THE ORIGINS OF THE RAF

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1914

At the start of the First World War in 1914, people had only been successfully flying aeroplanes for ten years. Aircraft were basic machines, made of wood, canvas and wires, which were not able to travel very far or very fast.

The aeroplanes were biplanes, as the technology of that time had not developed materials that could be strong enough but also light enough to withstand the mechanics of flight. Most of the planes could only carry the pilot although, as time went on, they were able to carry two people. The Sopwith Camel was typical of the type of aircraft used in in the First World War made out of fabric-covered wooden surfaces. Its fuel tank was located at the rear of the aircraft, which made the position of its centre of mass vary significantly with changing fuel load, earning it a reputation for being difficult to fly.

The Sopwith Camel was a biplane – that is, it had two sets of wings. Early aircraft were built in this way due to the weakness of the materials of the time. Metal in production during that period was too heavy, especially for the low-powered engines available. By having two wings, the stress on a single wing was reduced; therefore, by sharing the load, the wings were less likely to snap. It would take more powerful engines and stronger materials before the more modern aircraft would be possible.

Despite the limitations of the early aircraft, they still provided a unique view of what was happening on the ground, and this led to the formation of the Royal Flying Corps (RFC) as part of the British Army in April 1912. The Royal Navy formed its own Air Service (RNAS) just before the war. Nonetheless, when the war started, Britain only had around 200 working aircraft as part of its military.

AN AERIAL VIEW

An aerial image of the battlefield

Prior to the invention of aircraft, balloons were often used to obtain an aerial view. Static observation balloons were used on the battlefields during the First World War; however, their visibility was limited to their location, as all they were able to do was go up on a long rope and then be pulled back down again. Aircraft allowed a much wider view of the battlefield and could fly behind the enemy lines. However, in the early stages of the war, aircraft were not equipped with radios or camera, as both were very heavy, so pilots were required to fly and then remember what they were looking at so that they could tell it to the staff on the ground once they had landed. During an actual battle, pilots were able to use message streamers or weighted bags to try to communicate with those on the ground about what they could see.

By autumn 1914, the fighting on the Western Front had become focused around trench lines. The static, or immoveable, nature of the fighting made air reconnaissance even more important in order for military leaders to see what was happening and what the enemy was planning. In 1915, special cameras were developed that could be strapped to the side of the aircraft. The cameras were large, heavy devices and needed to be operated by hand. The pilots had to fly in a straight line so that numerous photographs could be taken over a concentrated area, creating an overlapping series of pictures that could be built up once they were developed and back on the ground. Flying in this manner made the pilots vulnerable to being fired at from the ground. Aircraft were often hit and destroyed, with the pilots captured, injured or killed.

The aircraft were also limited by the weather conditions. Low cloud meant that the pilots either could not see or had to fly dangerously close to the ground. In some battles, the visibility severely limited how helpful the pilots were able to be.

As the war progressed, radios were also attached to aircraft to speed up communication with the ground.

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DOGFIGHTS

The threat that the aerial reconnaissance made to plans was so great that each side sent up their own aircraft to to stop the activity. Having weapons on the early aircraft was difficult due to their fragile structure. Some pilots took a pistol into the air with them, but they could do just as much damage to their own aircraft if a bullet hit a wing or, more worryingly, the propeller.

The solution to not using a pistol was to have a fixed gun on the aircraft. The Germans did this first in 1915 on the Fokker Eindekker, after they had invented an interrupter mechanism on the machine gun that allowed the gun to fire through moving propeller blades. This also meant that the pilot had the gun in front of him and did not have to move around too much to fire the weapon. Once the Allied pilots had encountered this attack in the air, British scientists set about creating their own versions of fighter aircraft.

What followed became known as dogfights, as the pilots in their small aircraft fought each other while trying to carry out or prevent the reconnaissance missions.

PROPAGANDA

In the years 1915–1918, aircraft were used in the psychological war against the Germans and their allies. Aircraft were used to drop leaflets of support over occupied Belgium, France and Italy. Leaflets were also dropped by air onto the German trenches, with messages aimed at demoralising the soldiers.

