

THE FIRST MODERN WAR

From mass-produced cutlery and stoves to telegraphs and photography, the technological innovations of the Crimean War stretched far beyond the battlefield.

By **Crispin Andrews**

IN 1854, BRITISH industrialist Henry Bessemer met Napoleon III. Bessemer had designed a new type of artillery shell, and after the French generals had shown little interest in the product, the inventor decided to pitch the idea to the Emperor himself.

Napoleon had taken the French throne by coup three years earlier. In the mould of his uncle, the first great Bonaparte, the new Emperor was determined to restore France's influence both in Europe and the colonies. Only the previous year, he had sent troops to fight the Russians in the Crimea. Napoleon III liked Bessemer's idea of a longer, heavier shell cut with spiral grooves that would make the shell spin and as a result more accurately target enemy positions. This, he believed, was the sort of technology that would help him release France from the shackles imposed by the 1815 Congress of Vienna, the Peace Treaty that had brought an end to the Napoleonic Wars. There was, however, one slight problem with Bessemer's invention.

In 1854, naval artillery barrels were made from cast iron. These barrels, the French generals told both Bessemer and their Emperor, were not strong enough to deal with the forces that the new, more powerful Bessemer shell would generate. To sell his shells, then, Bessemer needed to come up with stronger gun barrels. Three years later he patented the Bessemer process, made the mass production of cheap steel possible, and himself very rich.

October 2013 marks the 150th anniversary of the start of the Crimean War – the first modern war, as many historians call it. For

two years and four months the French, British, Ottoman Turks and Sardinians fought the Russians, mainly in the Crimean Peninsula, on the Northern edge of the Black Sea, but also in the Caucasus, Anatolia (now Northern Turkey) the Baltic and White Seas and in the Pacific Ocean. "It was basically a war to see whether Britain or Russia was top dog in the world," says Professor Andrew Lambert from King's College London. "As it turned out, it wasn't the Russians."

Czar Nicholas I of Russia wanted to take the Black Sea from the Ottomans, as all the Russian-controlled seas froze over during the winter. Naturally, the Ottomans objected, and British politicians wanted to keep the Russian fleet out of Constantinople and the Mediterranean. Napoleon III needed a crusade in the Holy Lands to secure the support of the influential Catholic interests; at home the Sardinians wanted French and British support in any future war to remove the ruling Austrians from their homeland.

For the first time in the Crimea, military forces used mass-produced rifles, exploding shells, sea mines and armoured coastal assault vessels with long-range cannons. In two and a half years, over a million Russians died, while the British lost 25,000. The French and Ottomans didn't publish their figure, although Professor Lambert notes it was more than the British. Back home, money men like spiral shell-designer Bessemer, made their own kind of killing.

19th century engineers knew how to make steel, but it took six weeks to heat wrought iron with charcoal and roll the steel into

bars. This steel was expensive at £60 a tonne and could only be made in small batches. Steel was used for knives, forks and dinner plates, but for larger projects engineers used brittle cast iron or soft wrought iron.

Bessemer found that blowing air through a vat of molten pig-iron removed some of the carbon from the iron. Repeating the process over and over would eventually refine it into very strong steel. The Bessemer process produced steel without an external heating source. By 1856, a Bessemer converter could make 30 tonnes of high-grade steel in half an hour; the second Industrial Revolution was underway. Henry Bessemer never bothered making his artillery shells.

The first celebrity chef

There were many other inventions that emerged from the Crimean killing fields. British soldiers were dying of food poisoning. Chef Alexis Soyer visited the field kitchens to discover undercooked or burnt meat being served up by people with no knowledge of cooking. Soyer trained up the British Army's first regimental chefs and introduced the portable Soyer stove. The British army used it for the next 100 years. It sold well back home, too. "War," Soyer later wrote, "is the evil genius of a time, but good food for all is a daily and paramount necessity."

Textile designers produced warm garments to help British troops through the Ukrainian winter and named them after Lord Cardigan, the general at the iconic and disastrous Charge of the Light Brigade.

Soldiers of the Fourth Dragoon Guards rest in their camp



Warm headwear was worked up and named for the coastal Crimean town that Britain made its base: Balaclava.

This was also the first major war since Samuel Morse's inventions enabled communication over long distances via telegraph. The French and British laid lines from their Crimean HQs to Paris and London, the first time political leaders could directly contact their armies in foreign theatres. Newspaper war correspondents got reports back to Britain and France from the front line via telegram within five days. They sent photographs home too, and the British public saw for themselves the terrible conditions wounded soldiers had to endure. Nurses like Florence Nightingale and Mary Seacole became heroines and the first British nursing school opened in 1860.

On the Russian side, surgeon Nikolai Pirogov organised untrained female volunteers to work as field nurses for the Russians. Appalled at the loss of life during the Allies' siege of the Russian town Sevastopol in 1854, Pirogov petitioned the Czar to allow him and a group of other doctors to treat the wounded. He used anaesthetic and plaster casts on the battlefield for the first time and a new osteoplastic method for foot amputation, severing the foot so that part of the heel bone was left to give added support to the lower ends of the leg bones.

