Renaissance I
Famous personalities

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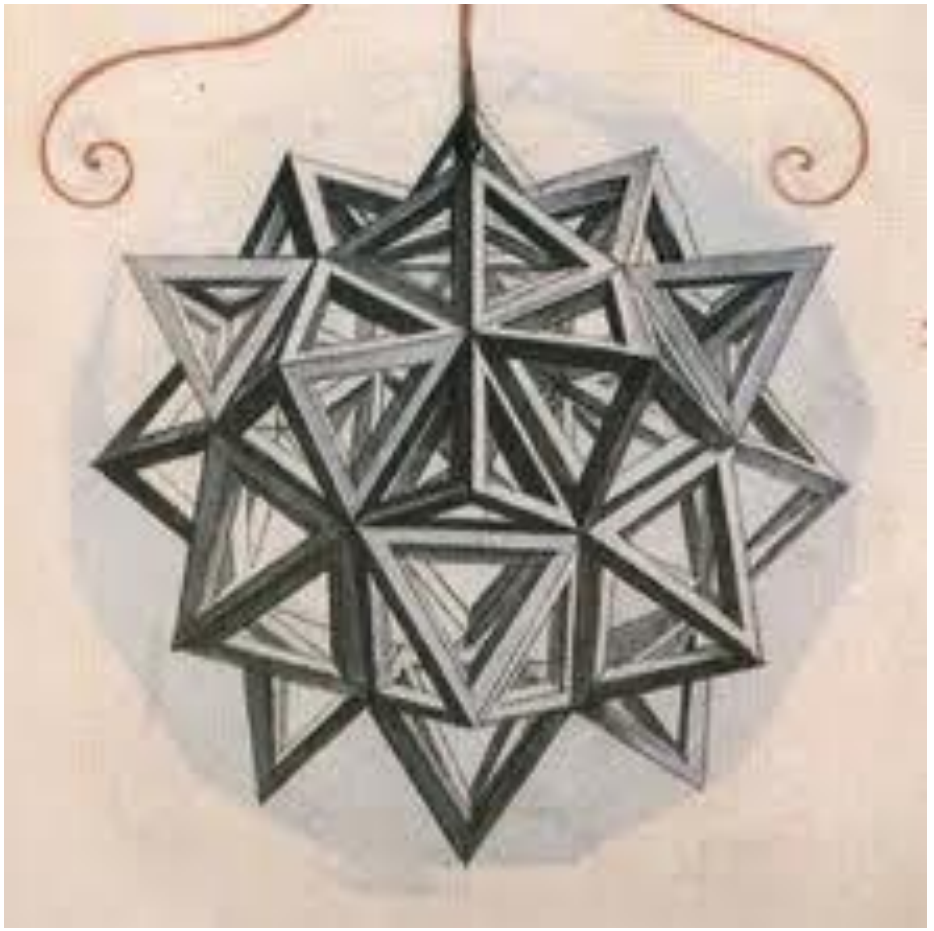
Famous personalities

- Leonardo da Vinci
- Albrecht Dürer



Leonardo da Vinci

- Leonardo Da Vinci was a great inventor, being fond of engineering, astronomy, aeronautics, mathematics and more.
- His drawings include a number of various inventions, the basics of which more or less can be found in different technologies today.
- Da Vinci is considered to be the father of modern science.
- Some of his most important inventions include the hydraulic machine, the boat and design of a flying machine.

Leonardo's Life

- Leonardo Da Vinci is often referred to as the ideal "Renaissance Man". He was a profound scientist and inventor, while at the same time completing incredible works of art in many different mediums. He managed to capture the ideals of the time by not only having a wide range of interests, but also by furthering human knowledge and excelling in his works of art.
- He was born in Vinci, Italy, leading to his namesake Da Vinci, which means "of Vinci".
- He was born on April 15th, 1452, to his unmarried parents: the twenty-five year old Ser Piero and a peasant girl named Caterina.
- His illegitimate birth eventually gave him a total of seventeen half-brothers and sisters.[

Education

- Although most of Da Vinci's early childhood is unrecorded and left to speculation,
- it is known that he had access to a large number of scholarly texts, through which he gained an informal education in subjects such as Latin and mathematics.
- At the age of fifteen, Leonardo was sent to work as an apprentice for Andrea De Verrocchio in an artistic workshop within Florence.

  He stayed with this workshop until 1477,

  when he set out by himself.

Painter and Engineer of the Duke

- Da Vinci eventually began working for the Duke of Milan, starting in the year 1482.
- He was given the title "painter and engineer of the duke", as he served both purposes until the Duke fell from Power in 1499.
- This time period is also noted as the beginning of most of Da Vinci's scientific work, which he continued after he left the Duke's service.
- Leonardo had a large effect on both modern knowledge and the modern method of scientific research.

