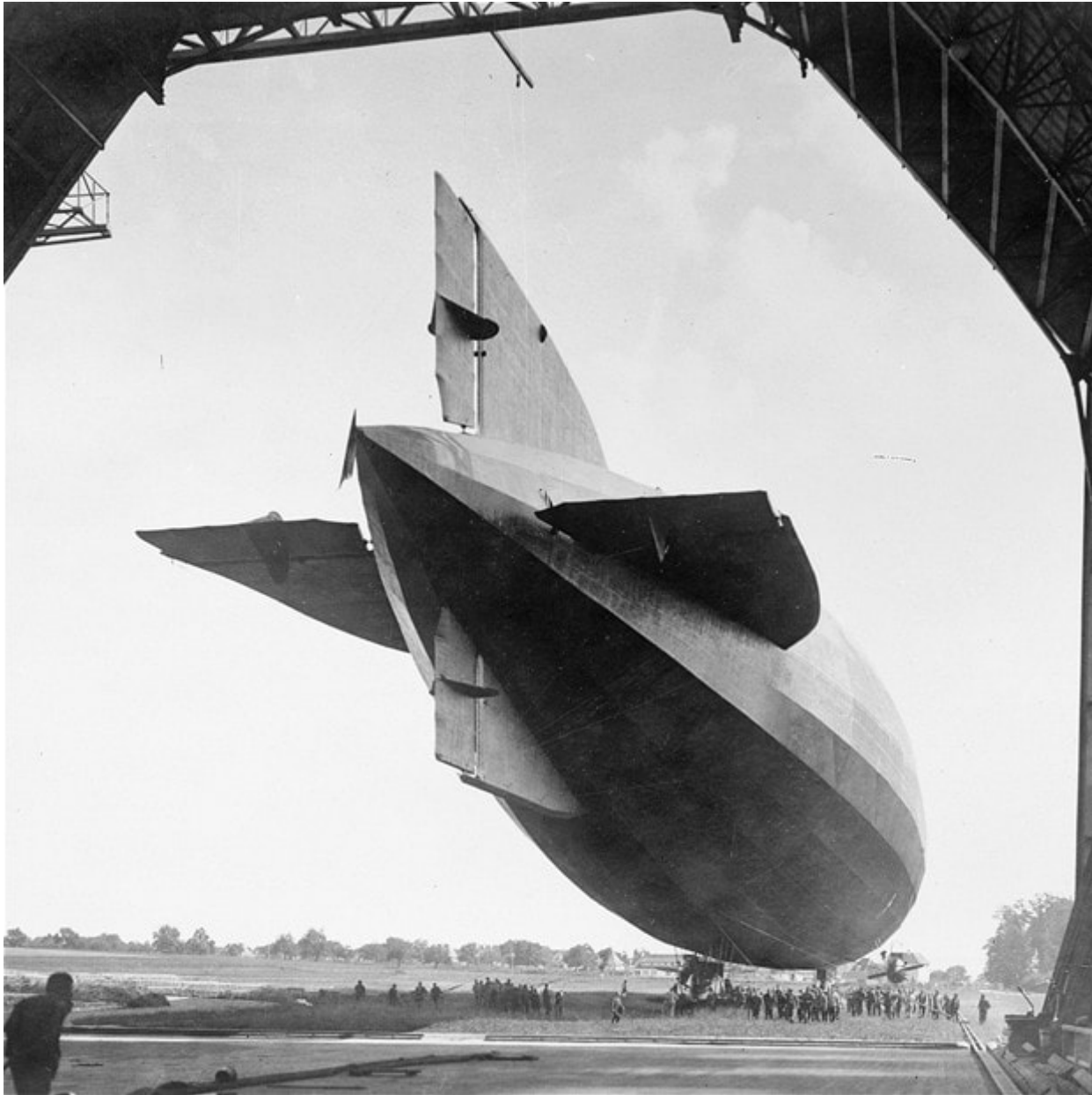


Killing machines: weapons of the First World War

The battlefield was a test bed for a range of technologies and weapons that transformed the nature of war and helped shape the 1939-45 conflict



A Zeppelin, probably the L50, leaves the hangar

By Patrick Bishop

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War has a way of speeding things up. The pressures it creates hasten the gestation of processes that would otherwise take much longer. This phenomenon was everywhere apparent in the **First World War** and particularly in the field of technology.

