

## The context of the British sector of the Western Front

### Flanders and northern France

- Britain declared war on Germany on August 1914.
- The British government sent the British Expeditionary Force (BEF) to northern France to try to stop the German advance through Belgium.
- The BEF was made up of 70,000 professional soldiers.

### The trench system

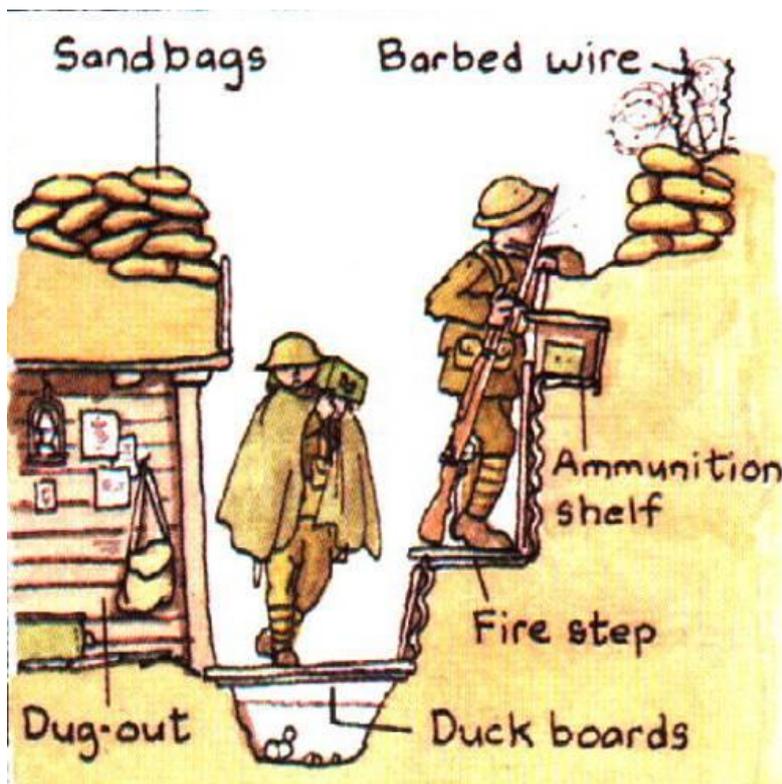
- By the end of 1914, much of Belgium and northern France had been occupied by the Germans.
- The war became static based on trenches, which needed to be defended from the enemy, with attempts made to advance from the trenches to seize land from the enemy army.
- A line of trenches was eventually established all the way from the English Channel in the north, to Switzerland in the south.

### Construction and Organisation

- Although some basic trenches were dug in 1914, a more complex system began to evolve from 1915.
- The trenches were generally dug to a depth of about 2.5 metres.
- Trenches were easier to defend than attack. Machine guns could fire

