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How Civilizations in the Mediterranean Were Influenced by Shipbuilding

Civilizations around the Mediterranean developed under the separation of its vast sea. As a result, they each developed their own unique culture and customs and grew without the influence of their neighbors. However, whenever a civilization grew, whether it was the Phoenicians in North Africa or the Ancient Minoans of Greece, each civilization developed ships. The creation of these ships allowed each ancient society to grow in one way or another. Trading ships allowed cultures to interact with one another, through cultural diffusion strengthened and created religions, technology, art, and furthered advancement in shipbuilding. Nevertheless, man is power-hungry. As these ships brought salvation and prosperity in trade and culture, they also brought turmoil and calamity with war and death. Ancient civilizations in the Mediterranean were bolstered by the trade and cultural diffusion created by the development of shipbuilding, however, they were also challenged by the violence and war brought by the evolution of warships.

Throughout the ages, the development of trading ships has allowed civilizations to better themselves by receiving resources they have in scarce amounts in exchange for items they have in abundance. The Phoenicians are a prime example of a Mediterranean civilization which relied on their trade with others in order to build a prosperous society. Although they lacked metal, ivory, silica-rich sand (an ingredient in glass making), and other precious metals (like gold, silver, and bronze), the Phoenicians (1100 B.C. - 850 B.C.) had an exorbitant amount of cedar-wood and snails (which were used to create very valuable purple dye). Through the use of wide trading ships, with round bottoms for cargo space, they were able to exchange their goods and import all the resources they lacked. By using this trading system the Phoenicians created their own trading empire and established many trading ports including those of Byblos, Ugarit, and Carthage. While not every civilization created a trading empire like the Phoenicians, many merchants and artisans were able to benefit from their trade with other societies. The invention of boats inspired new art and new craft. By carving these ornaments out of ivory and precious metals, civilizations were able to become rich in gold, purple dye, and spices. Ships bolstered civilizations and allowed them to develop riches through trade.

Through their creation of trade, boats also allowed for the development of cultural diffusion between many civilizations. Cultural diffusion is essential for a society to grow beyond the limitations set by solitude. With cultural diffusion, many civilizations took the ideas and tools of their neighbors and transformed them into more useful objects. The best example of this is the creation of the Phoenician boat. The Egyptian ships could only sail short distances, so the Egyptians sailed along the coast of Palestine and in the safe waters (when compared to the Mediterranean Sea) of the Nile River. The ability of Egyptian ships was limited, as the people of Egypt only had short and stubby acacia trees as material to build their ships. Thus, their ships required much internal patchwork and were constructed with ribs and cross braces (called thwarts) (Butler). On the other hand, Minoan (2000 B.C. - 1400 B.C.) ships were built by using a smaller canoe as the keel (skeleton of a ship) then staking planks over it to build the sides of a larger ship. Although the Minoan ships were more capable and efficient than that of the Egyptians, they were still unable to meet the standards of the Phoenicians. So, the Phoenicians combined the two building styles to invent their own unique vessel. To improve the invention they added tar to the hull (bottom of the boat which allows it to float on water) to prevent leakage and placed lead copper sheets beneath that to prevent sea worms from eating the wood. A quick example of how cultural diffusion improved a society, was the Phoenician adaptation of Cuneiform (from Mesopotamia) into their own alphabet (Grimbley). The Phoenicians made long voyages past the Strait of Gibraltar (where the Mediterranean narrows and its waters mix with the Atlantic Sea), they interacted with people in the Azores and possibly Cornwall (on the south-west tip of Britain) and spread their culture. They eventually transformed the area, and it became the center of tin mining. The cultural diffusion fostered by ships allowed civilizations to evolve and prosper.

The development of shipbuilding allowed civilizations to prosper with trade and grow with cultural diffusion, but this invention was also adapted into a weapon called warships/battleships. These ships were built for speed and designed for quick maneuvers in different directions. One of the earliest warships was employed by the Mycenaeans called the Pentekonter (800 B.C.). The Pentekonter consisted of fifty rowers all on deck level; however, there was little room and rowers slumbered with their oars. It was not ideal for long voyages so Captains would stick to the shoreline or jump from island to island. As is the normal course of life, humans always become more proficient at killing each other. Therefore warships evolved and were able to hold more combatants. The next step in its evolution was the bireme (700 B.C.) which had two oar banks instead of one and was more efficient, more powerful, and more maneuverable than the pentekonter. Following the bireme was the trireme, which was invented by the Phoenicians in 600 B.C., they were usually 130 feet (80 m) long and 18 feet (6m) wide. It was a three level ship which held up to 200 people, an Athenian crew would usually consist of 160-170 oarsmen (62 on the upper deck, 54 on the middle and lower decks), a flute player to keep time, 10-30 hoplite marines, 4 archers, and 15 deckhands. However, the trireme could be

sunk easily and was unable stay at sea for long due to its inability to carry enough supplies to feed the crew. Carthaginian battleships refined the trireme and built the quadrireme and quinquereme. The earliest naval tactic was to employ the use of grappling hooks to board the opponent's ship and fight in hand-to-hand combat while firing arrows. This mode of fighting was used until 1000 B.C. Then the ships were mounted with bronze battering rams, as they found it was easier to sink the ship. Although they were powerful and efficient in naval warfare, the warships had a few drawbacks. Powering ships by oar was labor intensive and stacked in wages, the ships were unable to carry enough food to feed its crew so it could not remain at sea for long. The invention of the battleships may have caused more brutal and violent wars, but they did support the society in numerous ways. Warships have been used to guard merchant ships against pirates, creating safe trade routes for the trading business. The Carthaginian empire expanded into North Africa, the Iberian peninsula, Sicily, Sardinia, Corsica, and many other islands. Their naval fleet kept the trade contact in their empire strong and enforced their laws and authority. Although they are the dark side of shipbuilding, battleships were powerful and fulfilled their purpose efficiently. Among the different types of ships, warships progressed the furthest.