Using aircraft in this way pushed the military commanders to investigate how versatile the role of the aircraft could be. It also pushed the designers to find ways for aircraft to carry more, and for pilots to be able to drop cargo or other items while still flying.

AIR DEFENCE

In December 1914, a German seaplane flew over the dockyards of Kent and dropped a bomb; the bomb missed but it was the beginning of the air battle, attacking Britain from the air. This was followed by attacks from Germany using Zeppelin airships, which could fly silently when they were near the required target. The Zeppelin raids resulted in the deaths of civilians across Kent and into London. British aircraft began to be sent up to meet the attackers and scare them off. But they could not always reach them, and the Zeppelins carried machine guns to fight off any attack.

Between 1915 and 1916, there were about 20 attacks a year, each one involving several airships attacking at once. A large numbers of airmen and aircraft that were needed at the Front had to remain in the UK to defend the skies. On 2–3 September 1916, Lieutenant William Leefe Robinson attacked an airship and caused it to explode and crash. Everyone on the ground who saw it cheered. He was awarded the Victoria Cross. This was the first sign that the airships were vulnerable.

In June 1917, the Germans started to fly Gotha bomber aeroplanes over the UK to drop bombs. The first attack caused many deaths, and the air defences had to be prioritised and reorganised; this was one of the factors leading to agreement that there should only be one air service. The use of anti-aircraft fire and barrage balloons, combined with fighting squadrons, meant that by May 1918, the Germans had lost 60 bombing aircraft and the attacks began to stop.

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THE PILOTS AND THE GROUND CREW

Flying was still new, and the new technology and fragile aircraft, along with the conditions, made being a pilot extremely dangerous.

Many men died just in training, and some new pilots didn't even make it into the air, crashing on take-off when the full fuel load pushed the aircraft's centre of mass to a position that was dangerously far back on the fuselage.

The basic aircraft, along with the likelihood of being attacked in the air and from the ground, resulted in life expectancy for an Allied pilot being approximately 17.5 hours of flying time or just 11 days during 1915. The German aircraft were more advanced, and this meant fewer losses.

Nonetheless, large numbers of young men wanted to be pilots, while anyone with a mechanical interest wanted to be a part of the ground crews.

The image of the pilot of the First World War is of someone from a wealthy background, which was often true in the early days. This was because the RFC was keen to recruit anyone who already had some flying experience – and that was generally only those from wealthy backgrounds. As the war progressed, people from a variety of backgrounds who were considered reasonably well-educated would be recruited. The racism that prevented black and Indian men from being officers and airmen at the start of the war also began to be challenged.

Hardit Singh Malik was born in the Punjab and was studying at Oxford University in the UK when he decided to join the RFC in 1916. As a Sikh, he needed to wear a turban, so he had a special helmet made to fit over it. He survived the war despite being fired at many times, resulting in having two bullets lodged in his leg for the rest of his life. He died aged 90 in 1985.

William Robinson Clarke – Robbie – was born in Kingston, Jamaica in 1895. Clarke travelled to Britain in 1915, to join the Royal Flying Corps. At first, Clarke served as an air mechanic, but on 18 October, he was posted to France as a driver with an unidentified observation balloon company. After promotion to sergeant, he went to Belgium to work on reconnaissance activities. Clarke became a pilot just in time for the Battle of Messines in June 1917. After being attacked and injured during a reconnaissance mission, Clarke spent time in hospital in Britain. He was honourably discharged in August 1919. He returned to Jamaica and died in April 1981, and is buried at the Military Cemetery at Up Park Camp, Kingston.

The highest-scoring (brought down enemy aircraft) fighter pilot, or 'ace' as they were known, was Edward 'Mick' Mannock VC. Born in 1887 in Brighton, he left school at a young age to help support his mother and siblings. He originally joined the army as a private, ending up in the Royal Engineers before being transferred to the RFC. On 26 July 1918, his plane was hit while flying over the Western Front and he died. He was awarded the Victoria Cross the following year.

Henry Allingham was born in 1896 and joined the RNAS in 1915. He served on board ship during the Battle of Jutland as part of the support for seaplanes. He was not a pilot but a mechanic,

William Robinson Clarke

and was posted to France in 1917 with the position of 'Air Mechanic First Class'. He transferred to the RAF when it was formed in 1918. Allingham lived until he was 113, dying in 2009. He was one of the last surviving veterans of the First World War.

