer War went so badly for the British.

In the Great War all British troops were immunised against Typhoid and it was not a significant problem, on the Western Front or anywhere else. The death rate was negligible. In France & Flanders 1914-18 there were only 2,400 Typhoid admissions amongst British & Dominion troops and 200 deaths.

Tetanus anti-toxin is a passive vaccine, produced in horses. Today we also have Tetanus Toxoid which induces active immunity. Like gas gangrene, which is caused by a closely related bacterium, Tetanus is a complication of dirty wounds which are bound to be common in war. The tetanus bacterium produces a toxin which causes paralysis [hence 'lock-jaw'] and in 40% of cases, death. Tetanus was a serious problem at the outset of the War but from 1915 practically every battle casualty received anti-toxin and the incidence was dramatically reduced.

Sanitation

Basic sanitary measures: clean water supplies, wholesome food and the proper disposal of human wastes, are as important in war as in civilian life. Together with personal hygiene, they offer far more effective, more efficient means to preserve health and fighting strength than medical treatment of the illnesses which are likely to arise if they are neglected. After its experiences during the Boer War, the British army understood the value of good sanitation and the sanitary organisation of the BEF was highly efficient, although there were failures during the Battle of the Somme which led to an outbreak of dysentery. There were sanitary sections and squads attached to every unit and every base, and regular inspections.

Standards of sanitation in some French towns were extremely poor and an early task for BEF sanitary personnel was to clean them up. There was much dissatisfaction too with the 'terrible filth and stench' as described by one officer in areas of the front previously occupied by the French army, and which the British had then to put in order. The French did not establish their own sanitary squads until November 1916.

By contrast with the broad success of hygienic measures on the Western Front, in the more difficult conditions of the Dardanelles, dysentery and other diarrhoeal illnesses ran rife with a total of 420 admissions *per* 1,000 ration strength. Many other factors contributed to the failure at Gallipoli and it cannot be claimed that had the troops only remained healthy the campaign would have succeeded, but ill-health at that rate must certainly have had a very serious impact.

Woman Doctors

At the start of the War, many women doctors volunteered their services, only to be turned down by the RAMC and the War Office. Two years on, an increasingly serious shortage of medical staff, at the front and at home, eventually overcame official resistance and they were reluctantly permitted to join the regular military establishment, but effectively as associates rather than full members. For the most part they then replaced men in the UK or at base hospitals although some were attached to the RAMC in the field. Once the initial strangeness wore off they were generally well-accepted by officers and men; they occasionally had more difficulty

with the female nursing staff. Despite all requests and much to their disappointment and irritation, they were never granted commissions.

Meanwhile, other women had found means to contribute independently, through the Red Cross or otherwise. One of these, Elsie Inglis of Edinburgh, founded the SWH, the Scottish Women's Hospital for Foreign Service, supported entirely by public subscription. Under its auspices over 1,000 women - doctors, nurses and support staff - went abroad to care for casualties in field hospitals. The SWH sent its first women's medical unit to France in November 1914. By 1915 it had established an Auxiliary Hospital with 200 beds in Royaumont Abbey, caring for French army casualties. From 1915, Inglis herself worked in Serbia and Romania, sometimes in desperately difficult conditions. She died from cancer in 1917, the day after her return to the UK.

Her death aroused a huge public reaction. Her body lay in state at St. Giles Cathedral. A memorial service was held in Westminster Abbey, when she was described as 'a glorious woman - with a rare capacity for origination and government'. It is clear from other accounts that she could be exceedingly tough-minded. In the popular imagination, she was almost certainly one of the two best known medical figures of the War years. The other, John McRae, the Canadian army surgeon who wrote the poem *In Flanders Fields* and who also died before the War's end, owed his reputation to that poem more than his medical work, worthy though that was.

Not Forgetting the Dentists

The dentists kept busy too. Over 6 months in 1918, in France & Flanders they performed over 40,000 fillings and nearly 80,000 extractions and made or repaired over 25,000 sets of dentures.

Management of Battle Casualties

There was a dilemma here. Casualties are best served if they are brought off the battlefield and properly treated as quickly as possible. On the Western Front they could travel no faster than their own feet would carry them, or a hand stretcher, at best a horse-drawn ambulance or later in the War a basic motor ambulance or a light railway. That argued for medical facilities as close as possible to the battlefront; but only a well-equipped military hospital could treat the more seriously wounded and it was entirely impractical to provide enough of these within easy reach. There were insufficient medical and other staff to man them and they would have been at severe risk from shell-fire, and from being overrun by an enemy advance.

