

# July 1st 1916 — a surgical catastrophe

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The Sir Thomas and Lady Edith Dixon Lecture for 1990

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On the morning of July 1st 1916, after five days of intense bombardment, the British Fourth Army under General Sir Henry Rawlinson, with a ration strength of 519,324 men, supported by two divisions of the Third Army, under General Sir Edward Allenby, advanced into what was to be known hereafter as the first day of the Battle of the Somme. Within the first 60 minutes of that attack, those troops sustained some 30,000 casualties, dead, dying and wounded, and that number would be almost doubled by the end of the day. ...

This lecture, founded in memory of Sir Thomas and Lady Edith Dixon, tries to convey to you how the Royal Army Medical Corps coped with the most enormous casualties in wounded ever sustained by our armed forces in any one day of any campaign before or since. Before considering the purely medical aspects of that day, let me briefly describe the military background of the battle.

In 1915 had been the abortive attempt to break the stalemate on the Western Front by the Allied landings at Gallipoli. The Allied plans for 1916 were for combined French and British attacks on the West with a simultaneous Russian advance in the East. However, the German attack at Verdun in February 1916 rendered the French army incapable of joining in a combined offensive on a large scale, and made the French, moreover, desperate for relief from their British Allies. But the old British regular army had almost gone — decimated in the early battles of 1914 and 1915 and at Gallipoli. The British Expeditionary Force casualties in 1914 alone had amounted to 86,000 men. Kitchener's "New Army" of half a million volunteers was still training, was largely untested in battle, and had few experienced officers. In the original plan, the French were to advance on a 25-mile front, while that of the British stretched north for another 18 miles. Because of Verdun, the French front was reduced to eight miles. The French High Command issued what almost amounted to an ultimatum; they told Sir Douglas Haig, Commander in Chief of the BEF, that the French Army would not be able to hold out after July 1st, a date earlier than Haig himself would have wished.

## *The plan of action*

Sir Henry Rawlinson's plan was for an intensive artillery barrage which would destroy the German front-line trenches, which occupied sloping and commanding ground overlooking the British line. The attackers, heavily equipped, would systematically occupy the German first line and beat off any counter-attack. The artillery would then destroy the second line, which would be occupied in turn.

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The Fourth Army, supported by elements of the Third Army on its left, having broken through the German lines, would enable the Reserve Army (Lt General Sir Hubert Gough), with its three cavalry divisions, to break through into clear country beyond.

There were two dreadful snags to the Rawlinson plan. First, the artillery was not sufficiently heavy nor sufficient in numbers to destroy the German deep and heavily reinforced dug-outs nor to cut the barbed wire entanglements. Second, our heavily laden troops could not move quickly enough to occupy the enemy trenches and to destroy their dug-outs before the German machine gunners could emerge from their largely undamaged deep shelters to re-man their guns. These two factors together proved fatal to the British Fourth Army.

Indeed, the obstacles facing the British along that 18 mile front were daunting. In addition to the fact that the German trenches were situated on high ground overlooking the British lines, these were supplemented by fortified redoubts and no less than nine heavily fortified villages, the names of which have been burnt into the history of the British Army. From south to north these were: Montauban, Mametz, Fricourt la Boissells, Ovillers, Thiepval, Beaumont Hamel, Serre and Gommecourt.

In spite of the formidable opposition there were some successes that day. On the extreme right flank, adjacent to the French, the 30th Division captured Montauban, although Rawlinson refused to allow the cavalry to exploit this advantage. Further north, at Thiepval, the Ulster Division made significant advances at great speed; so much so that troops encountered our own artillery barrage. Later that day, unsupported on either flank and infiltrated with machine-gun fire, the Ulstermen had to fall back. Their casualties were enormous — 5,500 killed and wounded. No less than four of the nine Victoria Crosses awarded that day went to men of this division.

#### *Medical planning*

Detailed arrangements had been made for the reception of the inevitable heavy casualties from the battle. The lines of evacuation were as follow: —

1. Battalion stretcher-bearers were increased from 16 to 32 per battalion for evacuation of the wounded to the regimental aid post (RAP).
2. From the regimental aid posts, wounded were to be collected by field ambulances using wheeled stretchers, hand carriages on trolley lines and horse wagons or motor ambulances, especially at night.
3. The field ambulances would distribute the wounded to: —
  - a) Walking wounded collecting points, where fit enough wounded were marshalled to make their own way to the rear,
  - b) Advanced dressing stations (ADS),
  - c) An advanced operating centre of 40 beds for urgent (and especially for abdominal) cases.
4. From the advanced dressing stations wounded were evacuated to main dressing stations, mainly using the motor ambulance transport of the field ambulances, but patients could also be evacuated directly from the ADS to the advanced operating centre or to casualty clearing stations (CCS) allocated for urgent cases.

5. From the casualty clearing stations patients were to be evacuated mainly by ambulance trains but also by motor ambulance convoys and canal barges to base hospitals.