The development of shipbuilding may have had some negative impact on civilizations in the Mediterranean, nonetheless, they opened the doorways for growth and prosperity in different civilizations and time periods. Since the people living around the Mediterranean were restricted by its rugged coastline and numerous islands, they were unable to grow into one civilization. Due to the establishment of independent city-states and the natural thirst for power displayed by humans, warships were created to cross the separating sea and claim the land for its resources. The only way multiple city-states became one was through being conquered into one empire e.g. Carthaginian Empire, Persian Empire, Roman Empire, et cetera. Although many conflicts have been sparked through the contact of different societies (which was made possible through the invention of trading vessels), the development of trade and the spreading of cultural diffusion allowed societies to grow in riches and culture. The evolution of shipbuilding may have brought war upon the Mediterranean, but with the amount of growth that occurred in civilizations the good and the bad cancel out. The development of shipbuilding evolved civilizations in the Mediterranean Sea in both war and prosperity.

Maddi Meyer

The Stories Behind the Naming of Our Planets

Have you ever wondered how the planets got their names? By comparing the characteristics and stories of gods with that of the planets, the mystery behind the names of the planets will be unveiled.

The mystery behind the naming of the planet Jupiter is quite simple: ancient Romans observed that Jupiter was the biggest planet and therefore was named after their god, Jupiter because he is the king of all gods. Jupiter is also the god of lightning, storms, and the sky. On the massive planet of Jupiter, there is a gigantic hurricane storm that has lasted for at least 300 years. Also called the Great Red Spot, it appears red because of certain chemicals like sulfur and phosphorus in ammonia crystals contained in Jupiter's clouds. At the largest recorded diameter of the spot, it is three times Earth's diameter. With Jupiter, the god, being a commander of storms and lightning, it is even more fitting that the planet with a giant storm on it should be named for the one who controls them. As well, there are others who speculate that ancient Romans used to believe that when the red spot was visible, it meant that Jupiter was at battle with the god of war, Mars. The gargantuan planet has a grand total of 63 moons, all of which are named for the god Jupiter's past lovers and friends. The four biggest moons discovered by Galileo are Io, Europa, Ganymede, and Callisto. Now, the four moons are called the Galilean moons after their discoverer, but Galileo had intended for them to be called Medicean moons after the prestigious Medici family. Originally called Jupiter III, the moon was renamed Ganymede in the mid-1800s when the Roman Numeral system was abandoned. The story of Ganymede actually originates from Greek mythology; Ganymede was a Trojan prince who transformed into an eagle and was carried by the Greek version of Jupiter, or Zeus, to Mount Olympus where Ganymede the eagle became a type of servant to the gods. Jupiter II, later named Europa, was another lover of Jupiter or Zeus. Zeus appeared to her as a white bull and carried Europa back to her kingdom of Crete. When they arrived, Zeus turned back into his godly self and the two became involved in a romantic relationship where Zeus gave Europa plenty of children. Jupiter I or Io was a priestess for Zeus's wife Hera, or Juno, who fell in love with Zeus and had an affair with him. However, Zeus turned Io into a cow so that Hera would not catch them. Jupiter IV, otherwise known as Callisto, was yet another lover of Jupiter. She was a loyal hunter for Artemis and therefore pledged to be a virgin, but she could not resist Jupiter's charms, and together they had a baby named Arkas. When it was revealed to Artemis that Callisto had broken the vow, she turned her

into a bear. Her son Arkas was returned to his father's castle. When Arkas was a man, Callisto the bear wandered into Arkas's territory. Not knowing the bear's true identity, Arkas tried to shoot her, but Jupiter prevented the attack by giving them both a place in the stars; they are now the constellation we know as Ursa Major and Ursa Minor. With Jupiter's countless affairs, Juno spent most of her time keeping a watchful eye on him and his lovers. Consequently, when a satellite was sent to orbit Jupiter and take photos, it was named Juno because it was spying on the planet Jupiter.

Jupiter's brother Neptune is the god of the sea, horses, and earthquakes. Planet Neptune is often referred to as the "blue planet" because it appears blue and is made up of an icy ocean composed of water, ammonia, and methane ices. Ironically, Neptune is actually blue not because of its icy water ocean, but because of its clouds that appear blue. Since Neptune is the god of the sea, it is only fitting that the blue ocean planet is called Neptune.

Jupiter and Neptune's infamous and abusive father, Saturn, is the king of the Titans and god of time. Saturn is the slowest planet to orbit the sun, which is why Saturn is named after the god of time. The ringed planet is also called Saturn because he is the father of Jupiter, and scientists believed Jupiter's father should be watching over him. Saturn's biggest moon, Titan, was named after the people that Saturn ruled. Titans were the elder gods to the more commonly known Olympians. Another of Saturn's moons is Iapetus, brother of Saturn and son of Gaia and Uranus. He fathered Atlas and Prometheus, the Titan who gave the humans fire. Because he is the father of the fire-giving Titan, people honor Iapetus by calling him the father of human beings; a moon is also named after Prometheus.

