



حلقة بحث بعنوان:

History of Aviation(flying)

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Grade: 11th

Date: 2015 - 2016

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Introduction:



From thousands of years people needed to travel long distance so they thought in a technology to travel easier than walk, then they saw birds and try to imitate them so they invented flight(aviation) .

The **history of aviation** has extended over more than two thousand years, from the earliest forms of aviation, kites, steam age, the Wright brothers , also the world wars , to space race and the digital age until that moment.

How Did We Learn to Fly?

Myths and Legends of Flight

Greek Legend - Pegasus

Bellerophon the Valiant, son of the King of Corinth, captured Pegasus, a winged horse. Pegasus took him to a battle with the triple headed monster, Chimera.

Icarus and Daedalus - An Ancient Greek Legend



Daedalus and Icarus

Daedalus was an engineer who was imprisoned by King Minos. With his son, Icarus, he made wings of wax and feathers. Daedalus flew successfully from Crete to Naples, but Icarus, tired to fly too high and flew too near to the sun. The wings of wax melted and Icarus fell to his death in the ocean.

King Kaj Kaoos of Persia

King Kaj Kaoos attached eagles to his throne and flew around his kingdom.

Alexander the Great

Alexander the Great harnessed four mythical wings animals, called Griffins, to a basket and flew around his realm.

Early Efforts of Flight

Around 400 BC - China

The discovery of the kite that could fly in the air by the Chinese started humans thinking about flying. Kites were used by the Chinese in religious ceremonies. They built many colorful kites for fun, also. More sophisticated kites were used to test weather conditions. Kites have been important to the invention of flight as they were the forerunner to balloons and gliders.

Humans try to fly like birds



For many centuries, humans have tried to fly just like the birds. Wings made of feathers or light weight wood have been attached to arms to test their ability to fly. The results were often disastrous as the muscles of the human arms are not like a birds and cannot move with the strength of a bird.

Hero and the Aeolipile



Aeolipile

The ancient Greek engineer, Hero of Alexandria, worked with air pressure and steam to create sources of power. One experiment that he developed was the Aeolipile which used jets of steam to create rotary motion.

Hero mounted a sphere on top of a water kettle. A fire below the kettle turned the water into steam, and the gas traveled through pipes to the sphere. Two L-shaped tubes on opposite sides of the sphere allowed the gas to escape, which gave a thrust to the sphere that caused it to rotate.

The Ornithopter- Leonardo da Vinci 1485



Leonardo da Vinci's Ornithopter

Leonardo da Vinci made the first real studies of flight in the 1480's. He had over 100 drawings that proved his theories on flight.

The Ornithopter flying machine was never actually created. It was a design that Leonardo da Vinci created to show

how man could fly. The modern day helicopter is based on this concept.

The First Hot Air Balloon-Joseph Michal 1783



One of The Montgolfier's Balloons

The brothers, Joseph Michel and Jacques Etienne Montgolfier, were inventors of the first hot air balloon. They used the smoke from a fire to blow hot air into a silk bag. The silk bag was attached to a basket. The hot air then rose and allowed the balloon to be lighter-than-air.

In 1783, the first passengers in the colorful balloon were a sheep, rooster and duck. It climbed to a height of about 6,000 feet and traveled more than 1 mile.

After this first success, the brothers began to send men up in balloons. The first manned flight was on November 21, 1783, the passengers were Jean-Francois Pilatre de Rozier and Francois Laurent.

George Cayley - 1799 - 1850's

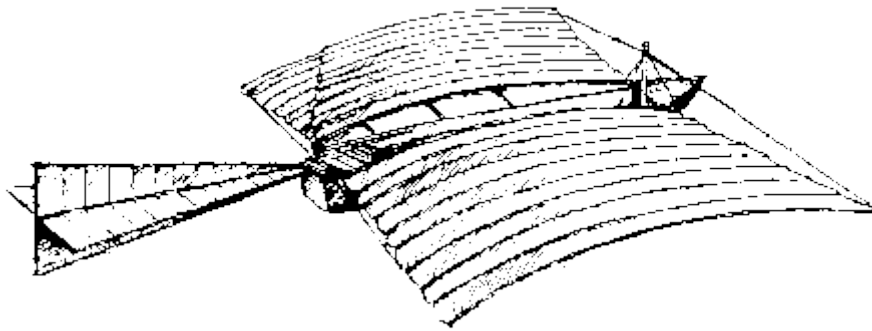


One Version of a Glider

George Cayley worked to discover a way that man could fly. He designed many different versions of gliders that used the movements of the body to control. A young boy, whose name is not known, was the first to fly one of his gliders.

Over 50 years he made improvements to the gliders. He changed the shape of the wings so that the air would flow over the wings correctly. He designed a tail for the gliders to help with the stability. He tried a biplane design to add strength to the glider. He also recognized that there would be a need for

power if the flight was to be in the air for a long time.



One of the many drawings of gliders

Cayley wrote *On Ariel Navigation* which shows that a fixed-wing aircraft with a power system for propulsion and a tail to assist in the control of the airplane would be the best way to allow man to fly.