At the regimental aid post only the most elementary first aid could, of course, be given, supplemented by an injection of morphia. At the field ambulance, essential life saving surgery was carried out. This comprised amputation of completely smashed limbs and control of haemorrhage, preferably by ligation of the blood vessel. If this was not possible, plugging of the wound or direct pressure was used, but patients were not to be sent back with a tourniquet on the limb. The bulk of the surgical work was carried out at the casualty clearing stations together with the advanced operating centre. However, at times of great pressure, patients might have to be evacuated further to the rear before even emergency surgery might be possible.



Operating theatre of No. 3 Casualty Clearing Station, July 1916.

(Reproduced with permission of the Imperial War Museum, London).

The casualty clearing stations were to be the mainstay for dealing with urgent surgical cases. These were designed to admit between 150 and 300 casualties at a time and a rotation system was to be employed so that these could be rapidly cleared. At the beginning of the battle the Fourth Army had 14 casualty clearing stations together with one advanced operating centre with its 40 beds, ready for casualties. The lines of communication and base hospitals in France had 61,000 beds and more than 30,000 of these were vacant, ready and waiting to receive casualties on July 1st. Essential for the rapid evacuation plans were the ambulance trains. Rawlinson himself stressed the importance of these and personally asked

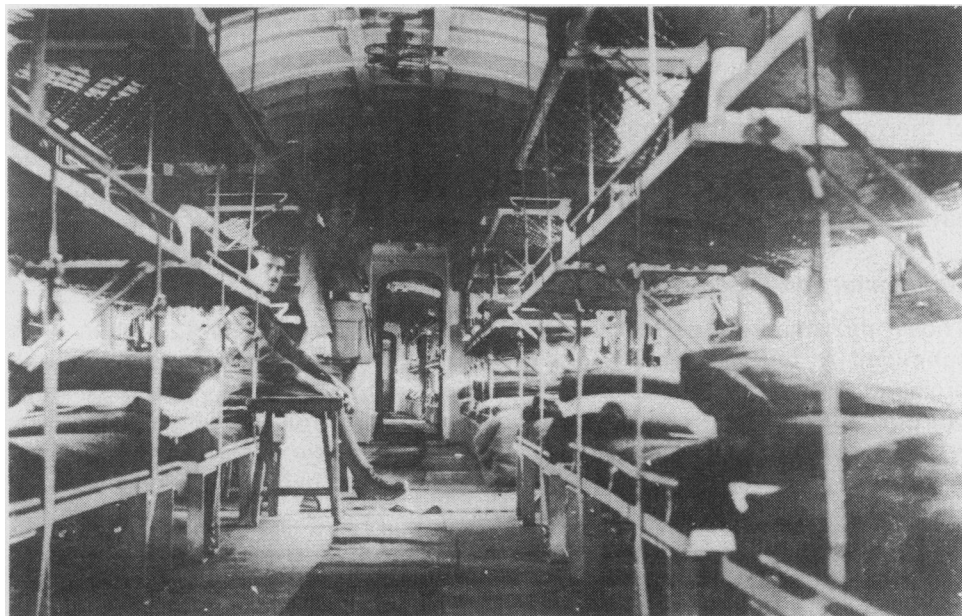
that 18 trains should be made ready for the first day of the battle. In the event, these proved to be, as we shall see, the weak link in the evacuation lines.

### *The casualties*

On that first day, 57,000 casualties were sustained by the British Forces — more than the combined losses for the whole of the Crimean, Boer and Korean wars. There were two casualties for every yard of the front: imagine a line of men, shoulder to shoulder, stretching from Westminster Abbey to St Alban's, all dead or wounded by the close of July 1st — indeed it seems *beyond* imagination.

During the first day of the battle the field ambulances dealt with 863 officers and 22,826 other ranks. Of these, over 14,000 were evacuated to the casualty clearing stations. On the morning of July 1st but a single ambulance train was available. Two more ran that afternoon and two more arrived at midnight. These five trains evacuated some 3,200 cases, many of them left over from the previous day and 647 of them were in fact medical. On the night of July 1st/2nd, the casualty clearing stations held over 12,000 cases, far in excess of their capacity. Yet the flood of wounded continued to arrive at the overflowing CCSs — on July 2nd, 13,800 and on the 3rd, 8,800 casualties were received.

At this point it is worth bearing in mind that the usual allocation to each casualty clearing station was 15 medical officers and 15 nurses (the closest that women got to the front in World War I) — hardly a lavish number of staff — together with about 70 NCOs and other ranks. Of course, the vast numbers of casualties swamped the medical services at every level. Many were lying out in the battle-field on the morning of July 2nd when heavy rain drowned unknown numbers of them. Wounded men from the first day of the battle were still coming back in



Interior of ambulance train at Boulogne.

(Reproduced with permission of the Imperial War Museum, London).

considerable numbers by July 5th and one private, wounded on July 1st near Beaumont Hamel, was brought in on the fourteenth day.

Tremendous efforts were made to clear the base hospitals for the influx of casualties. The hospital ships brought 5,600 wounded to the United Kingdom on July 3rd and each day the numbers increased. The peak was on July 6th, when nearly 12,000 wounded were evacuated by ship to the home ports.