Jupiter and Neptune share one last brother named Pluto, king of the underworld. Pluto's father Saturn the Titan had swallowed him and his siblings, except Jupiter, in order to imprison them. One may ask, why in the world would Saturn swallow his own children? His mother, Gaia, warned Saturn of a prophecy that his power would be diminished by his son. He became paranoid and decided to avoid his demise by swallowing every single one of his children to ensure that the prophecy was never to be fulfilled. However, Saturn's youngest son, Jupiter, was hidden away in Crete, destined to return, free his siblings, and condemn Saturn to never-ending torture in the underworld administered by Pluto. Jupiter had been hidden away by his mother Rhea so that Saturn could not trap him as well. With eternities spent inside of Saturn, Pluto's anger had built up. He had also become accustomed to the darkness and isolation he had been dwelling in. So, when Zeus returned and freed his siblings, Pluto claimed the dark and outcast underworld for himself. Not only did the underworld suit him because it was dark, it was also the land of justice, meaning he got to see through Saturn's punishment. Pluto was known to walk around his ginormous land and visit the river Styx, a river of hate and the daughter of Titan Oceanus who received a home in the underworld because she had sided with Zeus in the war against the Titans. He also fawned over the old power of Night, which gave the underworld its

isolating darkness. Finally, he stumbled upon Kerberos, the multi-headed hound who guards the gates to the underworld. The dwarf planet Pluto is farthest away from the sun in our solar system, making it a very cold, dark, and lonesome place; it was therefore very fitting to name the planet after the god who adored and ruled darkness: Pluto. Interestingly, scientists originally wanted the planet to be named Minerva because “the discovery of this planet (Pluto) is so pre-eminently a triumph of reasoning that Minerva, the goddess of wisdom, would have been our choice if her name had not for so many years been borne by an asteroid.” The scientists also thought Jupiter and Neptune “are already in the heavens and it seems particularly appropriate that the third brother should have a place.” Shortly after the discovery of the planet, its five moons were also found. Three of Pluto’s five moons are named for things in the underworld; Nix, Styx, and Kerberos. Interestingly, the fourth moon, Charon, was discovered in 1978, while Pluto was discovered in 1930. The astronomer who spotted it, James Christy, deemed it Charon after his wife. However, other scientists wanted to stick with the Roman theme and call it Persephone, after Zeus and Demeter’s daughter who Pluto kidnapped and made the queen of the underworld. Christy was still insistent on Charon so he researched and found that Charon was the name of the man who ferried people across the river Styx. Pluto and its moons very closely resemble the characteristics of the underworld described in Roman mythology, revealing why the small, dark, and distant planet was named Pluto.

Saturn’s father Uranus, Father Heaven, like Saturn, was not the kindest and loving father either. When Saturn was a child, he and his siblings had been locked in the depths of the Earth. Saturn’s mother Gaia, Mother Earth, tasked him with killing her husband Uranus. Under the cover of night, Saturn killed his father; but when he died he spawned three new species. Erinyes or Furies, goddesses of vengeance, giants, who simply exist to fight and wage war, and nymphs, earth goddesses. Uranus also gave birth to one last child during his death: Venus, goddess of beauty. Uranus is actually a Greek deity, there is no Roman counterpart, making it the only planet to be named after Greek mythology rather than Roman. The discoverer of Uranus, Frederick Herschel, named the planet Georgium Sides after the king of England at the time. Fortunately, the name did not stick because citizens of other countries were not satisfied. Seeing an opportunity, Johann Bode suggested Uranus because it continued with the mythological theme. Uranus was also suggested because, like Saturn is the father of Jupiter, Uranus is the father of Saturn. Uranus’s moons are uncharacteristically named after characters from English literature, such as Shakespeare’s many plays. Although, one of Shakespeare’s characters and Uranus’s moons overlap into the world of mythology: Cupid. Cupid is a character in Shakespeare’s *Timon of Athens*, but he is also the son of Venus and the grandson of Uranus. In this example, and through many others, we see that mythology can be found in all walks of life.

The planets of the Milky Way galaxy are entitled names of gods from Roman, and a little Greek, mythology. Not only are the planets named after mythology, but so are their moons and even satellites. The planets are selected to be represented by the deities based on their physical

characteristics, but as you dig deeper, you find that the planet and its moons are connected to mythology by more than just the planet's surface.

Hannah Powell

Medieval Disciplinary Devices

Throughout Medieval Europe, particularly in the late 1200's extending into the late 1800's, torture devices were used to extract information, force confessions, interrogate criminal accomplices, and as a form of punishment. In order for the torture to commence legally, "half proof" had to be found that they actually committed the crime. Common criminal offenses that were punishable by execution, sometimes leading to a slow, painful death, were treason and heresy. This shows how controlling and cruel the government could be, as well as the Church itself. God was an integral part of daily life and society which explained the extreme measures devout Christians took to keep its religion powerful at this time. Ironically, no blood was allowed to be shed at these Inquisitions, as it was considered unholy and sinful. Some tortures were done publicly, like the Rack, Shame Masks and the Drunkard's Cloak in order to instill fear in other citizens not to follow in their footsteps. This was a benefit on both ends, as the citizens seemed to enjoy it, and it helped the government create order. Typically, the type of torture used would depend on the convict's social status and crime committed. Often times, the torturers would use several devices at once in order to inflict even greater pain. However, some lost control of themselves and made mistakes. In a primary document, an account is recorded that read, "Driven out of his mind by anger...the rope broke and his body fell from a great height, the stone still tied to his feet...he was so insane with anger... he hit the man so hard he drove him into the ground like a ball." In the early 1800's, the spread of knowledge (the enlightenment), along with Frederick the Great and other rulers like Catherine the Great of Russia speaking out against the use of torture, ended most of these practices. However, it was still used until 1870 for religious reasons.