In late May 1918 at the height of the Ludendorff offensives, German troops surged forwards towards a French auxiliary casualty clearing station at Villers-Cotterets, east of Paris. During the last hours before it was evacuated it was 'A hell and a shambles. Nine thigh amputations running; the crashing of bombs and the thunder of ever-approaching guns; the operating hut with its plank floor and the tables and the instruments on them literally dancing to the explosions; the flickering candles, the anxiety lest the operated cases might hæmorrhage and die in the dark; the knowledge that the next bomb might get them.' [*The Women of Royaumont*] Soon after, staff and patients alike had to make their way to safety as best they could, many on foot. Those were no conditions in which to attempt skilled surgery or nursing care.

The solution was to establish centres close behind the front line staffed by a doctor and a few orderlies where casualties could be collected and triaged [sorted according to the severity of their injuries] and simple treatment carried out, with a chain of progressively larger and better equipped centres to the rear, feeding back to hospitals proper in base areas and beyond.

Men were taught how to care for themselves and each other in the first instance. 'Every soldier going into the field had sewn into the corner of his tunic a first dressing-packet containing, among other necessities, iodine.' [*The History of the Great War*, Volume X] I am advised that the iodine was soon left out; a glass bottle must have been rather vulnerable in battlefield conditions. Thereafter it was for colleagues and RAMC stretcher bearers to bring them within reach of medical care, as circumstances permitted. The photographic evidence suggests that German prisoners of war were commonly used as additional stretcher bearers.

'Casualties on the field of battle receive first aid and are collected and evacuated by regimental stretcher bearers to the nearest medical post, the regimental aid post, organised by the regimental medical officer, and usually situated in a dugout or shelter in close touch with unit headquarters. Here a subdivision is made; casualties able to walk are despatched with or without a guide to the walking wounded collecting post, if there is one, or direct to the advanced dressing station; while the more serious cases are conveyed thither by the field ambulance bearer personnel, either by hand stretcher or by some other form of transport.'

'At the advanced dressing station, which is formed as near the front line as military operations permit, first field dressings are readjusted, patients are treated, given hot drinks and other warm comforts before being transferred to the main dressing station where, if necessary, the slighter cases are detained, urgent operations are performed, dressings are again adjusted and the necessary clerical records are made. The sick and wounded requiring further treatment are then conveyed by horse-drawn or mechanical transport to the casualty clearing station which forms the first hospital link between the firing line and the base. Cases which are likely to recover after a few days' treatment are retained in this area, if possible, to

recuperate before returning to duty. Serious cases are treated by skilled surgeons or physicians before evacuation.'

The general principle was that casualties were sent to back areas for treatment and recuperation, but no further back than was necessary, otherwise the lines of communication and the medical facilities might become clogged by minor cases and men be removed from the fighting line unnecessarily. By the older process of triage, they were also divided into groups: those with relatively minor injuries who could afford to wait for treatment; those with more serious but still potentially treatable injuries who required rapid attention to optimise their chances of recovery; and those whose injuries were untreatable or with a poor chance of useful recovery who were simply kept as comfortable as possible until they died.

'Stretchers were brought down on which were the mangled remains of manhood. The doctor sees him at once, he says, put him round the corner, he's beyond assistance and in three minutes he will be no more. Time could not be wasted on such as those for no earthly power could restore them.' [Private Auger, hand-written recollection, quoted in *Doctors in the Great War*]

Only the more seriously wounded were likely to be sent further back than the casualty clearing stations. Early in the War they travelled on as they had been brought in, by whatever transport fell to hand but largely by horse-drawn ambulance. Later, as organisation improved, evacuation might be by road convoy, or ambulance train, or canal barge. The ambulance train system in particular became highly developed; these were not merely means of transportation, more mobile hospitals complete with nursing and medical staff on which a certain amount of treatment was possible *en route*. They could carry up to 450 casualties each, or 500 at a pinch. 'These trains were so fully equipped that they constituted complete hospital units awheel. Each train was divided into wards and carried a complete surgery, an operating table, a dispensary, kitchen, barrack room for staff, doctors' and sisters' quarters, and even an isolation ward in some instances.' [*The History of the Great War*, Volume X]

There was some shortage of base hospital facilities in France & Flanders and most evacuated casualties were shipped back to the UK, chiefly *via* Southampton, then sent on by ambulance train again to their final destinations. 'A Blighty one', 'Blighty' being a slang term for Great Britain, became the common term for a wound sufficiently severe to merit evacuation home.

