

## TECHNOLOGY AND TACTICS

## A TECHNOLOGICAL SOLUTION? THE AIR WAR AND TANKS

The phrase 'total war' evokes not just the open-ended sacrifices the nations were making by 1917 but also the way the sense of urgent necessity mothered inventions of all kinds. Two of the new technologies the war hastened deserve special mention, aviation and tanks.

**The Air War**

The public fascination with fighter pilots and dog-fights still obscures the more prosaic but important work of the airmen. That was to serve as an eye in the sky for the ground forces through reconnaissance and artillery spotting. Fighter aircraft evolved as a way to deny the other side this aerial view. Initially pilots carried side-arms to shoot at each other. Machine guns would obviously be better, but apart from finding a gun light enough for aircraft with such a limited lifting capacity, the aircraft themselves posed a problem. There was no place to mount a machine gun that gave a clear field of fire.

The airmen themselves addressed the problem of aerial gunnery by thinking things through. On 1 April 1915, Roland Garros, a French pilot, used a forward-firing machine gun to shoot down a German observation plane. The gun was crudely synchronized with the propeller, and to deflect bullets that were unsynchronized, Garros fitted metal collars to the blades. He ruled the skies for two weeks until the underlying logic of industrial warfare took effect. Both sides were technologically equal. What one could achieve, so could the other. When Garros crashed behind German lines, Anthony Fokker discovered the secret of his success. Fokker was a Dutchman whose aircraft designs interested the German authorities before the war. They now gave him Garros's aircraft and asked him to go one better. He was not impressed with the deflector plates that Garros had improvised; bullets could weaken the propeller or deflect back at the plane or the pilot. For some time he had been thinking about an interrupter gear to ensure that bullets would pass through the arc of the propeller

only when the blades were clear. He installed the interrupter on his monoplane, the *Eindecker*. It was as fast as anything the Allies flew, and now it had the best gun in the air, fitted so that the aircraft itself was virtually a flying gun. The leading German pilot by 1915, Oswald Boelcke, was the first airman to bring down an enemy plane with the new gun. Max Immelmann flew the second *Eindecker*. He was the first true fighter pilot, the first to devise methods to exploit the technology, for example the 'Immelmann turn' which used a half loop and then a half roll to enable a pilot to make a quick 180 degree turn.

By 1916, the Allies had copied the interrupter technology, brought their own true fighters like the Nieuport Scout into service and ended the Fokker scourge. The Germans achieved supremacy over Verdun. The British held a similar edge over the Somme. Unlike the Germans, however, the Royal Flying Corps was not aiming for a passing and local tactical advantage. General Hugh Trenchard, commanding the RFC, wanted to dominate the air-space over German front lines permanently. His nominal reason was the pressing need for observation patrols, which was logical considering the Germans usually had the advantage of the higher ground. His real aim was to win a moral advantage. Raiding in the air thus had the same purpose as the ground raids that Haig encouraged at the time, fostering an 'offensive spirit'. In contrast, German policy in the air reflected their defensive posture on the ground. They concentrated their air power in mobile units known as 'flying circuses' that could move quickly to sectors under attack and assist the defence or counter-attacks. Accordingly they held the advantage wherever they happened to be concentrated. This advantage swung to the Germans and their Albatros series of fighters through early 1917, culminating in 'Bloody April', when the RFC suffered losses of 30 per cent a week while covering the Arras offensive. With the introduction of the SE5, the two-seater Bristol Fighter, the Sopwith series of Pups, Camels and Snipes, and the French Spad, the Allies regained the edge. They kept it by producing more pilots and machines. With pilots, this involved a drastic improvement in training methods. Nevertheless, according to the official records of the RFC, of the 14,166 pilots who died, 8,000 died in training.