One of the forms of tortures used in the medieval ages in Europe was confinement. A popular device for this was called the Barrel Pillory, otherwise known as the Spanish Mantle. This was a barrel that was closely fitted to the accused's body, and had a hole just big enough for their head to stick out of. As the barrel was regularly sized, the accused would have to crouch down with their whole body in the confined space. They were never released, and had to sit on their own waste/excrement for as long as they were being punished or until death. Sometimes they suffered from dehydration and starvation, but other times were given food to extend the time of torture, which only caused more excrement and suffering. The dark, moist, putrid environment was the perfect attraction for insects, which ate the victim's flesh, as well as laid

eggs in the flesh. If they survived, the victim often times suffered from paranoia, delirium and shock from their experiences. This was mainly used on thieves, drunkards and people who fought publicly. Sometimes they would even be placed in extremely hot and cold conditions. A similar device called the Drunkard's Cloak was used for crimes of a lesser degree. The Drunkard's Cloak had an open bottom, which allowed the victim to walk around; which didn't benefit them in the long run. They had to walk around town with the barrel on, often painted with the crime they committed, open to ridicule. This often times led to violence and verbal abuse, which greatly added to the punishment.

Public humiliation was used in other torture devices other than the Drunkard's Cloak. Examples of this can be found in Branks and Shame Masks. The Branks, otherwise known as a Scold's Bridle, was a heavy metal cage that was fitted and locked onto the head. A Branks sometimes had different additions to it, such as bells attached to the head, or a whistle that would make noise every time you breathed, attached to the mouth. These were used to attract the attention of people around them. It was not particularly brutal considering the other devices, but served the purpose to publicly humiliate and slowly torture medieval women, which often times brought upon both verbal and physical assault from fellow citizens. A more disturbing part of the masks were the gags that were sometimes inserted into the mouth against the tongue to prevent speaking. Spikes were also attached to this piece so any oral movement would pierce the mouth. The heavy metal cage would make them go crazy, and often inhibited eating and drinking. There was never any set amount of time it would be worn, rather it would depend on the type of "crime" and the person administering it. On a note found with a Branks in Walton, England, it stated that it was used, "To curb women's tongues too idle." The other crimes that ensued this punishment were unpleasant behavior, disruption, being drunk or disorderly, gossiping, lying, offending other people, witchcraft, criticizing Christianity, cursing and scolding. It was a legal form of punishment in Scotland, but was used in England as well. However, in the 1850's, the Scold's Bridle stopped being used. Something very similar to the Scold's Bridle was the Shame Mask. It was a metal mask that was attached to a woman's head, making it hard to eat and drink. It also included bells and whistles, just like the Scold's Bridle. A difference between the two was that these were created to humiliate the victim even more by making them in the shape of different animals. For example, pig snouts and donkey ears were popular designs, which symbolized greed and foolishness. They had to do everything with this mask on, just like the Scold's Bridle. Both of these devices mainly relied on public humiliation in order to punish the victim.

Public torture helped spread obedience throughout the citizens so that they didn't end up like those suffering. Other devices used publicly were the Piquet and the Strappado. These both included suspension of the body, and included great/long term harm at times. The Piquet was mostly used as a military punishment if they rebelled, spoke out against the government, or didn't follow the rules. In this device, minimal materials were needed making it easy and cost

effective. All it required was a tree or pole, a rope and pulley system as well as a giant stake with a pointed tip that was rounded down. The wrist or thumb was tied to the rope, and the victim was raised slightly off the ground. This means that they had to distribute their weight either onto the point or onto their wrist, which would dislocate it. The time the victim would spend on the piquet would vary drastically, from a couple hours to 48 hours. Although extremely uncomfortable and painful, there was rarely any lasting damage. Another suspension torture device was known as the Strappado, often called “reverse hanging”. This was used widely for the Spanish Inquisition and was built by the church itself. It was used on heretics, witches, enemies or rival countries and traitors. The accused would have their hands tied behind their back with a rope, which was attached to a rope-pulley system (hung from a ceiling). They were then raised up off the ground, which dislocated and inwardly rotated and dislocated their shoulders as well as elbows and wrists. This was due to the force of their own body weight, but heavy stones and weights were sometimes tied to their feet to intensify pain. Another way the inquisitors would increase damage and pain would be by roughly jerking the victim up and down with the rope. There were no external injuries, but nerves, ligaments and tendons were torn and damaged, as well as resulting in broken bones. If the accused still didn’t confess to their crime, other devices like tongue rippers and toe crushers were used, as well as putting them in extremely hot and cold water. This was one of the most popular forms of torture in the middle ages and was particularly cruel depending on how it was carried out.

Perhaps the most brutal and disturbing of the medieval torture devices was the Rack. Invented in 1447 by an English man named John Holland, it spread to France, Russia and Spain (although was modified in some ways). It was used to punish traitors, people who committed blasphemy, heresy, witchcraft and religious crimes. Most of these charges were similar to those that would get someone burned at the stake (sometimes the accused had to endure both). The Rack had a rectangular wooden frame that was slightly risen from the ground. It had two rollers at both ends, with a crank that would turn them. The arms and legs were tied with rope to these two rollers, and the crank was rotated. This stretched the body, dislocating their joints. If they still did not confess to their crime, they would then continue to be stretched, which broke bones, cartilage and ligaments. If it was done *too* much, the legs and arms would be rendered useless for the rest of their life, or even ripped off. Almost all victims were left with lasting damage. As this device spread to other countries, modifications were made. One of these adaptations was a roller with spikes added to the bottom of the Rack so it would disembowel the victim (as they were tied face down rather than face up). Another addition was a sheet of spikes on the bottom of the Rack, so their back muscles and spinal cord would be torn up. This torture was oftentimes done in front of other people in order to get them to confess before they actually followed through. The insane terror and pain the exhibited went through scared the accused to confess before they were also tortured. The Rack was mainly used by Christians on Protestants during the

Inquisition; however, it was banned in 1628 because it was deemed a cruel and unusual punishment.