Women were able to serve in the army in support of the RFC and RNAS from 1917. Once the RAF was created, the Women's RAF was also set up. The WRAF was divided into four areas: technical and non-technical; household; clerks; and store women. Although the majority worked as clerks, some served as drivers and motorbike riders. The technical section utilised some of the women's specialist skills, including as metal welders, fitters and seamstresses.

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THE NEW SERVICE

Over the course of the war, the roles of the RFC and the RNAS expanded. The RFC was serving across the Western Front and also in the Middle East (as part of the Mesopotamia and Palestine campaigns), the Balkans and Italy.

The main role of the RNAS was to protect and support the Royal Navy. However, it was also involved with the defence of Britain from aerial attack and, as the war progressed, became involved with battles, such as those in the Middle East.

Both services had expanded and developed, with their commanders seeing the possibilities that new technology could provide them with. However, both services were often competing for new aircraft, pilots and support staff.

To try to end the overlap or competition between the two branches, it was decided to create a new military service. An Act of Parliament on 29 November 1917 agreed to the creation of the Royal Air Force, which formally started on 1 April 1918. Members of the RFC, the RNAS, the WAAC (Women's Army Auxiliary Corps) and the WRNS (Women's Royal Naval Service) were transferred across to the new RAF.

By the end of the war, the RAF had over 300,000 service personnel and 22,000 aircraft. The Women's RAF was formed at the same time as the RAF, making it the first military service to include women at the start. When the WRAF was disbanded in 1920, it had 32,000 service women.

THE TECHNOLOGY OF THE FUTURE

A biplane with one of the early cameras attached

By the end of 1918, the British military had built, used and lost thousands of aircraft as a result of the war. Advances in technology and understanding of aircraft had been pushed further than anyone could have imagined. Aircraft had become more than just an add-on; now they were viewed as an important part of the technology of war. Alongside basic reconnaissance, they had been used for communication, fighting, bombing and rescue. In the years that followed the First World War, competition and ingenuity would push aircraft design and technology even further. Air power, air support and air technology would be essential to any leading military power, and crucial in the conflicts that followed.

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USING THIS INFORMATION

This historical information can be combined with the introductory film and resources from the resource section for exploring some creative ideas in a school club/informal club, or for a more curriculum-based lesson.

Below are the ideas and questions that these materials could support.

In addition to the historical information above, case studies and extra information are available in the resource section. These include biographies, aircraft technology and information about the Act of Parliament that created the RAF.

KEY QUESTIONS FOR EXPLORATION IN ANY SETTING:

How did aircraft make a difference during the First World War?

Why did they form the RAF in 1918?

HOW TO USE THIS MATERIAL IN A HISTORY CLUB OR LUNCHTIME/AFTER-SCHOOL / INFORMAL CLUB

These ideas are suitable for a mixture of age groups and abilities.
They can also be used with the interactive map to begin a local history investigation.

SHOW THE FILM – ORIGINS OF THE RAF

Provide the historical information or read it to students, and select one or both of the questions from the list above that you think the group might find interesting. (You may want to use the additional questions in the box at the end of this section to stimulate ideas.)

Select some of the case studies/biographies from the resource section. Ask the young people to answer the question(s) and present their discoveries as:

- An information poster on the RFC or the RNAS at the start of the war
- A newspaper story for their school/group newsletter on the role of aircraft during the war
- A display for the school/class/ group noticeboard about the different ways that aircraft were used in a specific year
- A comic script showing all the ways that aircraft were used in the First World War
- An assembly presentation or talk for other members of your group about one specific thing, e.g. communication, air defence

Now use this information to start investigating the local history of an airbase near you – this can begin by using the interactive map. Over the course of the last century, there have been over 1,500 air bases or places used by the RAF; even if you don't live near to one now, there will have been one at some time.

Find out about the base. Identify what other information or understanding of an historical period is needed to tell the story of that base.

