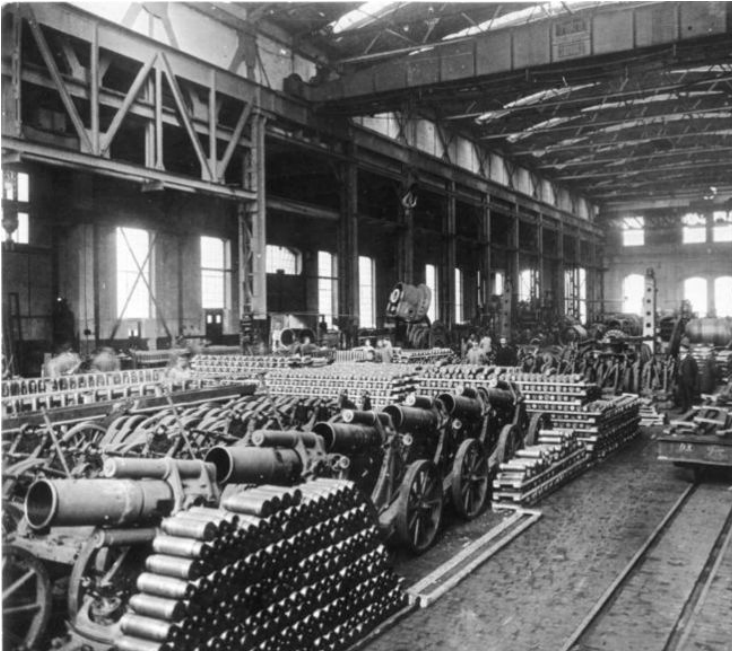# Industrialization

By the late 1800s, the process of industrialization had transformed most of Europe. Factories and densely populated urban areas dotted the landscape and railways connected them together. Advances in industrial production made manufacturing faster, and enabled factory owners to produce more complicated goods with precision. Factories used **assembly lines** to speed up production. With an increase in support and money from governments during the war, factories could **mass produce** guns, tanks, airplanes, automobiles, ammunition, and replacement parts needed for the war effort.

Bundesarchiv, Bild 146-1970-047-37
Foto: o.Ang. | 1914/1918

German munitions (weapons) factory, 1916.

Source:
https://en.wikipedia.org/wiki/Economic_history_of_World_War_I#/media/File:Bundesarchiv_Bild_146-1970-047-37,_Munitionsfabrik.jpg

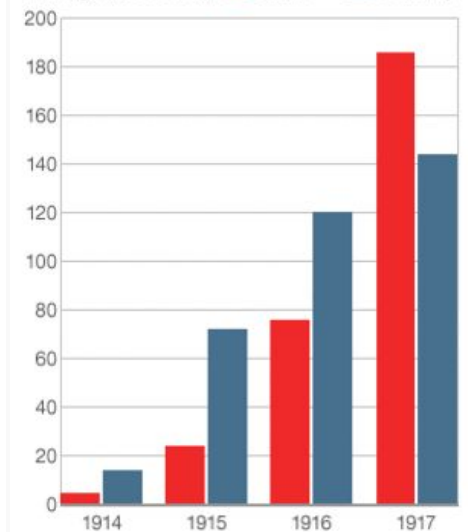Women munition workers stacking cartridge cases in the New Case shop at the Royal Arsenal, Woolwich, 1918.

Source:
https://en.wikipedia.org/wiki/File:Cartridge_cases_at_Woolwich_Arsenal_1918_IWM_Q_27848.jpg

Winning the war in the factories

British and German World War I explosive production

Tonnage (thousands)   ■ Britain   ■ Germany

Source: Niall Ferguson, The Pity of War

The chart above shows industrial output in Great Britain and Germany over the course of the war. Note how the British produced more goods as they started to have more success against the Germans.

Total War

A total war is a military conflict in which nations are willing to make any sacrifices necessary to win. In a state of total war, a nation will mobilize, or make us of its total available military, technology, and human resources to be victorious. In a state of total war, there are no limits to the weapons used, the territory or combatants involved, or the goals. Total war is considered the most extreme form of warfare because both civilians and soldiers are targets.