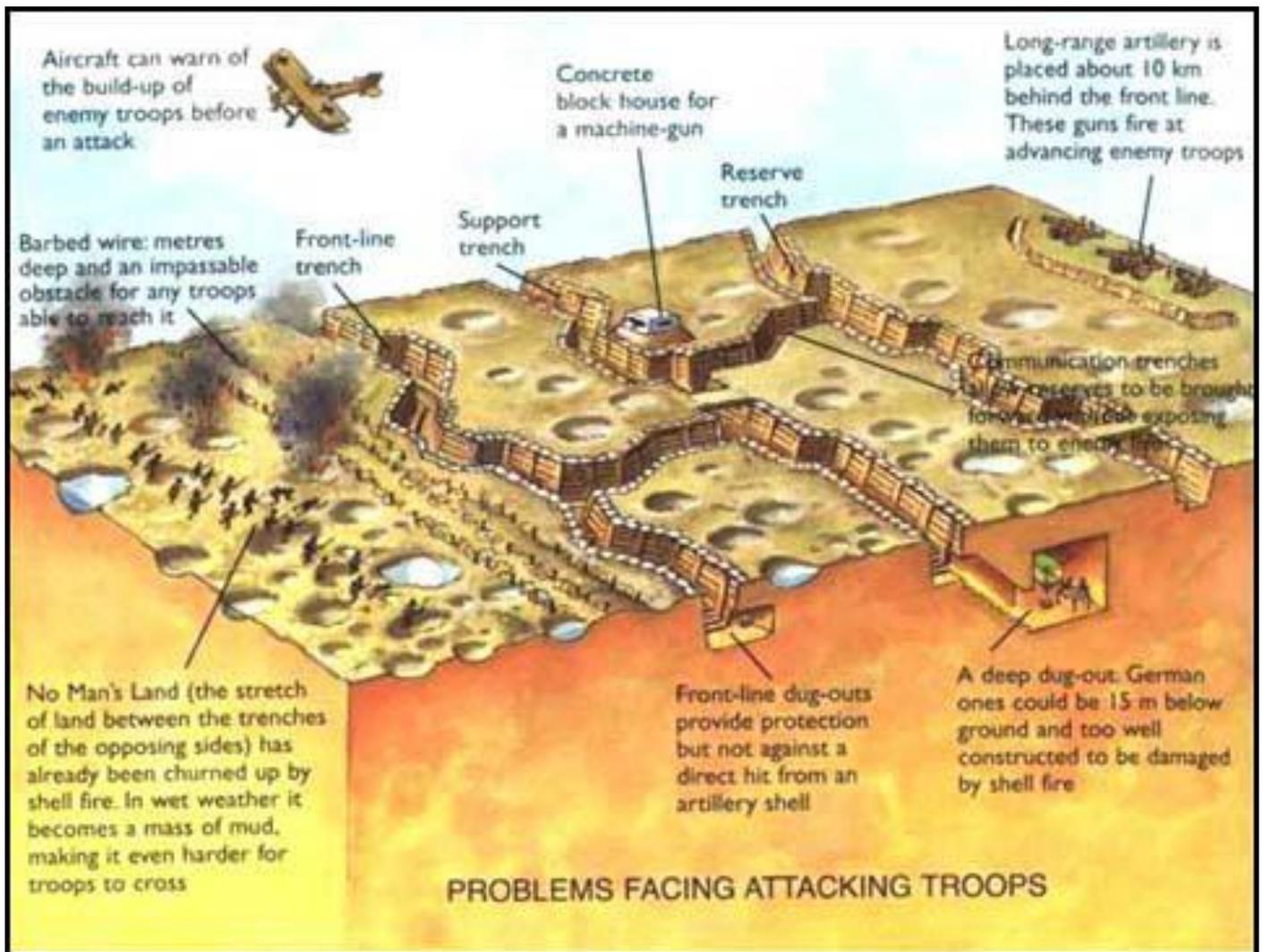
rapidly, and barbed wire was placed in no-man's-land to slow down the progress of attack.

- New tactics were developed to try to deal with the advantages held by the defenders.
- Such as tactics included the use of gas.



Cross section of  
a Trench

## The Trench System of World War I.



### Conditions requiring medical treatment on the Western Front.

	Main symptoms	Attempted solutions to deal with the problem
Trench foot	Painful swelling of the feet, caused by standing in cold mud and water. In the second stage if trench foot, gangrene set in. Gangrene is the decomposition of body tissue due to a loss of blood supply.	<ul style="list-style-type: none"> <li>• Prevention was key</li> <li>• Rubbing whale oil into feet to protect them</li> <li>• Keeping feet dry and regularly changing socks</li> <li>• If gangrene developed, then amputation was the only solution to stop it spreading along the leg</li> </ul>