19th And 20th Century Efforts

Otto Lilienthal 1891



**One of
Lilienthal's
Glider**

German engineer, Otto Lilienthal, studied aerodynamics and worked to design a glider that would fly. He was the first person to design a glider that could fly a person and was able to fly long distances.

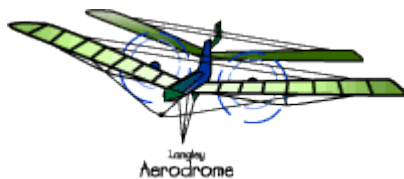
He was fascinated by the idea of flight. Based on his studies of birds and how they fly, he wrote a book on aerodynamics that was published in 1889 and this text was used by the Wright Brothers as the basis for their designs.

After more than 2500 flights, he was killed when he lost control because of a sudden strong wind and crashed into the ground.



Lilienthal's Glider in Flight

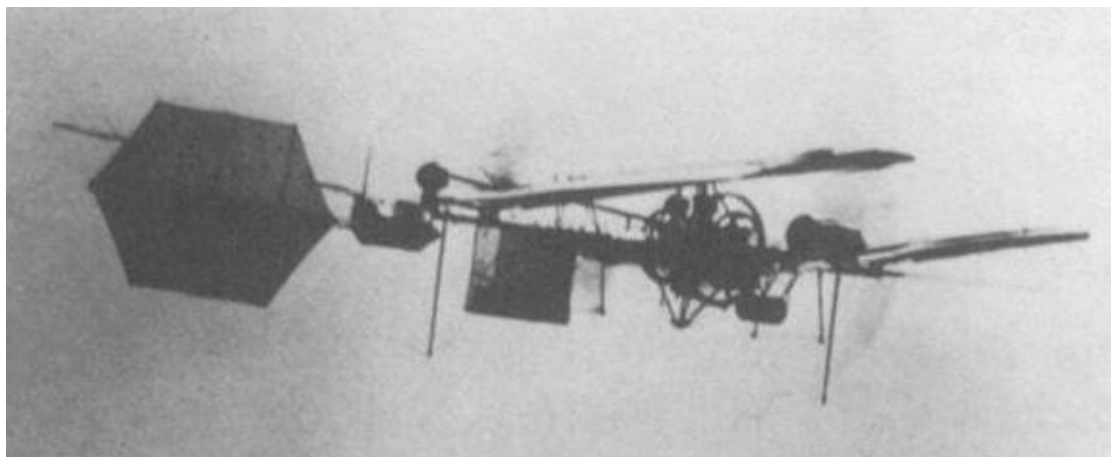
Samuel P. Langley 1891



Langley's Aerodrome

Samuel Langley was an astronomer, who realized that power was needed to help man fly. He built a model of a plane, which he called an aerodrome, that included a steam-powered engine. In 1891, his model flew for $\frac{3}{4}$ s of a mile before running out of fuel.

Langley received a \$50,000 grant to build a full sized aerodrome. It was too heavy to fly and it crashed. He was very disappointed. He gave up trying to fly. His major contributions to flight involved attempts at adding a power plant to a glider. He was also well known as the director of the Smithsonian Institute in Washington, DC



Model of Langley Aerodrome

Octave Chanute 1894

Octave Chanute published *Progress in Flying Machines* in 1894. It gathered and analyzed all the technical knowledge that he could find about aviation accomplishments. It included all of the world's aviation pioneers. The Wright Brothers used this book as a basis for much of their experiments. Chanute was also in contact with the Wright Brothers and often commented on their technical progress.

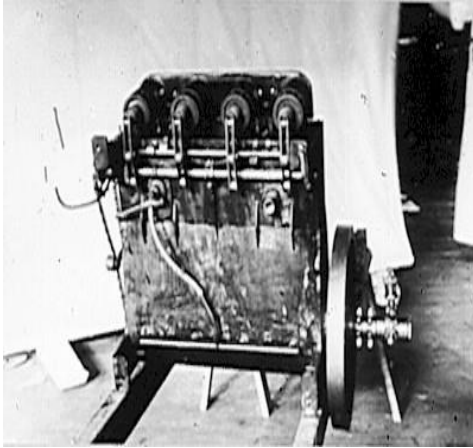
Orville and Wilbur Wright and the First Airplane

Orville and Wilbur Wright were very deliberate in their quest for flight. First, they read about all the early developments of flight. They decided to make "a small contribution" to the study of flight control by twisting their wings in flight. Then they began to test their ideas with a kite. They learned about how the wind would help with the flight and how it could affect the surfaces once up in the air.



**A Drawing of a
Wright Brothers
Glider (1900)**

The next step was to test the shapes of gliders much like George Cayley did when he was testing the many different shapes that would fly. They spent three years testing and learning about how gliders could be controlled at Kitty Hawk, North Carolina.



Picture of the actual 12 horsepower engine used in flight

They designed and used a wind tunnel to test the shapes of the wings and the tails of the gliders. In 1902, with a perfected glider shape, they turned their attention to how to create a propulsion system that would create the thrust needed to fly.

The early engine that they designed generated almost 12 horsepower. That's the same power as two hand-propelled lawn mower engines!