The 19th century was a time of great scientific advances in Europe and America. The innovations that resulted contributed to a feeling that it was a good time to be alive and that mankind's lot was generally improving. The applications saved labour, improved health, enhanced communications and shrank

distances. With the coming of the war, the dark side of science was given free expression, becoming death-dealing instead of life-enhancing.

“ The conflict forged prototypes of weapons used with devastating effect 21 years later

The conflict cannot be said to have been the mother of any great, transformative inventions. Aircraft, submarines, machine-guns and the wherewithal for tanks were all around before the war began. It was, however, a test bed for existing technologies, providing a gigantic laboratory in which they could be improved and made to be ever more efficient and destructive.

The commercial considerations that in peacetime determined how an innovation would be developed did not apply during the conflict. Governments threw money at anything that showed the slightest chance of improving their fortunes. So it was that the 1914-18 war forged prototypes of weapons that would be used with devastating effect when hostilities resumed a scant 21 years later.

The 1939-45 war would look very different to its predecessor. There would be no trenches; citizens found themselves in the front line, vulnerable to attack from the air; at sea, there were no great set piece battles between giant ships. This change in the nature of war was, to a large extent, the result of the accelerated evolution forced by military necessity during the great upheavals of the earlier struggle.

The catalyst for much of the change was a single pre-war invention – the machine gun. It was the brainchild of Hiram Maxim, a rumbustious, womanising American who moved to Britain and was knighted by Queen Victoria. The Maxim gun harnessed the gas energy produced by firing a round to re-cock the weapon. After Maxim sold it on, it became the Vickers gun, capable of spitting out 450.303 rounds a minute. It was effective over a mile and a quarter, reasonably portable with a total weight of 500lbs and astonishingly reliable.



With this weapon, a team of three or more soldiers could mow down scores of advancing infantry with ease. As the Germans had also benefited from Maxim's design, the mass charges that had decided battles before became impossible. After a few months of slaughter, the early war of movement ground to a halt and the troops went to earth, burrowing out the great underground cities of the Western Front.

But machine guns did not claim the majority of lives lost. It was artillery that did most of the killing. At the start, the British and French forces relied on mobile field guns that would have been familiar to a veteran of Waterloo. Their purpose was to pump shrapnel shells into or over the heads of the enemy. The Germans had heavier guns, designed to pound enemy strongpoints. With the stalemate, direct fire became impractical and field guns gave way to howitzers and mortars that could lob indirect fire on to the trenches from hidden positions.

Shell bombardments became an integral part of the trench experience, arriving either singly in routine harassing fire or in the huge barrages that preceded big operations. In one attack in September 1918, British guns delivered nearly a million shells in the space of just two days.

But the ever-bigger and more explosive guns that arrived on the battlefield could not break the deadlock. Once the stasis hardened, the belligerents looked for other means to dissolve it.

Chemical weapons were considered uncivilised and had been banned under the Hague Conventions of 1899 and 1907. In 1915, frustration drove the Germans to turn to their highly developed chemical industry for a war-winning solution. On the afternoon of April 22, 1915, at the Second Battle of Ypres, they opened cylinders holding 171 tons of chlorine gas along a four-mile section of the front.

The prevailing wind carried it towards the French lines causing 6,000 casualties. The gas attacked wet tissue — the lungs and the eyes — and the deaths were agonising, “like drowning, only on dry land” according to one witness. The French troops panicked and ran. The Germans, many of whom had been killed releasing the gas, were reluctant to press the attack and the advantage was lost.

The Allies soon retaliated in kind. Phosgene and mustard gas followed, but so too did the development of efficient gas masks and, despite accounting for about a million casualties, the use of chemical weapons never produced more than tactical and temporary successes. The verdict of the battlefield was that they were more trouble than they were worth and it was unsurprising that neither side would make use of them in the next war.

Instead, the future seemed to belong to three other innovations: the tank, the aeroplane and the submarine. A design for a caterpillar-tracked armoured vehicle had been offered to the British War Office in 1911 but was rejected and forgotten. Once again, the post-1914 paralysis revived interest in a weapon that might sweep through barbed wire and cruise over trenches and in September 1915, in the latter stages of the Battle of the Somme, a British tank made its first appearance in the conflict.