In addition to dedicating time and money to build new war technologies, European women at home were mobilized to work outside of the home to replace men who went off to war. Additionally, hose at home were asked to make the sacrifice of rationing. Rationing was a policy of strictly distributing food to ensure that soldiers had enough food. Sugar, meat, flour, butter, margarine and milk were tightly controlled and families were urged to consume less.
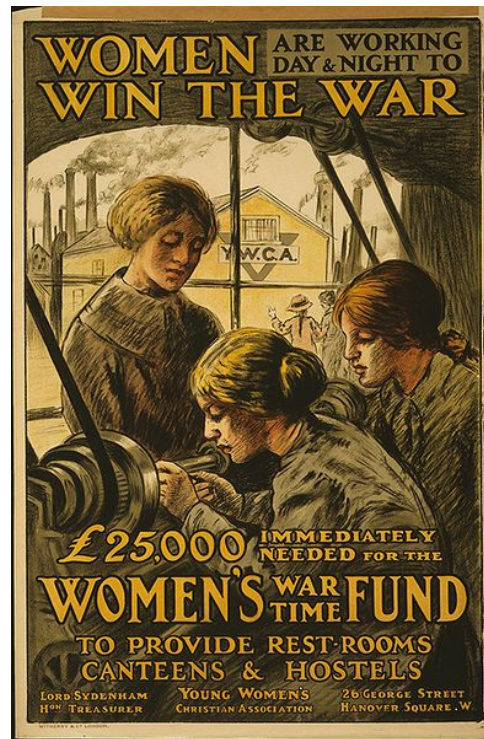
During the war, propaganda posters were used to influence people's decisions and to increase support towards the war effort.

Source: Adapted from https://www.britannica.com/topic/total-war, https://en.oxforddictionaries.com/definition/total_war, http://www.bbc.co.uk/schools/0/ww1/26439020, http://www.encyclopedia.com/history/educational-magazines/home-front

Aerial view of the village of Passchendaele, Belgium before and after WWI. In a total war, civilian and military buildings are targets.
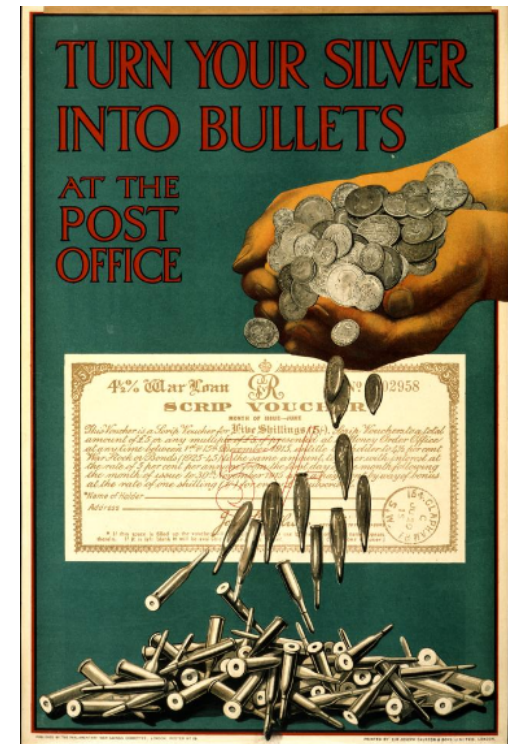
Source: https://commons.wikimedia.org/wiki/File:Passchendaele_aerial_view.jpg

War poster : Women are Working Day and Night to Win the War / Witherby & Co. London, 1915.

Source: https://en.wikipedia.org/wiki/File:Affiche-guerre_Femmes-au-travail.jpg

During World War I, the British government relied heavily on loans to finance the cost of the war. This 1915 posters, encourages British citizens to give metal and money to the war effort.

Sources: http://www.wdl.org/en/item/581/

Technological Developments

Advances in industrial production and competition between countries led to technological and scientific achievements that were used in World War I. Below are some of those that made the greatest impact.

▶ Watch [History.com video on technological developments in WWI](#) then analyze the images and text below.

Machine Guns	Chemical Warfare	Submarines

British Vickers machine gun crew during the Battle of Menin Road Ridge, World War I (Ypres Salient, West Flanders, Belgium).
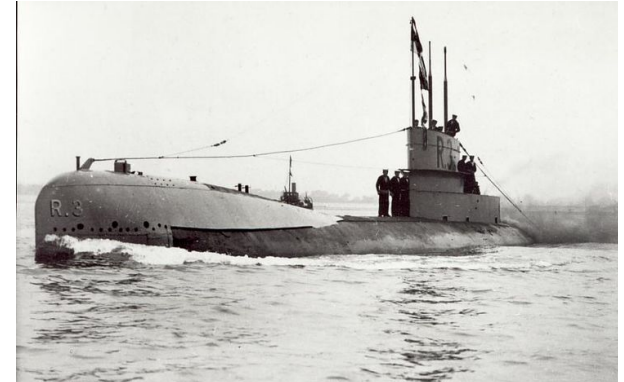Source: https://en.wikipedia.org/wiki/File:Vickers_IWW.jpg |

A Canadian soldier with mustard gas burns, ca. 1917-1918.