Industrial war

The Crimean War was the first industrial war. Military advantage no longer lay with the cleverest generals and the most

reliable troops. From now on, the side with the most advanced technology and the strongest industry to support the war effort would surely be victorious.

In November 1853, the Russian Black Sea fleet under Admiral Nakhimov destroyed the Ottoman fleet at Sinop on the southern Black Sea coast. Only one Ottoman ship escaped and with Russia on the verge of controlling the Black Sea, Britain and France entered the war. The Russian cannons fired their exploding shell, and instantly, wooden warships became obsolete. "One hit and a wooden ship would become a blazing inferno," says Professor Allen Guetzo from Gettysburg University. "There had been exploding shells for a while, but firing one was just as likely to catch your own ship on fire as sink an enemy ship."

This changed in 1841, when French artillery officer Henri-Joseph Paixhans developed a delaying mechanism that enabled cannons to fire explosive shells at flat trajectories, without endangering the host ship.

French and British navies used iron-clad warships in the Crimea, not the 20th century metal monsters we are used to seeing, but rather wooden warships covered with iron plates. "They looked like iron sheds," Allen Guetzo says. They were heavy, too. "It took steam propulsion to provide enough power to move these vessels," he adds. "Wind and sails alone couldn't manage it."

In 1845, the SS Great Britain crossed the Atlantic using a screw-propeller, designed by Isambard Kingdom Brunel, using a patent taken out by Francis Petit Smith. Before that,

steamships used massive, heavy and inefficient paddle wheels. The paddle wheel lost performance when the ship took on extra cargo, and if a shell struck it during battle, the ship would be instantly disabled.

Screw-propellers provided more power, but even they consumed so much coal that ships had to maintain a sail rig, and alternate between steam and sail power – particularly during the sort of long journeys that the British ships had to make around the Empire. "Military maritime engineers had to balance a warship's need for propulsion and protection," Guetzo says. He explains that some ships had huge pockets in the hull, so the screw propeller could be hauled in when it wasn't being used.

Professor Lambert adds that without these ships there would have been no Crimean War. "The Crimea was 3,000 miles from Paris and London," he says. "Wooden sail-powered ships wouldn't have been able to get the men and equipment there and keep them supplied."

At the Battle of Waterloo in 1815, soldiers used muskets, accurate over 50m. By the Crimean War, British and French armies had rifles that could shoot accurately over 400m. As long as the riflemen could see through the clouds of smoke that their guns gave off, that is. "Russian soldiers still had muskets," Lambert says. "Russian industry wasn't advanced enough to make rifles." He adds that the new rifles gave the allies such a firepower advantage a small allied force was able to defeat the much larger Russian army. "At the Battle of Alma, the French and >

1853

3 October Turks declare war on Russia
30 November Russians destroy Ottoman fleet at Sinope

1854

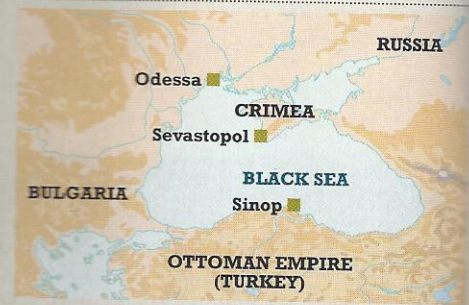
4 January Allied ships arrive in Black Sea
28 March British and French declare war on Russia
20 April Austria and Prussia declare neutrality
20 September Russia defeated at Battle of Alma
23 September Russian fleet destroyed at Sevastopol
17 October First Allied bombardment of Sevastopol
25 October Battle of Balaclava
5 November Battle of Inkerman

1855

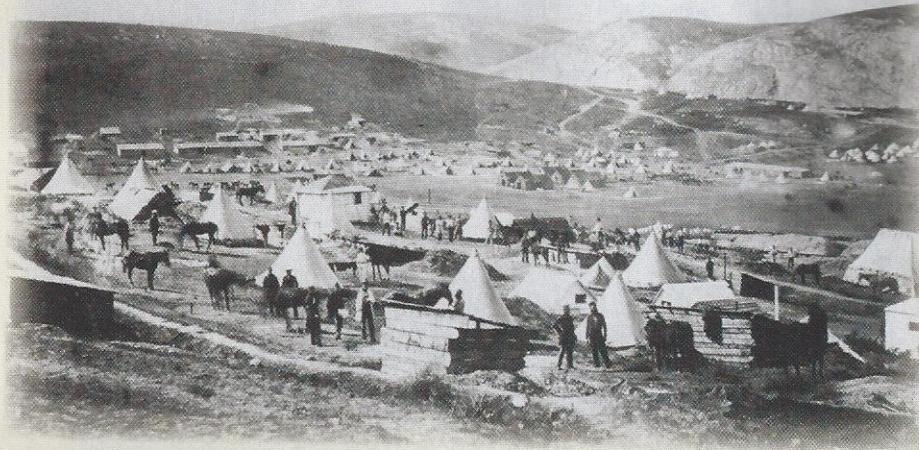
26 January Sardinia join the Allies
April – September Sevastopol besieged
28 June Lord Raglan dies
9 September Russia evacuates Sevastopol
6 November Ottomans defeat Russians on river Ingur

1856

30 March Treaty of Paris signed



Military camp of the Fifth Dragoon Guards, with men and horses among tepee-shaped tents



< British drove the Russians out of a heavily entrenched defensive position," Andrew Lambert says. "This was unheard of prior to the Crimean War."