The French had simultaneously developed the revolutionary Renault FT, a light tank that had a traversable turret. The Allies would produce nearly 6,000 tanks before the end of the war, whereas the Germans, who were hampered by lack of resources, managed only a handful. Despite the imbalance, the tanks did not prove decisive. They were slow, unwieldy and chronically prone to breaking down. However, their potential was obvious, particularly to the Germans, who would employ them as the spearhead of their devastating blitzkrieg tactics at the opening of the Second World War.

Aeroplanes were present from the first days of the fighting, flying over the lines and reporting enemy movements. Aerial reconnaissance would quickly become an essential element in battle planning. Both sides had an intimate knowledge of each other's dispositions with every inch of the front lines photographed and mapped. Air crews also acted as artillery spotters, recording the fall of shot and signalling back so that adjustments could be made.

Aircraft did a certain amount of bombing and strafing, though the effects were slight. But once again, their limited activities provided a grim picture of what future wars would bring. Warning had already been given. The arrival of airships and aeroplanes stirred the imaginations of writers such as HG Wells, who in 1908 alarmed readers of *The Pall Mall Magazine* with a serial, *The War in the Air*. The high point of the story was an attack on New York by an armada of German airships, dropping bombs that collapsed skyscrapers, ignited infernos and drove the city's population mad with panic.

In 1915, Wells's vision became fact when the Germans launched a long series of Zeppelin raids on coastal towns. On May 31, an airship attacked London, showering grenades and incendiaries on Stoke Newington. Seven people were killed, including a three-year-old girl, Elsie Leggat. The experience fell far short of Wells's apocalypse but none the less created an atmosphere of fear that translated into hatred of the perpetrators.



Despite their impressive size, the Zeppelins seemed extraordinarily hard to shoot down. When, on the night of September 2, Lt William Leefe Robinson finally set an airship ablaze over London, the population rejoiced and he became a national hero. By the end of the war, Zeppelins and Gotha four-engined bombers had launched 103 attacks on Britain, killing a total of 1,414 civilians and wounding 3,866. This was fewer than would be killed on the worst night of the Blitz.

Nevertheless, the lessons drawn from the experience would shape the post-war RAF as a strategic bombing force, whose function was to carry the war to German industry and infrastructure.

The war at sea was conducted far from civilian eyes. But here again, a new weapon was at work that would prove potentially even more dangerous to ordinary people in the conflict to come.

Like the tank and the aeroplanes, the concept of the submarine was an old one, made realisable by the great scientific leaps of the 19th century. All the belligerents' navies were equipped with them at the start of the war, but the German diesel and electricpowered U-boats were the most effective, with a range of 5,000 miles. As with the air war, the scope of their operations was initially strictly military but grew ever wider, ending in unrestricted attacks on all enemy shipping. The consequences for civilians became clear with the sinking of the British liner *Lusitania*, which was torpedoed by U-20 off Kinsale, Ireland, on May 7, 1915, with a loss of 1,198 lives.

German submarines sent more than 5,000 Allied ships to the bottom of the sea during the course of the First World War. It was a harbinger of what was to come during the Battle of the Atlantic in the next war, when U-boats, in combination with the Luftwaffe's long-range bombers and reconnaissance aircraft, almost severed the transatlantic trade routes on which Britain depended for its existence, raising the spectre of mass starvation.

In 1918, HMS *Argus*, a converted liner, became the first ship with a full-length flight deck capable of routinely launching and landing planes. The aircraft carrier and the submarine would change the nature of naval warfare, signalling the end of giant warships. But it would be some years before the world's admirals accepted this truth.

From the laboratory of the First World War emerged the means and methods that would determine the shape of the Second and the machinery of death took a great leap forward. The innovations were not wholly malign. In medicine, for example, dealing with the mass physical and mental trauma of battle improved surgical and psychological techniques, treatment and understanding. Marie Curie designed a mobile X-ray machine capable of operating near the front lines and Allied nurses adapted the new cellulose bandage material to create the first modern sanitary napkins.

But the bad massively outweighed the good. The technological legacy of the First World War would prove fatal for many millions of the next generation.

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