Most aerial combats were unequal affairs between veterans and newcomers, or between the agile fighters and the slow two-seaters used for observation. Fighters also went after observation balloons. The pilots themselves naturally recognized the more skilful and successful members of their fraternity, which could also include the other side. The notion of the aces began with this in-group recognition, spreading to the French media and then to Britain and Germany. By late 1917, the first aces – Boelcke, Immelmann, Albert Ball of Britain (44 victories) and Georges Guynemer of France (54 victories) – were dead. In their stead came Germany's Manfred von Richthofen, the 'Red Baron' from the colour of his Fokker triplane, with 80 victories, and from the RFC, Edward 'Mick' Mannock with 73 and the Canadian Billy Bishop with 72. Of these, only Bishop survived the war.

Passing along new techniques by learning from trial and error was not easy when the penalty for error was death. The pilots, nevertheless, worked out the new tactics of aerial combat. Contrary to the popular notion of dog-fights, the key to success was not tight turns and evasion but speed. The best technique was to dive from above, make the kill in a blazing run and leave the scene. The French were the first to move away from freelancing and organize fighters into tactical formations of six aircraft, the *Cigognes*. The Germans replied with the *Jagdstaffeln* or *Jastas*, the British with formations called flights. These were in turn co-ordinated into larger squadrons. By 1918, each side could send up formations of over a hundred machines, layered according to type and function.

Applying air power directly to the battlefield arose out of an obvious need. Applying it indirectly through bombing began as pure idea. The Germans sent their dirigibles or Zeppelins against Britain in May 1915. When the initial sensation died down and their success proved limited, Germany turned to heavier-than-air bombers. The campaign of the so-called Gotha bombers starting in May 1917 got the attention of the British press and parliament, and led the government to commission Field Marshal Jan Smuts to investigate the future of air power. Out of his report came the Royal Air Force, formed under Trenchard on 1 April 1918 with the amalgamation of the RFC and the Royal Naval Air Service. Trenchard quickly organized the Independent Air Force to bomb Germany. He achieved results as patchy as the Germans had had with their campaign against Britain. Between them, however, they had started on a path that led to Hiroshima.

Although strategic air power\* remained an idea without much substance until the next world war, tactical air power,\* the application of air power directly to the battlefield, was a reality by 1918. The Germans even devised an armoured fighter for ground attacks. The contact patrols the Allies flew during the German spring offensive in 1918 contributed to the gradual German loss of momentum. Ironically, strategic air power captured the interest of Britain and America after the war despite its marginal results. Even though tactical air power had worked for the British, the Germans were the ones who noticed and developed it. The same was true with tanks.

## Tanks

If aviation is an example of competition accelerating change, the tank demonstrates something else: competition forcing change along different paths. Because the Germans chose to concentrate their scarce resources on other weapons, notably gas shells because of the clear superiority of the German chemical industry over the Allied, tanks were exclusive to the Allies. The idea of the tank – that is, of an armoured vehicle that could cross trenches and eliminate machine guns – occurred to several people once the war stiffened

into stalemate in 1915. The most relentless advocate was Colonel Ernest Swinton, who was also the first 'Eyewitness' for the War Office. By February 1915, Churchill was interested enough to form a Landships Committee at the Admiralty. The committee found that caterpillar tracks were superior to wheels, and soon produced 'Little Willie', a rectangular box with tracks along the sides. To lower the profile, the box was changed to a rhomboid shape with the tracks running around it. From this model, 'Mother', came the first operating tank, the Mark I, which had 'male' versions, with six pounder guns mounted on outboard sponsons, and 'female' versions with machine guns. The Mark I had armour 12 mm thick, a weight of twenty-eight tons, a top speed of 3.7 mph and a crew of eight, four of whom took care of the steering, which was done by gears that varied the speed of each track. The later Marks IV and V were comparable. The name 'tank' was meant to conceal the function of the vehicles, as if they were mobile water tanks. Meanwhile, Colonel Jean Estienne, inspired by the Holt tractors the British used to move their artillery, persuaded the French high command to start a tank programme.