New Observation of Nature

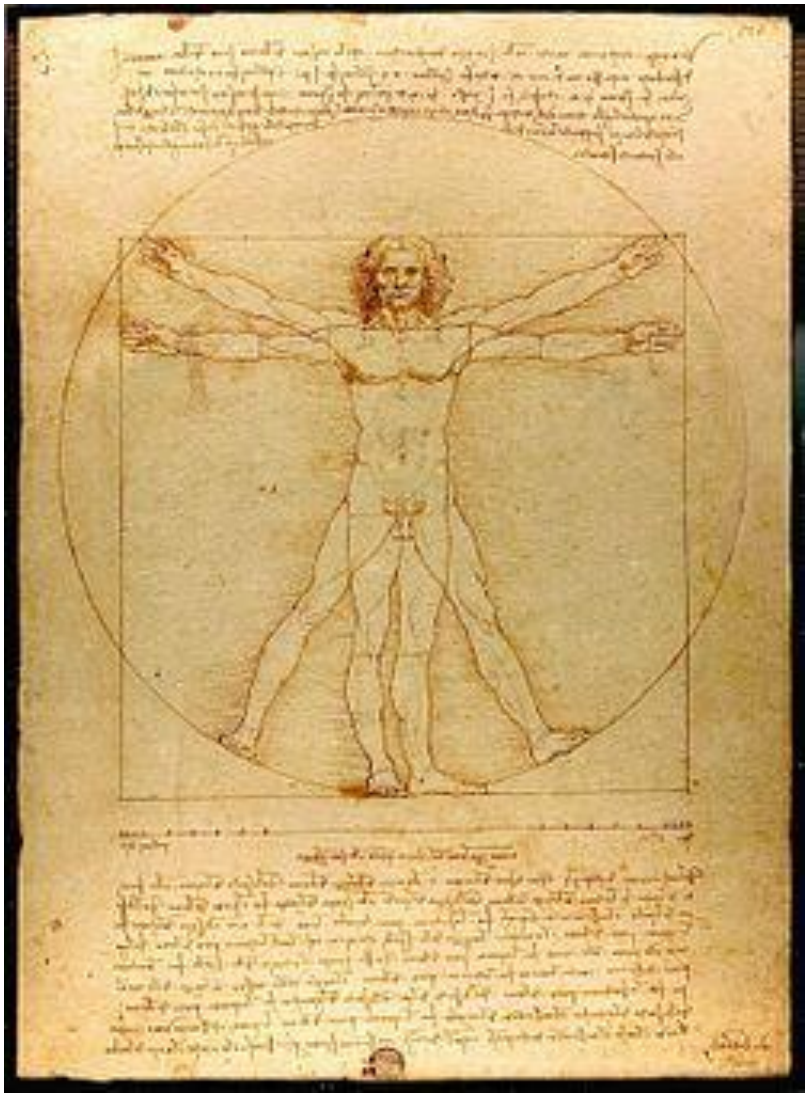
- Many of Leonardo's predecessors and contemporaries based knowledge of the natural world off of religious thinking only,

  as it had been done in the medieval era.
- Da Vinci applied a new method, and used observation of nature to help create scientific theories and study the world around him.
- The modern scientific method is based off of observation and the testing of these observations, which we owe in part to Da Vinci.