The old network of military hospitals soon proved inadequate and many more were built, or established in existing buildings taken over for the purpose. A complex system developed of general and specialised hospitals providing immediate treatment, auxiliary hospitals for those on the road to recovery and convalescent homes proper. Bed states for all the acute hospitals were telegraphed to Southampton and the other receiving ports once or twice daily. However, in the

short term a large proportion of evacuated casualties were admitted to Netley Military Hospital on Southampton Water and sent on to their final destination later.

'So wonderful was the organisation that a patient could have been wounded on one morning and by the next morning have passed through aid post, field dressing station, casualty clearing station and even base hospital, and have found himself in an infirmary at home.' [*The History of the Great War*, Volume X]

My grandmother was a nurse. 'From time to time she gave up her off duty to work in a reception centre for wounded men returning from the front on their way to suitable English hospitals. These men were by no means 'walking wounded', but some of the most seriously injured survivors. The memory of one in particular remained with her; a man with so many broken bones that traditional splinting and bandaging was of no avail. Instead, a slatted crate, like an orange box, was used to support his mangled body and to minimise the chance of movement during his journey home.' [From my Mother's *Memoirs*.]

'The watchwords of the hospital service were 'Undelayed Evacuation''. [*The History of the Great War*, Volume X] Initial collection of casualties from the battlefield is bound to be difficult and dangerous and there can be no doubt that many battle casualties died in the Great War who could have lived had they been brought in sooner. Evacuation may also be difficult, as it was at Gallipoli, or even impossible, but that was not a problem in France & Flanders; the Western Front was a remarkably, perhaps uniquely, well-organised battleground. Once a wounded man had been brought so far as the casualty clearing station he was practically guaranteed first class treatment thereafter, by the standards of the time: what we should now call 'state of the art'.

However it was also claimed in 1915 that 'Army hospitals - do not exist for the purpose of curing sick men, but that of indexing them, supplying a name to their disease, ascertaining their religion, and 'booting them out' elsewhere, with as much celerity as possible.' [Dr. J.H. Dible, an army bacteriologist, quoted in *Doctors in the Great War*]

Criticism along those lines was repeated as the War progressed. The consensus at the time appears to have been that it was justified in part, but that it was nonetheless unwise to plan to carry out major treatments too close to the front line. There were advantages and disadvantages in both directions. However as the War progressed there was an increasing effort to reinforce casualty clearing stations with both staff and equipment so that more treatments were carried out there, and to a higher standard, rather than send the casualties on yet further. During the battle of the Somme in 1916, 10% of casualties admitted to casualty clearing stations were operated on, at Third Ypres in 1917 over 30%.

A Hospital at War

During a 'big push' the pressure on medical facilities was immense. Royaumont was an Auxiliary Hospital attached to the French army, about 20 miles north of Paris and 25 miles behind the front line, within easy earshot of the guns. It was established by the Scottish Women's Hospitals, an offshoot of the women's suffrage movement, and staffed entirely by women, in which it was remarkable. Otherwise it appears to have been a typical base hospital in organisation and workload, although some of the its patients may have received less treatment *en route* than their British counterparts.

During the Battle of the Somme it took cases from the French sector of the battlefield. At that time it had a total of about 400 beds. Over 24 hours 2nd - 3rd July 1916, 121 casualties were sent in, and they kept coming; over 200 altogether in the first week. 'Their wounds were terrible, many of the men were wounded dangerously in two, three, four or five places.' These were mostly wounds from shell fragments, jagged chunks of exploded metal capable of tearing a limb, or a body, to shreds or embedding themselves deep in the tissues, carrying with them battlefield mud and torn clothing so that sepsis swiftly followed.

That first night, the surgeons operated through until 7.00am, exploring and debriding wounds and amputating shattered limbs. The urgent need was to prevent the spread of gas gangrene, which was already developing or established in 90% of the cases. The gas could be seen on the X-rays, the bacteria could be seen microscopically on the wound smears, the putrefaction could all too easily be smelt. 'The stench was very bad.'