Trench fever	Flu-like symptoms with high temperature, headache and aching muscles. This condition was a major problem because it affected an estimated half a million men on the Western Front.	<ul style="list-style-type: none"> <li>• By 1918, the cause of trench fever had been identified as contact with lice</li> <li>• Delousing stations were set up. After this, there was a decline in the numbers experiencing the condition.</li> </ul>
Shellshock	Symptoms included tiredness, headaches, and nightmares, loss of speech, uncontrollable shaking and complete mental breakdown. It has been suggested that about 80,000 British troops experienced shellshock.	<p>The condition was not well understood at the time</p> <p>In some cases, such as Siegfried Sassoon and Wilfred Owen, this involved treatment back in Britain</p> <p>The Craiglockhart Hospital in Edinburgh treated 2,000 men for shellshock</p> <p>However, some soldiers who experienced shellshock were accused of cowardice. Many were punished for this - some were even shot.</p>

The main stages in the chain of evacuation were:

1. **Regimental Aid posts (RAP):** They were generally located within 200m of the front line, in communication trenches or deserted buildings. Wounded men would either walk in themselves or be carried in by other soldiers. The purpose of the RAP was to give immediate first aid and to get as many men back fighting as possible.
2. **Dressings stations (ADS and MDS):** In theory, there should have been an Advanced Dress station about 400 m from the RAP and a Main Dressing Station a further half a mile back. The Dressing stations were located in abandoned buildings to offer protection. Each dressing station would be staffed by ten medical officers, plus medical orderlies and stretcher bearers. From 1815, there were also some nurses available for this part of the chain of evacuation. Each field ambulance unit could deal with 150 wounded men, but when major battles were taking place, they would have to deal with many more.
3. **Casualty clearing stations (CCS):** They were located a sufficient distance from the frontline to provide some safety against attack, but

close enough to be accessible by ambulance wagons. The CCS closest to the frontline would specialise in operating the most critical injuries. They were set up in factories or schools and were often located near to railway line. When a wounded soldier arrived they would split up into 3 groups:

- The Walking wounded: Those were the men who could be patched up and returned to the fighting
- Those in need of hospital treatment: These men would need to be transported to a base hospital once they had been treated for any immediate life threatening injuries
- Those who were so severely wounded that there was no chance of recovery: These men would be made comfortable, but the medical resources available were given to those who were more likely to survive their wounds.

The role of FANY: The first six FANYs arrived in France on 27 October 1914. In 1916, the British army decided to allow FANY's to drive ambulances. They became the first women to carry out this role, replacing Red Cross male ambulance drivers.

4. **Base Hospitals:** Base Hospitals on the Western Front were located near the French and Belgian coast, so that the wounded men who were treated there would be close to the ports, from which they could be transported home to Britain. As the war progressed, Casualty Clearing Station played an increasingly important role in dealing with wounds, instead of base hospitals - gangrene wounds needed to be dealt with a lot quicker. This resulted in the CCS performing more surgery. The size of base hospitals increased, especially after a major offensive had taken place. In 1917, three new Base Hospitals with a total of 2,500 beds were available. The Base Hospitals started to experiment with new techniques, such as allocating specialised wards.

### **New techniques in the treatment of wounds and infection**

- A major problem that faced the RAMC at the start of the war on the Western front was dealing with infection caused by gas gangrene.
- It was not possible to perform aseptic surgery in Dressing Stations and Casualty Clearing Stations, due to the contaminated conditions and because of the large numbers of wounded men needing treatment.

The main techniques used to prevent infections from spreading

1. Wound excision or debridement: This was the cutting away of dead, damaged and infected tissue from around the site of the wound. This needed to be done quickly to stop the infection spreading. After excision, the wound needed to be closed by stitching and if the tissue had not been removed before the wound was stitched the infection would spread.
2. The Carrel-Dakin method: Antiseptics, such as carbolic lotion, were, inefficient when treating gas gangrene. By 1917, it was agreed that the Carrel-Dakin method which involved using a sterilised salt solution in the wound through a tube, was the most effective alternative. The solution only lasted for six hours and so had to be made as it was needed. This was difficult especially with large numbers.
3. Amputation: If neither wound excision nor the use of antiseptics succeeded in halting the spread of infection, the only way to deal with it was through the amputation of wounded limbs. By 1918, 240,000 men had lost limbs - many of them because it was the only way to prevent the spread of infection and death.