Town Plan

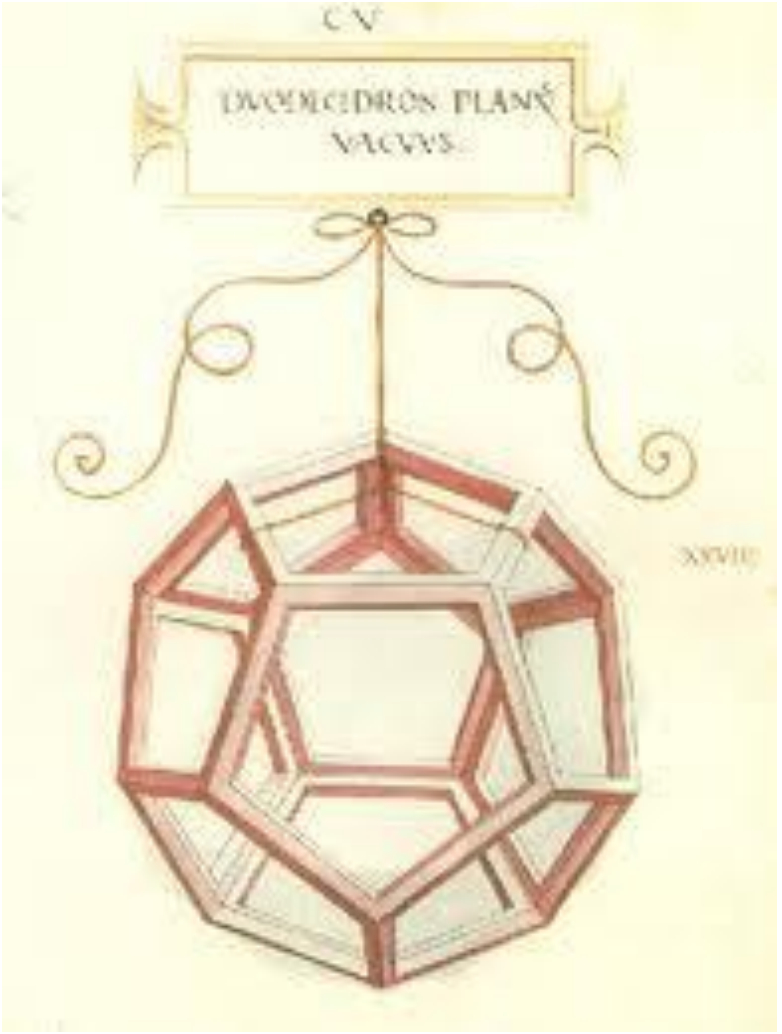
Vitruvian Man

- The artist made mathematical discoveries of nature and the human body that are still studied today.
- In his painting the "Vitruvian Man", Leonardo demonstrates the perfection of the human body.



The Divine Proportion

- The divine proportions lead us to the one we find everywhere in nature.
- Φ - it is the ratio to which everything is built around. 1.618.
- This ration defines growth and patterns. The number of female bees vs the number of male bees in a hive.
- The spirals of a sunflowers seeds. Leaf arrangement on a branch. And also in the human body.
- Distance from the tip of your head to the floor divided by the distance from your belly button to the floor is equal to 1.618 … (irrational number).
- Distance from your shoulder to your fingertips divided by the distance between your elbow to your fingertips.
- Hip to floor divided by knee to floor.



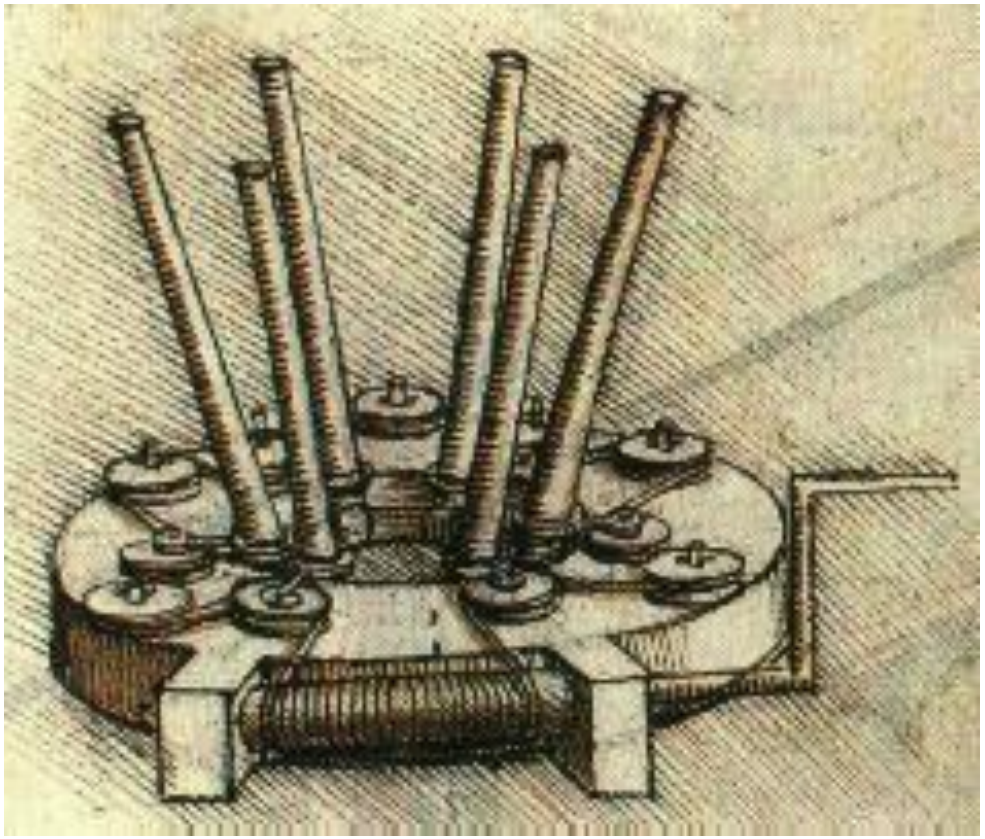
Inventions

- Leonardo Da Vinci is known world-wide for his incredible art and

  his inventions that plunge him ahead of his time.
- Although he lived in the 14th century, he sketched amazingly accurate prototypes of machines that have inspired the modern-day inventors to produce similar gadget.
- Some examples are helicopters and war tanks.