A radiographer describes her work schedule: 'July 2nd 2.00pm till July 3rd 7.00am; July 3rd 11.00am till supper time. Rest till 10.00pm. Worked 10.00pm till 6.00am on July 4th. Slept 6.00am till noon. Dinner. Worked till supper. Rest till 10.00pm. Worked 10.00pm till 4.00am on July 5th. July 5th four hours sleep after 4.00am. Worked till 11.00pm. July 6th sleep one hour then wakened as a new convoy had come in and some of the cases needed immediate operation.' On July 4th a doctor snatched time to write home: 'We have had a ghastly time of horrors since Sunday. Men badly wounded pouring in at the rate of 70-100 per day.' Nonetheless, a bacteriologist could record: 'All the gas gangrene cases were sorted out [by means of swabs] and the incipient cases were spotted early and operated according to the severity of infection as notified by me. By that means we saved lots of limbs as they were spotted early and opened up in time'. [All quotations from *The Women of Royaumont*]

Early treatment reduces the incidence of infectious complications and surgical shock. In preventing and controlling gangrene it is crucial. Gas gangrene develops in contaminated wounds; gangrene bacteria are widespread in the soil of France and Flanders so it was a constant risk on the Western Front. Once introduced into the tissues through a wound they spread inexorably, producing toxin and doing

further damage. Untreated, established infection is fatal and gangrene may easily kill a casualty whose original injuries were survivable. An infected limb is as good as lost; it must almost always be amputated.

The French developed gas gangrene anti-serum during the Great War and it was trialled at Royaumont from 1915, but it was not produced in significant quantities until 1918 and even then it was not generally available. There were no antibiotics as would be used today. In any event, anti-serum and drugs alone are insufficient; the cornerstone of effective treatment is surgical debridement, the rigorous removal of foreign material and dead tissue. The sooner that is done, before any infection has time to spread, the better.

Medical Arrangements at the Somme and at Third Ypres

In the battle of the Somme 21 division were engaged. There were 15 casualty clearing stations with 174 MO's, 137 Nursing Sisters and about 1,900 other ranks. Between them they treated about 42,000 wounded during the first week of fighting: an average of 400 cases *per* CCS per day and about 35 *per* MO. Those figures are daunting enough in themselves but averages conceal extremes both in the flow of casualties, which surged with every fresh battlefield push, and in their distribution. These were largely men with serious wounds, some very serious, and soon many of the clearing stations were overwhelmed.

Only 10% of admissions received surgery and that figure almost certainly represents the maximum achievable work-rate. Of the remainder, some were non-surgical cases, some were passed on for treatment further up the line and some died of their wounds. During that first and grimmest phase of the battle, wounded men lay out in the fields around some of the busiest clearing stations in their hundreds, largely untreated, sometimes for days, as the medical teams struggled to cope. Some undoubtedly died who might have been saved by more timely treatment, or developed avoidable complications, although it is impossible to judge how many.

In the Third Battle of Ypres, 14 divisions were engaged. There were 24 casualty clearing stations with 379 MO's, 502 Nursing Sisters and about 3,600 other ranks. They treated about 26,000 wounded during the first week of fighting: an average of just 155 cases *per* CCS *per* day and 10 *per* MO. With 30% of admissions now receiving surgery, the individual surgical work-rate would have been about the same at 3-4 cases *per* MO *per* day, but the overall workload was lighter and under better control. Surgical teams worked for only 12 hours on, 12 hours off; previously 16 hours on and 8 hours off had proved too great a strain. Casualties were allocated in rotation; after 150 lying cases had arrived at any one CCS, any more were switched to the next in the group. These arrangements certainly paid off in terms of surgical results. Of about 5,000 casualties brought in after the Battles of Arras and Messines, only about 1% died and less than ½% developed serious gas gangrene.

Military Medicine on the Western Front

Behind the Scenes

There is more to modern medicine than hands-on treatment of the sick. Diagnostic services are also essential. The first mobile bacteriological laboratory arrived on the Western Front in 1914. Bacteriological investigation played a vital rôle in the treatment of outbreaks of infectious disease amongst the troops, particularly meningitis and enteric fever. Later, RAMC bacteriologists discovered the organisms responsible for two debilitating infections which became widespread in the trenches, epidemic jaundice and trench fever, and their mode of spread: by rats and by lice respectively. Effective control measures could then be applied.

A great deal of effort was put into keeping the rat population down. One RAMC captain was appointed full-time rat officer. Lice were tackled by introducing delousing pits, dugouts in which clothes were hung and heated by stoves to a temperature at which the lice were killed. It requires determined organisation and attention to detail to keep even simple measures of that type going amidst the chaos of the battlefield.

However medical research had little success in the face of the epidemics of influenza which arose towards the end of the War. Neither the responsible organism nor any specific treatment or means of control were discovered. Eventually, the devastating pandemic of 1918-19 caused over 21,000,000 deaths worldwide: more than the War itself.

Medical Developments Encouraged by the Great War

The treatment of large numbers of casualties in relatively controlled conditions led to useful research, much of it overseen by the Medical Research Committee which later became the Medical Research Council. There was also a good deal of *ad hoc* research by MO's in the field. Medical societies were formed and papers read, and published in the medical journals.