Although the pioneers devised vehicles that were remarkably similar, they differed over how the tanks ought to be used. Swinton wanted tanks to support the infantry; he proposed massing them together and using them by surprise to break open the front, as a sort of can-opener, after which the infantry and artillery would take over. Colonel Hugh Elles, the eventual commander of the Tank Corps, and his Chief of Staff, J.F.C. Fuller, thought tanks should have a role independent of infantry. Fuller indeed thought the entire army should be mechanized. More important than the advocates, however, was the opinion of the commanders, especially Haig. Legend has it that he ignored tanks. On the contrary, he showed a keen interest from the start, and his memorandum of October 1916, written after the first use of tanks a month before, has been called 'clear-sighted and intelligent'. It was his subordinate commanders, Rawlinson and Gough, who had reservations about tanks, which was reasonable given the exaggeration of the advocates and the mixed results tanks showed in action.

The first concerted tank attack came at Cambrai on 20 November 1917. Behind a thousand-gun surprise barrage and a screen of 300 fighters, the British sent 378 tanks forward with eight divisions of infantry. Fuller choreographed the tanks and the auxiliary supply-carriers to cross the German wire and trenches. The result was an advance of over five miles along a seven mile front, with only 1,500 casualties. Half the tanks then fell to German fire, broke down or got stuck and the attack bogged down until the Germans counter-attacked. Using storm troops and tactical air power, the Germans regained the ground they had lost.

Despite their inauspicious start, tanks played a role in the Allied and American attacks that ended the war. The Australians in particular practised and virtually perfected the co-ordination of infantry and armour. The Americans

used French and British tanks and took to armour instinctively. Yet the tanks of World War One were too slow, fragile and prone to breaking down to amount to more than a support for the infantry. They were still at the end what they had been at the start: a clever idea that needed work. They were not the solution to the stalemate.

#### A TACTICAL SOLUTION?

If strategy had been reduced to brute endurance, despite the application of new technologies, what about tactics? Was there a more intelligent and effective way to fight? By 1917, the German, French and British armies understood the problem they faced and were innovating with tactics and technology. The Germans used the Eastern Front as a laboratory for new methods. After Falkenhayn was sacked, he took command of the campaign against Romania, repeating Mackensen's earlier success against Russia with a lightning victory. The team of Lieutenant-Colonel Georg Bruchmüller and General Oskar von Hutier brought new ideas to artillery and infantry tactics respectively. Bruchmüller's notion of the rolling barrage was similar to the creeping barrage the French and British had developed, a curtain of shells which advancing infantry followed closely. He organized the guns for the assault of Hutier's Eighth Army on Riga in September 1917. Hutier planned a fluid encirclement campaign of the sort the Germans had used in the east since 1914. He surprised the Russians by bridging the Dvina River where they were weak. Bruchmüller used mortars of all sizes to keep the Russians away from the infantry crossing the river in boats, and then gas shells to disable the Russian artillery. After five days, the Germans took Riga and 25,000 Russian prisoners for relatively slight losses.

The French reformed their tactics in earnest when they moved to attack at Verdun in the autumn of 1916. These changes, and ones the British army were implementing, were reflected in an interesting report General Arthur Currie, then commander of the 1st Canadian Division, made after a visit to Verdun. As a part-time soldier before the war, Currie's advantage was that he knew that he had a lot to learn. He kept his eyes and mind open. He isolated four essentials for a successful infantry attack. First, the need for reconnaissance and information: raids were the conventional way to keep up to date, but Currie preferred aerial photographs of German positions. Second, the need for suitable objectives: the French went after tactical features rather than trenches or lines on the map. Third, training. The British made a start at simulating the site of attacks in their training in 1915 but the French took the notion of preparation much further. They instituted small-group training in special manoeuvres like leap-frogging and in the use of specialized weapons. This tied in with the fourth feature Currie noticed, the importance of the platoon. Out of necessity, the platoon had been a primary unit of the small

Canadian militia before 1914, so that Currie saw nothing new when the centre of gravity of the British army moved from the larger formations down to the company and platoon, which in turn were subdivided into bombing, Lewis gun and rifle sections. Momentum could be restored to the attack only by focusing responsibility for real-time decisions at the lowest possible level and letting the assault troops flow around resistance, which could be mopped up later.