Technological Advances

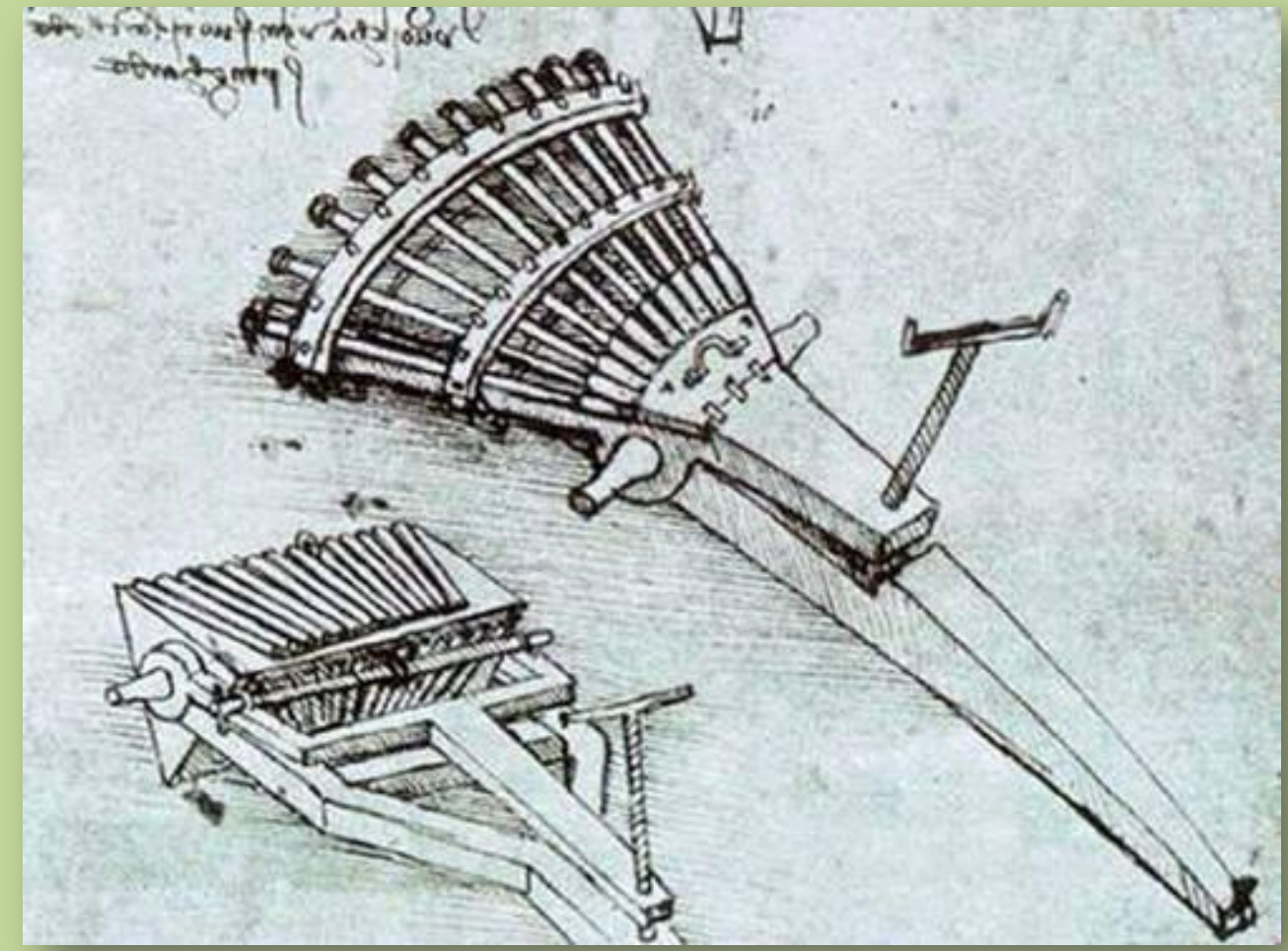
- Technological advances, such as optics or hydrodynamics, both fields that are often used in technological design today. Da Vinci also made contributions to the study of flight through the observation of birds, laying the groundwork for one of humanity's greatest technological achievements.[1]