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LESSONS IN SUPPORT OF THE CURRICULUM AND/OR EXAMINATIONS

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GUIDANCE ON HOW THIS MATERIAL COULD BE USED IN A LESSON ABOUT:

1. The First World War
2. The Technology of Warfare

1. THE FIRST WORLD WAR

Ages 11 years and above

The information gathered here could be used with existing lessons around the First World War, or it could be a single lesson or half lesson based on the model outlined below.

Example key enquiry question:

How were aircraft used at different stages during the First World War?

Watch the film, Origins of the RAF and use the historical information.

Create a chart that explores the uses of the aircraft and ask the students to make an assessment of how important that use was. For example:

Aircraft use	Reason for doing it for their own side	Impact on the opposing side	Importance to the war overall –
dropping leaflets	morale boost	create low morale	low
taking photographs of the trench lines	helps to gather intelligence	takes away any secrecy	high

COMPARE THE FINDINGS AS A CLASS

Now ask the students to create a chart that explores how that role would be carried out without aircraft and to decide whether it would be effective, writing down their reason.

Activity carried out by the aircraft	Use for its own side	Alternative to using aircraft	Would that be effective in the same way?
dropping leaflets	morale boost	none available	it wouldn't happen and there would be no advantage even if it was small
taking photographs of the trench lines	helps to gather intelligence	using static balloons	unable to see as far and balloons are easier to fire/shoot at

ONCE AGAIN, COMPARE THE FINDINGS.

Using the findings, ask the students to discuss whether the use of aircraft made a difference to how the war was fought.

EXTENSION:

Create a recruitment campaign, highlighting the different roles and skills needed to serve in the RAF in 1918.

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2. THE TECHNOLOGY OF WARFARE

Key Stages 3 and 4

The information and resources on this site can be used to explore the developing role of aerial technology during the First World War. Below is a suggestion for a lesson outline.

SHOW THE FILM – ORIGINS OF THE RAF

Use the pictures taken by aerial reconnaissance (in the resources) and discuss how important they are for a side that is planning an attack or trying to spot where their enemy will attack. Using copies of the images, indicate the key information that has been captured in the photograph.

Ask the students to read the historical information and to create a fact sheet about aircraft used on the Western Front during the First World War.

Create a timeline from 1914 to 1918, indicating the key developments of aircraft roles, using their fact sheet as the source.

Using the historical information and other sources, ask the students to create three arguments in favour of aircraft making a difference in defence or defending those on the ground.

Ask the students whether they think the arming of aircraft with guns and/or bombs was an important step for:

- Technology
- The war as it progressed
- Those fighting in the trenches
- Those planning the next battle
- Those defending civilians

They should explain their answer.

Ask the students what the key problems were with the expansion of the use of aircraft during the First World War.

Ask the students to create a chart that organises all the different roles of aircraft from 1914 and throughout the war, indicating what the limitations were and whether they attempted to overcome the limitations during the war, e.g. supply, limited size of aircraft, training of pilots, safety of the aircraft, etc.

As a class, ask them to discuss and answer:

Was aircraft technology too limited to be versatile through the First World War?

Conclude. Ask the students to consider how aircraft technology was changed during the war and to identify what they think the key change was.

ADDITIONAL QUESTIONS TO SUPPORT LEARNING FOR ALL GROUPS

Did the formation of the RAF send any messages out to the public/the military/the enemy about the importance of aircraft during the war?

What were the significant ways in which the use of aircraft was changed by technology during the First World War?

Were the pilots and support staff all from similar backgrounds?

SUPPORT QUESTIONS AND ENQUIRIES

Can you find out how many aircraft other nations had at the start of the war?

How many Victoria Crosses were awarded to members of the RFC, RNAS and RAF during the First World War?

Who was Dame Helen Gwynne-Vaughan?

What were the main aircraft used by the British during the First World War?

What were the main aircraft used by the Germans during the First World War?

Why were the uses of aircraft limited during the war?

USING THE PHYSICS/STEM SUPPORT MATERIALS:

The activity is designed to show an aspect of technology that demonstrates some of the thinking in the past. The STEM activity here is about flight – try it to understand some of the issues the pilots of the First World War faced in training and manoeuvring their aircraft, which affected how they could be used.