In these Ages, not much knowledge was shared with the common people of Europe, and their faith was placed fully in the Church and the government and king. Anyone who spoke out against it was sentenced to death, or, as seen in the many devices during this era, tortured. The Church held great power, and could punish anyone who spoke out against it severely. Devices such as The Rack, Branks, Shame Masks, the Piquet, Strappado, Barrel Pillory and Drunkard's Cloak are prime examples of this. Things that were considered crimes back then, such as gossiping and speaking out against the government wouldn't even be considered crimes in today's society. Before the enlightenment, people followed in the government's and Church's footsteps, but rulers like Frederick II and Catherine the Great (of Russia) helped spread knowledge and stopped the practices of torture.

Jenna Sortisio

The Impact of Frank Lloyd Wright

Frank Lloyd Wright was an American architect renowned for his unique and innovative styles. He emerged on the architectural scene in the late nineteenth century when the United States was struggling to find their architectural identity. Wright drew attention to American architecture. His influence not only impacted the United States, but also extended across the globe to Europe and Asia. Wright became one of the great idiosyncratic talents of the twentieth century and, received a great deal of recognition for his works. He designed over one thousand masterpieces over his seventy-year long career. Wright built both public buildings and private residencies. Many of his works are iconic such as, Fallingwater, the Johnson Wax Headquarters, the Guggenheim Museum, and Taliesin. He created multiple styles, such as the Prairie Style and the Usonian homes. He valued nature and incorporated it into everything he built. His extraordinary architectural talent received an abundance of recognition because it was futuristic, whilst still practical and economical. Frank Lloyd Wright changed American architecture by creating a unique modern style, incorporating nature, and constructing functional and affordable homes for many.

Frank Lloyd Wright's passion for nature can be traced back all the way to his early childhood. Nature was an enormous inspiration for Wright's masterpieces, especially the Wisconsin landscapes. Wright discusses the nature he observed, "The modeling of the hills, the weaving and fabric that clings to them, the look of it all in tender green or covered with snow or in full glow of summer that bursts into the glorious blaze of autumn." The proceeding statement depicts the beauty Wright witnessed and demonstrates his zeal for the outdoors. He had an innate connection and enthusiasm for the outdoors. Wright believed that he was as much a part of nature "as the trees and birds and bees are, and the red barns." Wright's immense passion for the environment shaped his architectural style. Wright's merit for nature in architecture was a new concept and impacted many upcoming architects.

Frank Lloyd Wright attended the University of Wisconsin at Madison, where he studied civil engineering. In attempt to earn money to pay for his tuition Wright worked for Joseph Silsbee and the dean of the engineering department, Allan Conover. Joseph Silsbee was a renowned architect, well known for the variation between each building he built. Under their

tutelage, Wright developed his passion for architecture. When Silsbee moved to Chicago, Wright followed him, dropping out of college. Wright then had an apprenticeship at Adler and Sullivan, a famous architectural firm. When Adler and Sullivan split, Wright trailed Sullivan, and became his chief assistant. Sullivan, known as “the father of skyscrapers” and “the father of modernism,” impact on Wright is greatly seen in his style. Wright’s apprenticeships and engineering education enabled him to ultimately grow into the distinguished architect he is recognized as today.

Frank Lloyd Wright was passionately devoted to giving America its name in the architectural world. He sought to create buildings that would honor and mirror the special character of the United States. He did this by creating buildings for the landscape they were in. It was said Wright built from the “ground into the light.” Wright also strove to incorporate technology into his works, while making each building as functional as possible. Entirely different from the ornate designs popular in Europe at the time, Wright emphasized simplicity. He generally preferred few straight lines rather than intricate shapes and patterns. Wright once said that, “the work shall grow more truly simple, more expressive with fewer lines, fewer forms; more articulate with less labor; more plastic more fluent, although more coherent, more organic.” This demonstrates Wright’s unique yet simplistic approach to designing buildings. His simplicity gained the love of many Americans.

Wright did not only design the exterior of his buildings, he also focused on the interior. He wanted to control every aspect of a client’s home. He would decide on what carpet, fabrics, accessories, and furniture were in the homes he built. Wright’s insistence on governing every aspect in each home resulted in well assembled, comfortable, and affordable homes for the general population.

Wright worked unremittingly at building a platform for architecture in the United States. He stressed the importance and superiority of architecture among all other art forms. Wright felt that architecture was, “the great mother art, behind which all others are definitely, distinctly and inevitably related.” He also once stated, “Architecture is life, or at least it is life itself taking form and therefore it is the truest record of life as it was lived in the world yesterday, as it is lived today or ever will be lived.” His strong advocacy of architecture’s significance was recognized by many Americans, and began a hunger for good architecture in America. Previously many Americans had simple, identical looking, generic houses. This occurred as a result of there being a miniscule amount of respect and value for the art of architecture. With each new building that Wright constructed he invented a new unique style. Wright believed in individuality in buildings which was seen when he stated, “There should be as many styles of houses as there are kinds of people and as many differentiations as there are different individuals. A man who has individuality has a right to its expression and his own environment.” This idea was new in America and gained great popularity.