33-barelled organ

- One of the wartime machines designed and built by Da Vinci was the “33-barelled organ”, a multi-barreled gun designed so that it could be fired and reloaded at the same time.
- The thirty-three low caliber cannons used in this invention were mounted in three eleven-cannon rows. These rows were all mounted upon a revolving platform. While one row of cannons was being fired, another could be cooling down and the third would be reloaded. This was a huge advantage in war, as the cannons of the time period took a long time to reload.
- The nickname “33-barelled organ” came from the upright cannon rows resembling organ pipes.
- It is interesting to note that this invention allowed rapid fire long before the first modern machine gun was designed.

8th Organ



The Triple Barreled Cannon

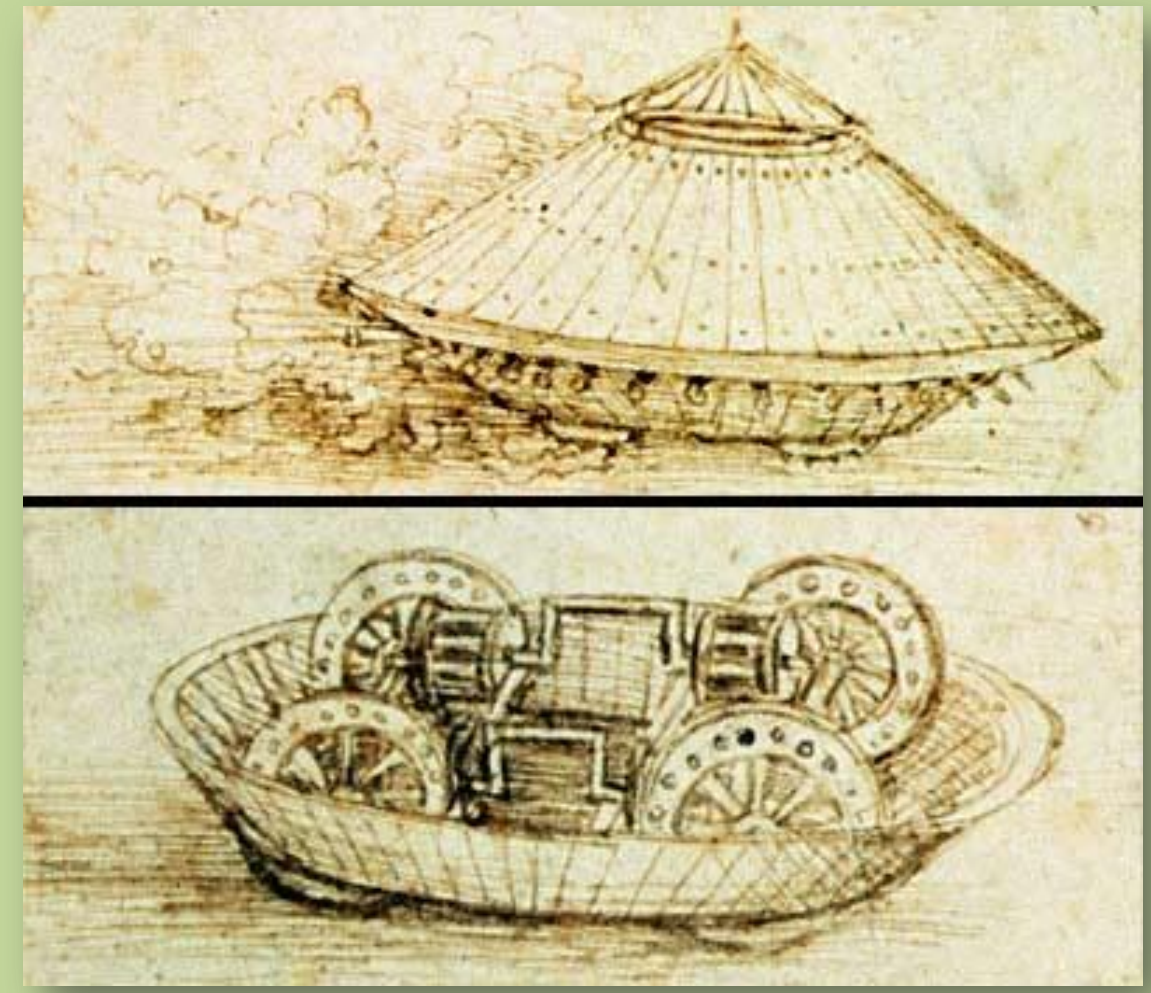
The idea was somewhat similar for this invention:

- Three smaller cannons were used so that three separate shots could be taken for one reload time.
- Most cannons of the time were also often very heavy, meaning that they were rarely moved in battle.
- Da Vinci's cannon was much lighter, giving it greater maneuverability.