Source: https://commons.wikimedia.org/wiki/File:Mustard_gas_burns.jpg |

British R-class submarine.
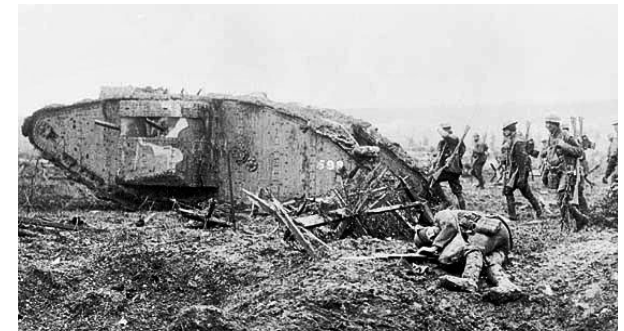Source: https://en.wikipedia.org/wiki/File:British_WWI_Submarine_HMS_R3.JPG |

Airplanes		Tanks

German Albatros D.IIIs of Jagdstaffel 11 and Jagdstaffel 4 planes parked in a line at La Brayelle near Douai, France.
Source: https://commons.wikimedia.org/wiki/File:AlbatDIII.jpg | The first use of chemical weapons of mass destruction were during World War I. The use of chemical weapons such as chlorine and mustard gas were not only a threat to soldiers but also civilians and those who worked to manufacture these weapons. The French were the first to use chemical weapons during the First World War, using tear gas. The German's first use of chemical weapons were shells containing xylyl bromide, an early form of tear gas, that were fired at the Russians near the town of Bolimów, Poland in January 1915.
Source: Adapted from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2376985/, http://www.bbc.com/news/magazine-31042472 |

Mark II Tank Number 598 advancing with Infantry at Vimy. April 1917.

Source: https://en.wikipedia.org/wiki/File:Canadian_tank_and_soldiers_Vimy_1917.jpg |

Trench Warfare

At the start of the war, both sides thought that WWI would be fought in the open like previous wars had been. Once they realized how accurate and effective the new artillery and machine guns were, they needed a new tactic. Both sides dug a series of trenches to protect themselves from enemy fire. Most of WWI, especially in the Western Front in France and Belgium, was fought through trench warfare. One side would attack by climbing out of their trench, over the dangerous section known as "no man's land," and into the opposing trench to fight the enemy. Later, the other side would do the same thing to win back that trench, gaining only a small amount of land and losing a lot of soldiers to machine gun fire, grenades, and gas. This resulted in a **stalemate**, a position in which neither side could win.

> ▶ **Watch [History.com video on trench warfare in WWI](#), [this scene from the film All Quiet on the Western Front](#) and/or [this excerpt from the History Channel show _Conquest_](#) then analyze the images and text below.**
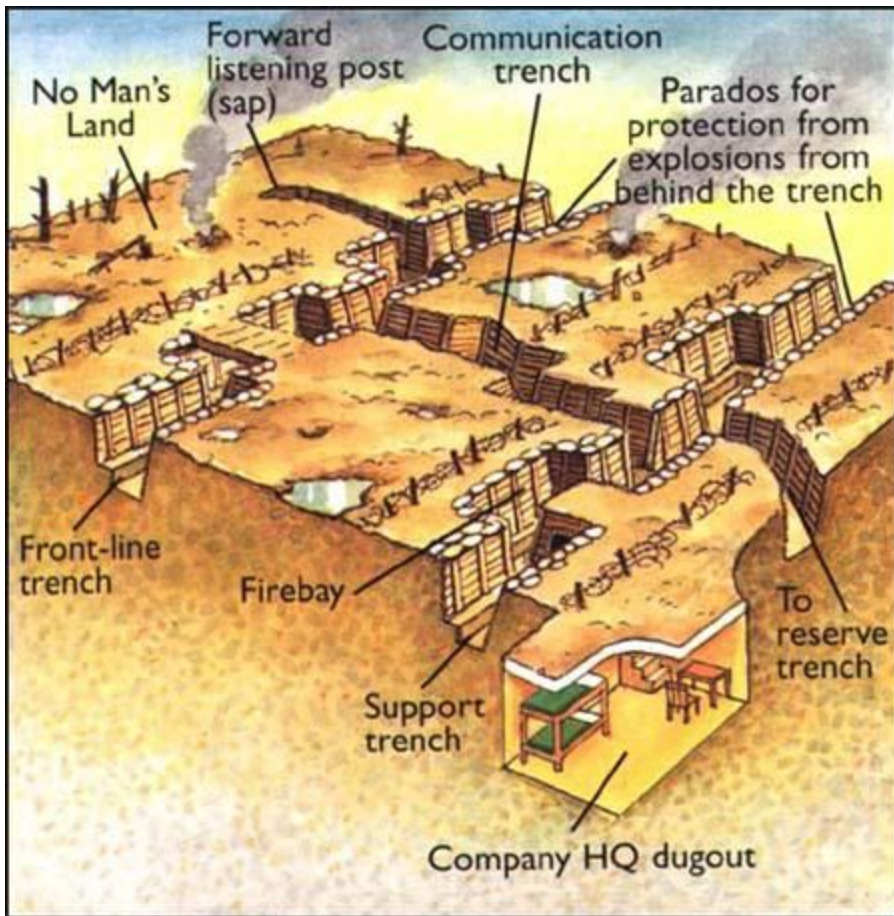