Taking Sevastopol

The Allies knew that taking Sevastopol, Russia's main Black Sea port and naval base, was their best chance of winning the war. The town was heavily guarded, though, and when the Russians held off the initial allied assault, British leaders needed to find a way of getting supplies and ammunition from their Balaclava base, 13km away, to the troops, based on a plateau between the two towns, near Kadikoi. The single track road between Balaclava and Kadikoi was slow, up a steep hill, and when the winter weather set in, virtually impassable. The British needed a railway.

Soon afterwards, railway contractors Peto and Betts arrived in the Crimea, and in three weeks built a railway to replace the road. Peto and Betts shipped in engineers and resources from Britain, assembled their own wharf near Balaclava and built the railway through marshland and a 150m incline. The Allied bombardment of Sevastopol continued. A year later, the city fell.

There were no Russian railways near Sevastopol. The Russians, defending the city, had to make do with a supply road to the north, connected to some of the Ukraine's major roads. "Russian efforts to keep this supply line open triggered the battle of Inkerman in November 1854," Guetzo says. He adds that the Russians did have the materials to build their own railway, lying in the Sevastopol docks, but that their commanders had no idea what to do with it.

After the war, the Russians learnt quickly. In 1855, there was only 700 miles of rail track

in the whole of the country. By 1881 the Russians had built 14,000 miles. "Building railroads became an immediate military priority for the Russians," Guetzo says. In 1890, work began on the Trans-Siberian Railway, which would connect Moscow with Russia's Pacific coast. By 1941, when Hitler invaded, the Soviet Union had 106,100km of railway. This proved vital in supplying the troops that first withstood the German invasion and later pushed Hitler's armies back to Berlin.

The business of war

After the Crimean War, railways played an increasingly vital part in warfare.

In 1859, during the Second Italian War of Independence, the French used them to get troops into northern Italy quicker than their Austrian foe.

Both sides in the 1861-65 American Civil War used railroads to great effect, and the Austrians again lost out to the Prussians in 1866, after Prussian forces used trains to reach battlefields at previously unheard of speeds. Prussian and Bavarian forces used railways to outflank the French during the 1870 Franco-Prussian War. By the start of the First World War, railhead location determined all aspects of communication lines. Both sides built narrow-gauge railways to bring supplies as close as possible to the front line. This meant, armies could sit in trenches for longer than ever before.

"Nearly all the military technology used during the First World War was either introduced or foreshadowed during the Crimean War," Guetzo says. "Small underwater mines, became big underwater mines and, by the 1860s, torpedoes."

By the 1880s, steel warships powered by double-expansion steam engines

TROOP NUMBERS

Russian Empire 700,000 troops
Bulgarians 3,000
Allies: Ottoman Empire 300,000
French 400,000
British 250,000
Sardinians 18,000

THEATRES OF WAR

Moldavia and Walachia, Black Sea, the Crimean Peninsula, Azov Sea, Caucasus, Baltic Sea, White Sea, Pacific port Petropavlovsk.

MILITARY LEADERS AT THE START OF THE CONFLICT

Russian Empire: Prince Aleksandr Men'shikov
Britain: Lord Raglan
France: Jacques de Saint Arnaud
Ottoman Empire: Osman Pasha

meant the end of sail rigs. Bessemer's steel-making process had been refined enough to make gun barrels.

After the Crimean War, all the world powers started mass-producing infantry rifles. The Russians still didn't have the industrial capacity, so they set up two factories, and bought all the equipment and raw materials from Samuel Colt in the USA. "The Crimean War kick-started the industry of warfare," Professor Lambert says. "Everyone realised that to wage modern war required a large industrial base capable of mass producing high tech equipment."

It was economic strain as much as military defeat that finally made the Russians sue for peace. The British blockaded Russian ports in the Baltic, the White Sea and the Pacific, crippling the country's overseas trade. When Sevastopol fell, in September 1855, the Czar risked civil unrest if he continued the war.

The British had also threatened to bombard St Petersburg. The Royal Navy had a fleet of 300 steam-powered gun boats in the Baltic, with screw-propeller engines produced by Thames ship builders six months after they'd been commissioned. In 1855, William Armstrong, a hydraulic engineer from Newcastle had read a newspaper report from the Crimea about overly heavy naval cannons He sketched out a design for a rifled, breech-loading, lightweight steel cannon. Just six years later, Royal Navy ships were fully equipped with Armstrong cannon.

With Russia defeated, and the workshop of the world behind them, Britain was the world's undisputed top dog during the decades that followed the Crimean War. It wasn't until bigger, more efficient workshops opened in Germany, the USA and the Soviet Union that the balance of power began to change. *