Battle Tank

- One of the most iconic of Da Vinci's war invention designs was his battle tank. The tank, which was never built or used in war, was able to move in any direction. A 360-degree ring of small cannons formed the armaments of the machine, while protective armor made from metal plates protected those inside.
- The sloped design of the tank's wall also served a purpose, as the angle was more likely to deflect enemy bullets than receive them in full force.
- Manpower would be used to power the tank, and instructions on steering and firing would be passed down from a small turret on the top.
- It was revealed in Da Vinci's notes that he had considered using horses as the power supply, but was worried that they would be too uncontrollable in battle.

The Battle Tank



Vinci as Pacifist

- The power cranks were shown going in opposite directions, which would make forward locomotion impossible.

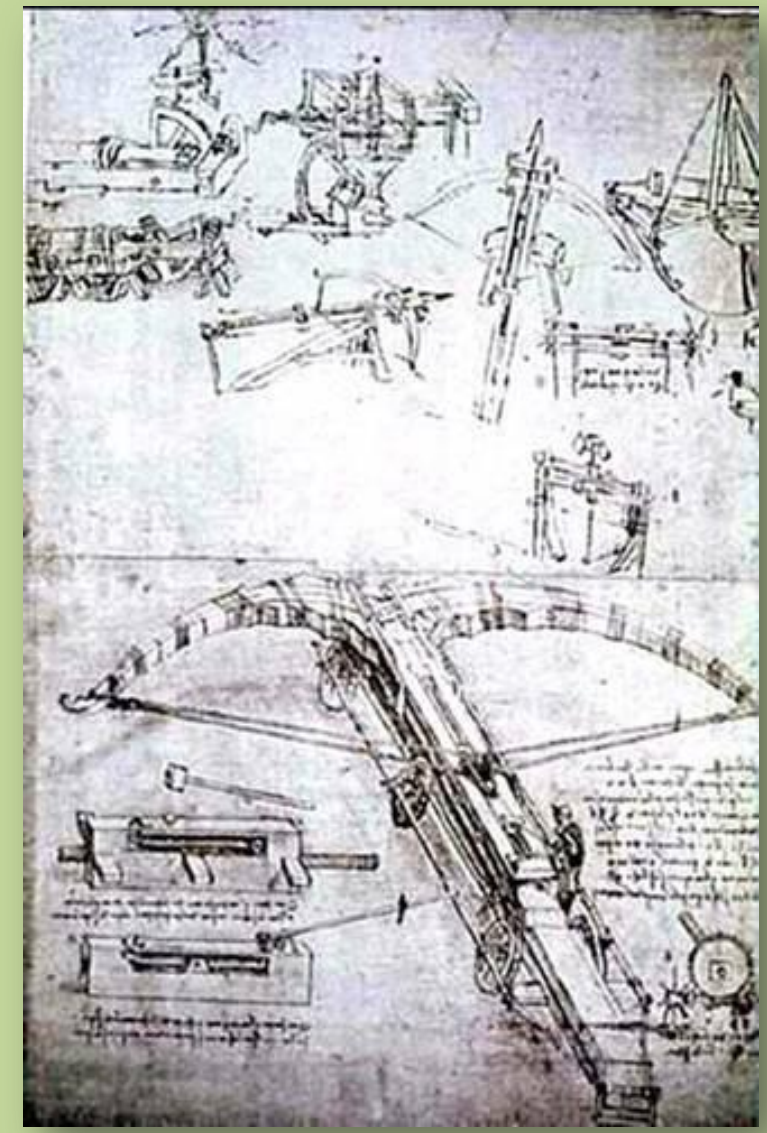
  It is shocking that a detail such as this would escape Leonardo Da Vinci, which has led to many historians believing this design flaw was intentional.
- Da Vinci was a noted pacifist, detesting violence so much that he became vegetarian so that no animals would be harmed to feed him.
- Most of his war inventions were results of his employment,

  as he was much more likely to be paid for his wartime engineering than his painting or sculpting.

The Giant Crossbow

- Other offensive wartime inventions designed by Da Vinci included a giant crossbow, redesigned catapults, assault chariots, and cluster bombs.
- The giant crossbow was designed to instill fear in the enemy rather than being purely practical.
- The bow was to be constructed from wood, in order to lend it the flexibility it needed to operate, and would have measured around twenty-four to twenty-five meters across.
- This crossbow was also designed to shoot rocks or bombs, rather than giant arrows.[

Vinci'Crossbow



Fortress design

Da Vinci's fortress design was meant to defend against attack by cannon, and therefore had a very different style than earlier castles.