Illustration from Neil Demarco _The Great War_

Source: http://spartacus-educational.com/FWWsapping.htm

French soldiers in a trench northwest of Verdun, 1916.
https://en.wikipedia.org/wiki/File:French_87th_Regiment_Cote_34_Verdun_1916.jpg

A ration party of the Royal Irish Rifles in a communication trench during the Battle of the Somme. The date is believed to be 1 July 1916, the first day on the Somme, and the unit is possibly the 1st Battalion, Royal Irish Rifles (25th Brigade, 8th Division).

Source: https://en.wikipedia.org/wiki/File:Royal_Irish_Rifles_ration_party_Somme_July_1916.jpg
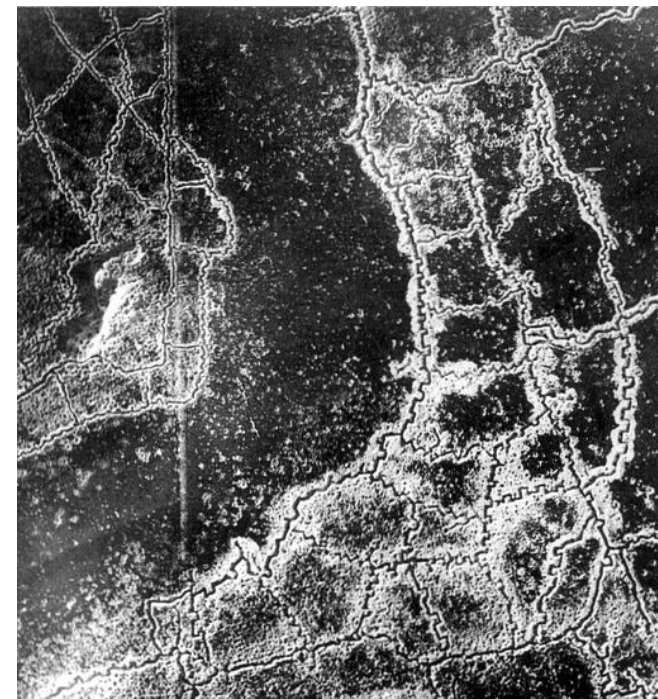
Voices of Soldiers

"We have been in camp near the wood at Écurie for some days now and a more miserable existence it would be hard to imagine. There is nothing but unrest and uncertainty and everyone here is absolutely fed up to the teeth."
- Private Archie Surfleet, February 8th, 1918

"Bombardment, barrage, curtain-fire, mines, gas, tanks, machine-guns, hand-grenades — words, words, but they hold the horror of the world."
- Erich Maria Remarque, All Quiet on the Western Front

An aerial reconnaissance photograph of the opposing trenches and no-man's land between Loos and Hulluch in Artois, France, taken at 7.15 pm, 22 July 1917. German trenches are at the right and bottom, British trenches are at the top left. The vertical line to the left of center indicates the course of a pre-war road or track.

Source: https://commons.wikimedia.org/wiki/File:Aerial_view_Loos-Hulluch_trench_system_July_1917.jpg

No Man's Land, Flanders Field, France, 1919. Source: https://en.wikipedia.org/wiki/File:No-man%27s-land-flanders-field.jpg