Wright believed that his job as an architect was of utmost importance, and that he could influence the character of the inhabitants of each home he built. His controlling attitude toward each project he encountered is a result of his desire to shape the personalities of his clients and his aspiration to enable his customer's lives to be enhanced and lived to the fullest. Wright describes the importance of architecture on individuals lives:

I'd like to have a free architecture. I'd like to have an architecture that belonged to where you see it standing, and was a grace to the landscape instead of a disgrace. And the letters we receive from our clients tell us how those buildings we built for them have changed the character of their whole life, and their whole existence. And it's different now than it was before. Well, I'd like to do that for the country.

The preceding quote exemplifies how Wright's works truly did improve and shape his clients lives. He was so talented and had such new ideas that he was able to form a whole new importance and respect toward architecture among Americans. Wright's belief that he was influencing people so deeply made him committed to his cause.

Another way in which Wright impacted society to such a great extent was the accessibility of which he made his works. Most renowned architect's homes were extremely expensive, but, quite contrary to this, Wright strived to make his works affordable for the middle class. He created the Usonian style and designed over sixty homes in this manner. All of the Usonian homes were priced to suit middle-income families. He did this to allow his influence to spread to all Americans, rather than solely the upper class.

Wright invented the Usonian style in an attempt to fulfill his mission of honoring and celebrating the unique culture of the United States. Usonian is defined as: "relating to the United States." The Usonian homes were single-story affordable homes. These homes contained an advanced heating system, which was new technology for the time. Each house had an open floor plan that seemed to effortlessly flow into the outdoors. The connection of the kitchen, dining, living, and family rooms brought about a sense of community and simplicity. Straight horizontal lines and unpainted materials were key features to these homes. In contrast to the Prairie Style homes Wright designed, these houses were economical for middle-class families. A Usonian home could be purchased for a mere six thousand dollars. Fine architecture was only available to very wealthy people, so Wright pioneering the accessibility of exquisitely built homes to the working class sparked an intense desire and passion. Usonian homes were a huge influence for Ranch houses, which are known for having a low set open layout that smoothly connects to the surrounding environment. Ranch Houses are a prominent style across the globe, and now cover the United States. Wright's invention of Usonian homes perpetrated the Ranch house trend, as well as influenced the desire for fine architecture for all social classes.

Another house design Wright invented was the “Prairie School” style. He drew upon the American Midwest for inspiration for these homes. Long horizontal lines that followed the landscape, many windows, and overhanging eaves were key elements in the design of these houses. The Prairie School homes were the first unique style fabricated in the United States, and gave the time-period the nickname, “the American Century,” of architecture. This style brought America on to the architectural scene, and separated the country from the intricate and ornate style that Europe brimmed with. The Prairie Style was an important precursor to the invention of the Bungalow style in Southern California. The Bungalow style drew from Wright’s designs by incorporating many parallel lines and protruding eaves. Wright’s invention of the Prairie Style inspired the creation of the popular Bungalow style, as well as helped America emerge into the architectural sphere.

One of Wright’s most famous and controversial buildings is the Solomon R. Guggenheim museum located on Upper Fifth Avenue in New York City. Wright was commissioned by the museum director, Hilla Rebay, because she said she needed, “a fighter, a lover of space, an originator, a tester and a wise man,” to design a building fit enough to encase to modern art. Wright’s selection for the design of such an important museum shows the impact his gift and expertise on architecture had on society. The design for this museum is truly one of a kind, and its spectacularity was intended to honor the modern art in which it contained. The Guggenheim diverges greatly in appearance from the oblong rectangular buildings that surround it. The museum was once described as resembling, “a white ribbon curled into a cylindrical stack that grows continuously wider as it spirals upwards towards a glass ceiling.” The unprecedented design of the museum led to a great deal of controversy since society had never witnessed a building so sui generis and extraordinary. The Guggenheim was said to be “the most controversial building ever to rise in New York” and was “a topic of conjecture and debate for millions of New Yorkers and visitors.” Some artists even went as far as expressing their unwillingness for their paintings to be displayed on the rounded walls of the Guggenheim. Despite the turmoil the unique architecture of the Guggenheim created, it was eventually appreciated and admired for its unparagoned structure. The museum eventually was designated the prestigious status of being called a “New York City Landmark” by the Landmark Preservation Commission. The Guggenheim continues to attract people from all over the world each day. Wright’s creativity whilst designing such a momentous landmark opened the mind of many to the creative freedom in architecture.

Fallingwater is another architectural masterpiece designed by Wright. This home was built in 1935, and was located in the Bear Run Nature Preserve, Pennsylvania. He built this as a vacation home for the Edgar J. Kaufman family, who possessed a strong adoration for nature.

The home was built upon a thirty-foot waterfall, and created the optical illusion of emerging from the rocky stream. The rocks that made up the waterfall were the foundation for the home.