Besides the investigation of meningitis, the enteric fevers and other infectious diseases, valuable work was also done on surgical shock [the physical reactions of the body to wounds, especially blood loss, not psychological shock] and on many other topics. By 1917 blood transfusion was firmly established in the Casualty Clearing Stations as a routine measure and by the end of the war, shock and its management were far better understood. There was a move from Ether and Chloroform anæsthesia to Gas and Oxygen which was safer and gave better results. Great advances were made in plastic surgery, also in the design and fitting of artificial limbs. The experience of widespread wound infection, which killed many men who might have survived the wounds themselves, spurred bacteriologists to search for effective antibacterial agents. Alexander Fleming, himself a Great War MO, eventually discovered Penicillin, the first antibiotic, in 1928.

As in so many other areas of national life, so in medicine, despite deep-seated prejudices the desperate need to find pairs of hands to do essential work led to the increasing employment of women. It has taken a long time but today we see something approaching true professional equality.

One of the lessons of the Great War was, or should have been, that a proper system for collecting military medical statistics is invaluable, so as to assess outcomes and learn lessons for the future. But lessons can be forgotten and a major difficulty in assessing the reality and possible causes of 'Gulf War Syndrome' turns out to be the glaring lack of proper vaccination records for many of the troops involved. No-one can now work out precisely who received what, or when.

Other Developments

Great War military medical arrangements were elaborate and highly effective. After the War they were mostly dismantled, but the idea had grown up amongst doctors, administrators and politicians that medicine worked better when it was properly co-ordinated on a large scale than as a cottage industry. Proper medical care was seen as an important element in the 'land fit for heroes' which politicians aspired to create for the homecoming troops. Also, the poor quality of 1914-18 recruits, many of whom had to be turned down on medical grounds, had come as unpleasant surprise in a prosperous country, still at the head of a powerful empire; proper attention to the nation's health could help to set that right. Some of those early ambitions foundered amidst the economic difficulties of the 1920's and early 1930's but wartime experience of the effectiveness of centrally administered military medicine was one of the strands which led to the eventual establishment of the NHS a generation later.

A comprehensive system of medical boards was set up under the Ministry of Pensions to assess the war-disabled and to award proper disability pensions. Between 1919 and 1929 nearly 5,000,000 wounded ex-servicemen were 'boarded', although the number of individuals seen was less, as many appeared more than once for reassessment. Here was the forerunner of the Department of Social Security and a step on the road to eventual full social security provision for all. By 1929, 290,000 ex-servicemen had been granted pensions for wounds, amongst whom were 41,000 amputees, and 332,000 for diseases related to war service, over 620,000 in all.

'Arrangements had [also] to be made to meet the current and future demands of the Ministry for providing medical and surgical treatment. The limbless wanted limbs, face wounds required plastic surgery. 'shell-shocks' demanded a remedy for their multitudinous complexes and complications. The insane needed mental institutions, and the tuberculous sanatoria. Men from the East brought with them malaria, dysentery, bilharziasis, and other tropical diseases. The blind sought training, the paralysed a home. The situation was without precedent.'

This led to the establishment of a national network of hospitals, clinics and rehabilitation and care facilities for ex-servicemen, which later became an important component in the early NHS.

Compare with Today

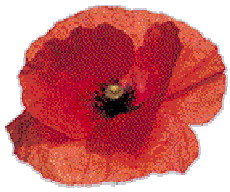
The principles for handling military casualties remain the same today as in the Great War: pragmatic selection of cases; rapid evacuation from the battlefield as far as appropriate medical facilities, but no further, and rapid, skilled treatment; subject always to military necessity.

Today, evacuation may well be by helicopter, or by fixed-wing aircraft over longer distances, well away from the theatre of operations, even to the home country. In the Falklands campaign, hospital ships were used at first before land-based facilities could be established.

Modern treatment may include: intravenous fluids, blood transfusion, antibiotics and other advanced drugs, life support machines, internal fixation of fractures and a host of other medical techniques which were either entirely unavailable in the Great War or came into use only in the later years. But speed of evacuation remains the crucial factor. Casualties left untreated for any length of time still do badly. Retrieval from the battlefield is a vital first step, but insufficient in itself. They must then be quickly be brought to a point where they can receive treatment appropriate to their injuries.

Endpiece

War destroys, but it also stimulates. We deplore the destruction, but can we progress without the stimulus?



Return to Top