The Wright Brother's Flyer

The "Flyer" lifted from level ground to the north of Big Kill Devil Hill, North Carolina, at 10:35 a.m., on December 17, 1903. Orville piloted the plane which weighed about six hundred pounds.



Actual Flight of The Flyer at Kitty Hawk

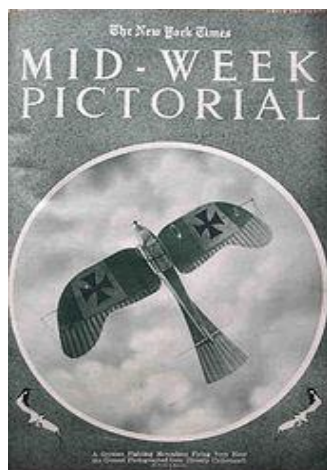
The first heavier-than-air flight traveled one hundred twenty feet in twelve seconds. The two brothers took turns flying that day with the fourth and last flight covering 850 feet in 59 seconds. But the Flyer was unstable and very hard to control.

The brothers returned to Dayton, Ohio, where they worked for

two more years perfecting their design. Finally, on October 5, 1905, Wilbur piloted the Flyer III for 39 minutes and about 24 miles of circles around Huffman Prairie. He flew the first practical airplane until it ran out of gas.

World War I (1914–1918)

Combat schemes



German Taube monoplane, illustration from 1917

It was not long before aircraft were shooting at each other, but the lack of any sort of steady point for the gun was a problem. The French solved this problem when, in late 1914, Roland Garros attached a fixed machine gun to the front of his plane,

Aviators were styled as modern-day knights, doing individual combat with their enemies. Several pilots became famous for their air-to-air combat; the most well known is Manfred von Richthofen, better known as the **Red Baron**, who shot down 80 planes in air-to-air combat with several different planes.

France, Britain, Germany and Italy were the leading manufacturers of fighter planes that saw action during the war, with German aviation

technologist Hugo Junkers showing the way to the future of much of 20th-century aviation, through the pioneering of practical all-metal aircraft in late 1915.

Between the World Wars (1918–1939)

The years between World War I and World War II saw great advancements in aircraft technology. Airplanes evolved from low-powered biplanes made from wood and fabric to sleek, high-powered monoplanes made of aluminum, based primarily on the founding work of Hugo Junkers during the World War I period and its adoption by American designer William Bushnell Stout and Soviet designer Andrei Tupolev.

World War II (1939–1945)

World War II saw a great increase in the pace of development and production, not only of aircraft but also the associated flight-based weapon delivery systems. Air combat tactics and doctrines took advantage. Large-scale strategic bombing campaigns were launched, fighter escorts introduced and the more flexible aircraft and weapons allowed precise attacks on small targets with dive bombers, fighter-bombers, and ground-attack aircraft. New technologies like radar also allowed more coordinated and controlled deployment of air defense.

Not only airplanes, but also helicopters saw rapid development in the Second World War, with the introduction of the Focke Achgelis Fa 223, the Flettner Fl 282 synchropter in 1941 in Germany and the Sikorsky R-4 in 1942 in the USA.

The postwar era (1945–1979)



D.H. Comet, the world's first jet airliner. As in this picture, it also saw RAF service

After World War II, commercial aviation grew rapidly, using mostly ex-military aircraft to transport people and cargo. This growth was accelerated by the glut of heavy and super-heavy bomber airframes like the B-29 and Lancaster that could be converted into commercial aircraft.

The 1945 invention of nuclear bombs briefly increased the strategic importance of military aircraft in the Cold War between East and West. Even a moderate fleet of long-range bombers could deliver a deadly blow to the enemy, so great efforts were made to develop countermeasures. However, the approach diametrically changed when a new type of nuclear-carrying platform appeared that could not be stopped in any feasible way: intercontinental ballistic missiles. The possibility of these was demonstrated in 1957 with the launch of (Sputnik 1) by the Soviet Union. This action started the Space Race between the nations.

The space race between the United States and the Soviet Union would ultimately lead to the landing of men on the moon in 1969 (Apollo 11).



Apollo 11 lifts off on its mission to land a man on the moon

in 1979 the Gossamer Albatross became the first human powered aircraft to cross the English channel. This achievement finally saw the realization of centuries of dreams of human flight.

The digital age (1980–present)

The last quarter of the 20th century saw a change of emphasis. No longer was revolutionary progress made in flight speeds, distances and materials technology. This part of the century instead saw the spreading of the

digital revolution both in flight avionics and in aircraft design and manufacturing techniques.

In 1986 Dick Rutan and Jeana Yeager flew an aircraft, the Rutan Voyager, around the world unrefuelled, and without landing. In 1999 Bertrand Piccard became the first person to circle the earth in a balloon.

In 2015, André Borschberg flew a record distance of 4481 miles (7212 km) from Nagoya, Japan to Honolulu, Hawaii in a solar plane.

The Result:

Humankind was now able to fly! During the 20&21 centuries, many new airplanes and engines were developed to help transport people, luggage, cargo, military personnel and weapons. The 20&21th centuries' advances were all based on this first flights by the American Brothers from Ohio

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