Concrete slabs formed various horizontal planes. Cement porches protruded from the home, and hung over the rapids. The entire house did not appear to be on solid ground, but seemed to be balancing in perfect harmony with its surroundings. Light ochre and Cherokee steel were the only colors Wright used in Fallingwater to create a simplistic appearance, and to blend in with the surrounding environment. Small rocks were incorporated all along the side of the home, which helped it to seem like a completely natural part of the forest. Wright created a feeling of serenity and connection with nature in his unique design of Fallingwater. The powerful feeling one feels whilst at Fallingwater and the impact it can have on someone was once described as follows, “The house thrusts out over the waterfall of Bear Run, seeming at first to challenge nature. It is all sliding horizontal planes, balanced there over the falls, as if to prove that modern man is not bound by natural forces, that he can suspend himself at the edge of a cliff and feel as if he could keep going, flying out into open space.” The way in which Wright effortlessly weaved Fallingwater into its environment was so extraordinary he impacted many, and caused society to rethink the role in which nature can play in architecture. Fallingwater has gained tremendous recognition and is considered to be most famous twentieth century house.

4.5 million people have visited Fallingwater since 1964. The home received accolades from the media and was featured in *Time Magazine*, *The New York Times*, *Voice of America*, and has earned a plethora of other publishings. Fallingwater has achieved such tremendous fame because its unique structure, and the way in which it shows the immense impact nature can have on architecture.

Taliesin is a national historic landmark located among the rolling hills of Wisconsin. Wright began building Taliesin in 1911 and continued making adjustments up until his death in 1959. This was his home, an architectural school, and a farm. Taliesin was his most famous Prairie Style home. He used his concept of organic architecture to connect his home with its surroundings. Taliesin was built with yellow limestone and sand from a nearby quarry and river. Wright’s utilization of these local materials helped the building to blend in with its landscape. Taliesin West was another Prairie Style home located in the Arizona Desert. Wright and his students would reside at Taliesin West each Winter. At Taliesin Wright was able to pass on his gifts to his students. He had his pupils work with him on projects rather than in a typical classroom setting. By closely working with his students he could pass on innovative ideas, and influence the next generation of architects. Wright’s legacy lives on to this day at Taliesin, where students continue to study the craft of architecture.

Another distinguished magnum opus of Wright’s is the Johnson Wax Company Administration Building in Wisconsin. Wright completed this undertaking in 1939. The location of this building was very industrial which was not pleasing to Wright. He struggled to figure out how to make the building palatable without visually appealing surroundings, but eventually succeeded in fabricating a unique design for the Johnson Wax Building. The building’s exterior

consisted of high rising bricks creating the appearance of a “fortress.” The entire building consisted of many anomalous features such as, concrete disks, tubular windows, and horizontal lines. Wright expresses the oddity of the Johnson Building, “you catch no sense of enclosure whatever at any angle, top or sides....Interior space comes free, you are not aware of any boxing in at all. Restricted space simply is not there. Right there where you've always experienced this interior constriction you take a look at the sky!" Wright succeeded in creating something truly one of a kind for this building. He utilized space to create a flowing and free feel. Wright's acclimation to the environment of the Johnson Wax building helped to emphasize his point that each home or building should be uniquely built to cater towards its surrounding and use.

Frank Lloyd Wright transformed architecture in the United States. His unique and modern ideas brought life to the American architectural scene. Rather than following the ornate styles that were popular in Europe Wright invented his own style. Simplicity and straight horizontal lines stood in stark contrast to the European's architecture, but were key elements to each one of Wright's masterpieces. He valued architecture, and was able to spread his zeal to the middle-class by creating economical homes. Nature was a key aspect to all of Wright's buildings, which was a new concept for the time. He expressed the importance of individuality in architecture, and help move a way from a time-period where almost everyone's house looked exactly the same. Frank Lloyd Wright made a huge impact on America and the world as a whole, by creating new unique styles.

Andrea Riefkohl

The Influence of Vladimir Ilyich Lenin on the Russian October Revolution of 1917

On October 25, 1917 in Russia, the entire government collapsed, and was born anew by the revolutionary party known as the Bolsheviks. The Bolsheviks were a somewhat popular radical socialist group in Russia that before the abolishment of the Romanov dynasty had possessed little to no power. It was after the abolishment of the Romanov dynasty, and the return of Vladimir Ilyich Lenin, that the party was able to gain considerable power under the leadership of Lenin. Lenin was a key leader and catalyst of the party and its movements, driving the party and shaping it to his ideas. The Bolshevik party gained significant and dictator-like power in Russia under the direction and command of Lenin; Lenin was instrumental in the party's success. Lenin was able to lead and shape the party, creating the coup of October, and making the party into what it truly was. By constructing the party to his ideals, he constructed the revolution, and the new government that followed. Vladimir Ilyich Lenin had a large personal impact on the revolutions of 1917, and the Bolshevik party as a whole, inspiring the formation of the party, directing the party and leading it to prominence, shaping the party to fit his various motives, and directly creating the revolution as a whole.

Vladimir Ilyich Lenin was born in Russia on April 10, 1870, and raised in Ulyanovsk, Russia. He was the son of a high official in the czarist educational bureaucracy, receiving a high education similar to that of the children of the nobility at the time. It was during his young formative years that he became a revolutionary. In 1887, when Lenin was 17, his brother was arrested and hung for conspiring against the czar, Alexander III. This event shaped Lenin into a Marxist revolutionary from a very young age, determined to take down the czarist government and get revenge for his brother. Lenin soon after moved to St. Petersburg and started a multitude of Marxist groups, starting what would evolve into socialist Russian parties later on. It was during this time in 1897 that Lenin was arrested and exiled to Siberia, not to return to Russia until 1917. During his time in exile, primarily spent in various major European cities after his three year sentence in Siberia, he shaped the Bolshevik party from afar, becoming a prominent revolutionary and Marxist in the party's organization.