### *Surgical management*

How were casualties dealt with in 1916? In the early days of the war, a whole variety of antiseptics were applied to and within the wound. But Listerian methods, adequate for the trauma of civilian life, were soon found to fail hopelessly in the face of the massive injuries produced by shot and shell. Gas gangrene was more common than in any other war before or since, due to a combination of extensive tissue injury and the fertile soil of Flanders. Tetanus complicated 8·8 per 1000 of all wounds in September 1914.

By 1916 the lessons had been learned. Wounds were dressed at the field dressing stations and wide excision performed at the casualty clearing station, with removal of all damaged tissue and particularly of any foreign body. Dry gauze was used to pack the wound and delayed primary suture then performed four or five days later at the base hospital — a technique which has been used ever since. This, combined with tetanus prophylaxis given at the field ambulance, had reduced the incidence of tetanus to the region of 0·2 per 1000. Gas gangrene, however, was still encountered when there was delay in the wounded soldier receiving definitive surgery.

The Thomas splint was in widespread use by the end of 1915 and proved to be a great life saver. Modifications of the splint were also used for upper limb fractures. Compound skull injuries were treated by careful excision, and Harvey Cushing had taught how a glass sucker could be used to débride pulped brain. Removal of the missile from the wound tract was important and this was helped by the availability of X-rays at the casualty clearing station. The scalp wound was closed by primary suture, if necessary by flap rotation. Many lives were undoubtedly saved by the recently introduced "tin helmet".

### *Abdominal and vascular injuries*

Those abdominal cases surviving to reach the casualty clearing station were submitted to laparotomy. Perforations of the small bowel were sutured with drainage, or resected if extensive. Perforations of the colon were sutured if small but otherwise exteriorised. The mortality of bowel injuries was very high: for the small intestine in the region of 65% and for the colon in the region of 59%. Wounds of the stomach were sutured as were wounds of the bladder, which were closed with catheter or suprapubic drainage.

In spite of the pioneer work of Carrel, who had shown how to suture arteries in the experimental laboratory, arterial reconstructive surgery was virtually unknown. Major arteries were ligated and frequently, especially in the presence of an associated fracture, amputation was more or less inevitable — a finding made again in World War II.

### *Surgery at base hospitals*

At the base hospitals there was much to do. Excised wounds required secondary suture. Many urgent guillotine amputations required revision. Gas gangrene was not rare, particularly where surgery had been delayed, and again amputation might prove necessary. A particularly serious problem was wound infection. After much experimentation, irrigation of the wound with hypochlorite solution through multiple tubes (the Carrel-Dakin technique) or packing with BIPP (bismuth iodoform and paraffin) as advocated by Rutherford Morison of Newcastle were in common use. Secondary haemorrhage, resulting from infection, was not uncommon and would require arterial ligation and perhaps amputation. Dreadful injuries of the face, with extreme mutilation, were particularly difficult and the pioneer work of men like Harold Gillies laid the foundations of modern plastic surgery. The invention of the endotracheal tube by Ivan Magill (an Ulsterman) contributed greatly to the safety of anaesthetising men with maxillo-facial injuries.

### *RAMC casualties*

In the First World War, battalion medical officers frequently left their regimental aid posts and, together with their stretcher bearers, went out in close support of their men across no-man's land. The consequence of their heroism was a very high casualty rate. On the Somme, 52 officers and 406 other ranks were killed; 188 officers and 2,107 other ranks were wounded. Among the dead were no less than 43 infantry battalion medical officers.

There were numerous individual acts of great heroism. On that first day of the Somme, Captain John Green, RAMC, attached to the Sherwood Foresters at Gommecourt, although himself wounded, went to the assistance of an officer who had been wounded and was hung up in the enemies' wire entanglements. He succeeded in dragging him to a shell hole, where he dressed his wounds. He then carried the wounded officer to cover under a hail of bombs and rifle grenades, but he was hit again and killed before he could reach the British lines. The officer died that night and Green's body was not found until eight months later. He was 27 years of age. He was awarded a posthumous Victoria Cross.

Two more doctors were to receive the VC during the Somme. Major William Barnsley Allen was decorated for his devoted care of the wounded under shell fire although he himself had been wounded four times. By the end of the war he had also received the DSO, and the MC and Bar. He returned to general practice in Hounslow, where he remained until his death in 1933. Captain Noel Godfrey Chavasse, who had already been awarded the MC, received his VC for rescuing wounded under fire on October 26th at Guillemont. He gained a posthumous Bar to his VC in August 1917, again for rescuing wounded under fire. He died of his wounds.

The Battle of the Somme ended on November 14th 1916. During those 140 days the British sustained 400,000 casualties and advanced six miles. What lesson can we learn? First, that human flesh and bones are no match for high velocity missiles, nor can bravery alone overcome machine gun fire over open sights. Second, that under extreme adversity, men can show a degree of courage that goes beyond our imagination. Third, that the Royal Army Medical Corps can look back with a mixture of pride and humility at the tenacity, fortitude, bravery and downright hard work of its grandfathers on July 1st 1916.