The fortress had rounded towers and a slightly inclined slope present on the walls. Just like his tank design, this was meant to help deflect enemy projectiles rather than stopping them and absorbing all of the force of the projectile.

Another feature of the castle was an underground passage,

which could be used for escape during a siege.

The Robotic Knight

- Many of his inventions were also precursors to modern-day era technologies, such as his robotic knight or his autonomous vehicle.
- The robotic knight was created for a pageant in Milan, and could sit down or stand up, move its head and arms, or even lift it's visor all by itself.
- The knight was constructed using levers, gears, and pulleys, and Da Vinci's anatomical knowledge helped him to design a robot in the form of a human figure.
- The original robotic knight has been either lost or destroyed, but Mark Rosheim, a roboticist working for NASA, used drawings from Da Vinci's notebooks to recreate a model of the original. This model was able to move on its own, just like the original was intended to work, so it can be assumed that the robot built in Da Vinci's time did indeed work.
- The knight robot would inspire NASA to create the anthrobot, a human-like robot that is to be used in space for repair missions.
- This is an especially interesting example of Da Vinci's work directly influencing modern technology.

The Robotic Knight II

Leonardo Da Vinci's mechanical knight was not discovered until 1957, when Carlo Pedretti discovered it, hidden amongst Da Vinci's countless designs. The mechanical knight, first sketched by DaVinci in 1495, was mentioned in 1974, in the Codex Madrid edited by Ladislao Reti, but there was no attempt to reconstruct it until 1996 when Mark Rosheim published an independent study of the robot, followed by a joint enterprise with the Florence Institute and Museum of the History of Science.

- However, it was not until 2002 that Rosheim built a complete physical model of the robot for a BBC documentary. Since then, a soldier on wheels labelled, "Leonardo's robot" has been included in countless exhibitions and museums.
- In the 2007 Mario Taddei made a new research on Da Vinci's original documents finding enough data to build a version of the soldier robot, more closely related to the original drawings. This robot was designed just for defensive purposes, not for war or theatre. Its movements are somewhat restricted since the arms only move right and left when pulled with a rope. This particular model is shown in various exhibitions around the world and the Tadei's research results are published in the book, Leonardo Da Vinci's Robots.

Study of Flight

- Da Vinci's intense study of flight through observation of birds and other flying creatures led him to design several flight-orientated machines.
- One of the earliest inventions was a different form of anemometer.
- Leon Batista invented the anemometer that Da Vinci made improvements to in 1450.
- Da Vinci's anemometer used a small piece of wood hung upon a hinge. When the wind would blow, it would push the wooden piece up. A scale behind the wooden piece would indicate how hard the wind was blowing.
- It is believed that Da Vinci took these measurements with the eventual intention of using them to dictate which direction his flying machines should take off in.

Parachute

- Another one of his flight designs was a parachute. This parachute was never actually built or used, so the credit for the first practical parachute does not go to Da Vinci. Certain aspects of Da Vinci's design also led many scholars to believe that it would not have worked.
- The canopy was triangular instead of circular, leading many to believe that the parachute would not have had enough air resistance to work.
- The materials that would have been used at the time, such as wool and a wooden frame, were also thought to have been too heavy.
- However, recently a full-scale model was build and tested by Adrian Nicholas, which correctly functioned, showing that once again Leonardo Da Vinci was often able to design machines on paper that would function correctly in real life without any changes to the initial design.[