#### The Thomas Splint

- In 1914 and 1915, men with a gunshot or shrapnel wound to the leg only had a 20% chance of survival. This was because the wounds created a compound fracture where the broken bone pierced the skin.
- The splint that was in use as the wounded man was transferred from the frontline did not keep the leg rigid. By the time they arrived at the casualty clearing station the patients were suffering from shock.
- The answer to the problem came in 1916. Hugh Thomas had designed a splint to stop joints moving.
- As a result of this, in December 1915, he was sent to Boulogne to instruct medical practitioners on how to use the Thomas Splint. The introduction of its use from this time increased the survival rate for this type of wound from 20% to 82%.

#### The use of mobile X-ray Units.

- The main use of X-Rays was to identify shell fragments and bullets in wounds, which, if not removed when the person was wounded could cause infection.
- Two X-rays would be taken from different angles and this helped the surgeon to identify quite accurately the location of shrapnel and bullets in the body.

- There were some problems with the use of x-rays for medical practitioners on the Western front:
  1. X-Rays could not detect all objects in the body. E.G. Fragments of clothing that were driven into wounds from shrapnel.
  2. The length of time that a wounded man had to remain still whilst the x-ray was taken was still several minutes, which could cause problems depending on the wound.
  3. The tubes used in the x-ray machines were fragile and overheated quite quickly. They could only be used for one hour before they had to cool down. Some base hospitals had unmoving x-ray machines. While, there were six mobile units.

### Blood Transfusions

- The use of blood transfusions from 1915 in the British sector of the Western Front was pioneered by Lawrence Bruce Robertson. He used an indirect method, where syringe and tube was used to transfer the donor blood to the patient. The purpose was to stop the patient going into shock through blood loss before surgery.
- Geoffrey Keynes designed a portable blood transfusion kit that was used to provide blood transfusions close to the front line. While, Keynes added a device to the blood bottle to regulate the flow of the blood which helped prevent clotting because blood could not be cooled to start with.

### The blood bank at Cambrai:

- The identification of blood groups and the use of blood type O as a universal donor blood type meant that the risk of being transfused with the wrong blood group was reduced.
- The problem of clotting remained, however it was reduced to the following:
  1. In 1915, Richard Lewisohn discovered that by adding sodium citrate to blood, the need for donor-to-donor transfusion was removed.
  2. In 1915, Richard Weil discovered that blood with sodium citrate could be refrigerated and stored for up to two days.
  3. In 1916, Francis Rous and James Turner found that by adding citrate glucose solution to blood, it could be stored for much longer period - up to four weeks.
- The use of stored blood was clearly demonstrated in 1917 at the Battle of Cambrai. During the Battle, Oswald Hope Robertson, treated 20

severely wounded soldiers with 22 units of blood, some of which had been collected 26 days before. 11 survived.

The attempts to deal with increased numbers of head injuries

- About 20% of all wounds were to the head, face and neck. Injuries of this nature could be caused by both bullets and shrapnel.

Brain surgery

- Injuries to the brain were very likely to prove fatal at the start of the war because:
  1. The issue of infection applied just as much to head injuries as it did to wounds to other parts of the body.
  2. There were difficulties involved in moving men with head injuries through the chain of evacuation, as they were often unconscious or confused
  3. There were very few doctors who had experience of neurosurgery before the war.
- Harvey Cushing developed new techniques in Brain surgery. He used a magnet to remove fragments from the brain and use a local anaesthetic when operating.

Plastic surgery

- Harold Gillies developed plastic surgery along with Charles Valadier. Both men became interested in facial reconstruction - as there was no previous work they came up with new ideas and techniques.
- The intricate operations and recovery that were required in plastic surgery could not be carried out in France. Men who needed this surgery were returned to Britain to go to the Queen's Hospital in Sidcup.
- By the time of the end of the war, just over a year after the hospital opened, nearly 12,000 operations had been carried out.