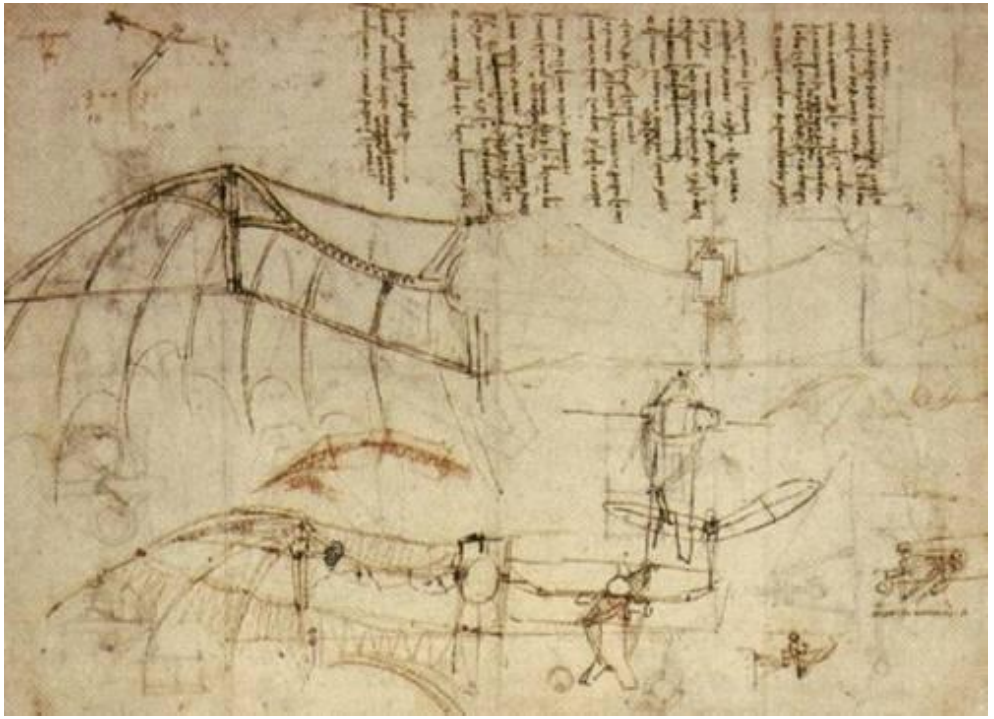
Da Vinci’ Parachute

Helicopter and ornithopter

- Two of Da Vinci's most famous flying inventions are his "helicopter" design and his ornithopter. The "helicopter", more correctly referred to as an aerial screw, was essentially a platform suspended underneath a rotating screw.
- he screw would be made from linen and reeds, and would be rotated by four men on the platform.
- The diameter of the screw was to be approximately two meters, and by rotating Da Vinci theorized that the screw would compress air underneath the vehicle, pushing it upwards.
- The aerial screw was never constructed, and it is believed that both the materials and the four men driving the machine would have made it too heavy to fly. It is not surprising that the weight of the power system was a limiting factor for Da Vinci's design.
- One of the reasons today's flying vehicles work so well is the incredible power to weight ratio provided by internal combustion and jet engines.

The ornithopter

- The ornithopter was based off of Da Vinci's observations of birds in flight. The name itself is drawn from the Greek words "ornithos", which means bird, and "pteron", which means wing.
- He began his design after observing that attaching wings to a human's arms would not allow the person to fly. The design of the machine is composed of two wings that flap in the same manner as animal wings. This design is entirely different from modern airplanes, whose wings do not provide the lift through flapping, but through thrust created by propellers or jet engines.



The ornithopter II

- The wingspan of the machine was to be over ten meters long, and the wings and frame were to be made from fabric and pine wood.
- The pilot was to provide the power for the machine through a pedal system and a hand crank, with the power being transferred to the wings through a pulley system.
- The wings were designed to twist during the flap, just like a bird's. In order to steer the vehicle, the pilot would wear a headpiece which was attached to a rudder system, similar to the steering system used on modern day airplanes.
- Analysis of Leonardo's design reveals that even if the machine could have possibly remained airborne, there was no way for a single human to create the power and thrust needed to lift the machine off of the ground.
- In order for a flying vehicle to be powered by a single human, the machine would have to be very light.

Model of Ornithopter

- A group of Canadian inventors recently set out to create a man-powered ornithopter, just as Da Vinci had imagined.
- Using lightweight materials unavailable in Da Vinci's time such as carbon fibers and synthetic foam, and their own design with a wingspan of thirty-two meters, the group successfully created the first man-powered ornithopter.
- The machine was named the Snowbird, and had a record flight of about 145 meters, travelling at an average speed of 25.6 kilometers per hour. The wings of the machine provided thrust by flapping, just like in Da Vinci's design.
- Unfortunetly, just like Da Vinci's design, the Snowbird could not take off with human power alone, and had to be dragged with a towline. The success of the Snowbird just goes to show that sometimes Da Vinci's designs were limited by material constraints of the time period.

The End of Vinci's Life

Leonardo Da Vinci died on the
2 of May, 1519,
to natural causes.
He passed away in Cloux,
France,
and
legend has it that
King Francis I, whom
had befriended, was by side
when he died. Whether this is true

or not is left to speculation.

- What is not left to speculation is that Leonardo Da Vinci was one of the most talented people of his time period, if not all of recorded human history. He made great strides in scientific research and technological developments. His advances are still evident today, although some of his inventions were too advanced to have large impacts during his time period. He has also served as a source for inspiration for scientists and inventors throughout the modern world.[3]

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