Lenin helped inspire and create the Bolshevik party during his lengthy exile. Lenin helped to create the party by interviewing and training, but more importantly he helped by speaking up to make sure that the party separated from other socialist movements. He sparked this separation by giving the Bolsheviks more of a radical approach, and showing how all other socialist parties were not truly socialist. This creation of a separated Marxist party primed his country and his party for revolution and upheaval. The revolution of October 1917 would not have been possible without Lenin because he was able to create and form the party, evolving it into a prominent, distinct power that could take power and make changes.

The second key way in which Vladimir Ilyich Lenin influenced the October revolution of 1917 was through his role of directing, leading, and shaping the party after he returned from his exile. Lenin returned to his home country in the spring of 1917 along with several other members of radical parties who had been exiled as well. They returned because Germany sent them home in hope to promote civil discontent and ultimately cause Russia to pull out of the war, a goal that ultimately succeeded. Lenin returned home to Petrograd, and immediately started to work with and become a very high member of the Bolshevik party. Lenin quickly ascended to become the leader of the party itself, and here he was able to motivate and manipulate the party to his favor. He won such high power for his ideas that communism was not a far, unreachable goal, but could be achieved in the here and now, and ultimately he was somewhat correct. Lenin returned to Russia and immediately started working on advancing the Bolshevik agenda, polarizing the views of all the citizens. The idea of polarizing the views of the citizens opened the stage for radicalism and radical movements, after all parties turned to radicalism, the provisional government that was in place after the abolishment of the Romanov dynasty earlier that year soon was torn apart and dissolved, letting power fall into Lenin's and the Bolshevik's hand. Lenin became the leader of the party, influencing it and radicalizing the public until he sparked the October revolution, and gained control of the whole of Russia.

The third and most significant way Vladimir Ilyich Lenin influenced the Russian revolution was through his formation of the revolution as a whole. The event commonly referred to as the October revolution in Russia was the day the Bolshevik party led a military coup to overtake the provisional government at the Winter Palace in Petrograd. The Bolshevik council had issued this military takeover at the wish of Lenin, and on October 25, 1917 they stormed the palace. The revolutionaries had surrounded the palace that afternoon, and during the evening after a blank shot fired on the Russian cruiser Aurora, the revolutionaries forcefully stormed the palace and arrested all the members of the provincial government. By 2:45am the next morning, the Bolshevik party had control over the Russian government. This October revolution is what gave the Bolshevik party real political authority; giving the party effective control over the whole country and military. The October revolution was a key turning point in Russian history, giving

the Bolshevik Marxists control over the government, instituting communism and governmental reforms.

The October revolution was the key turning point for the Bolshevik party, and was sparked by Vladimir Lenin. This revolution was sparked by Lenin because he was the one who coined the idea and pushed it to execution. When Lenin returned to Russia in the spring of 1917 he saw the state of the weak provincial government, and immediately polarized opinion and undermined the government. Lenin pushed for a proletarian revolution from the very beginning for it was in this that his principle of Marxist communism could be started. Lenin pushed for radicalism and revolution in the Bolshevik council meeting on October 23, two days prior to the coup. He spoke in the meeting among the top party officials, saying, “an armed uprising is inevitable, and that the time for it is fully ripe”. Lenin spoke to the council about how a revolution was necessary and the time was right, and at the end of the council the members voted 10-2 in favor of an uprising. This speech was the catalyst for the revolution that would occur two days later, an event that would never have even gone into motion without Vladimir Lenin. Lenin was instrumental and necessary for the October revolution by the Bolshevik party, starting the movement and pushing it through until the party had taken all power in Russia.

On October 25, 1917 in Petrograd Russia, the Bolshevik party seized power in Russia through a military coup. This revolution would have been impossible without the help and leadership of Vladimir Ilyich Lenin because he helped form the party as a whole, directed and lead the party, and ultimately sparked and led the revolution itself. Lenin was an exiled revolutionary for many years, but he returned to his home country in the spring of 1917, and within months he had overthrown the Russian provincial government and became the most influential and important man in his country.

Will Klepper

How Cartoons Were Used as Propaganda During WWII

Cartoons have been around for thousands of years, starting with cave drawings in 30,000 BC. Since then, animators have created millions of cartoons for all ages. After Walt Disney created the first cartoons with sound, starring Steamboat Willie in 1928, the “golden age” began. During of what most people call the golden age of animation (1930s-1950s), companies such as Warner Bros., MGM, and Disney came to be. After years of animation success, the outbreak of World War II in the 1940s caused box-office sales in Britain to decrease dramatically. This led to Disney stopping their production of feature length animated films for the rest of the war. However, even with the war raging on in Europe, nearly two-thirds of Americans went to the movies each week, allowing the studios to continue producing cartoons for their audiences. The films made by animation studios during World War II, helped with the war effort and changed the role of cartoons forever.

The thought process of every animation company changed after the attack on Pearl Harbor. Following the infamous bombing in Hawaii, the US Government commissioned Disney to create propaganda and instructional cartoons for the war effort. Several branches of the military were involved in these films. The Army actually took over a section of Walt Disney’s studio to store ammunition and troops, showing how close the studio was to the war. Over a span of three months, the studio produced over 90,000 feet of film. Over the whole war, Disney had completed about 400,000 feet of film, or 68 hours total. The first of many, many films were instructional films for soldiers going to war, such as for the Navy and the Army, teaching the recruits tactics and rules. Following these dull and sometimes boring cartoons, Disney brought in beloved characters such as Donald Duck, who was the Disney’s biggest star in the effort. Donald Duck spent these war-torn years fighting members of the Axis powers and learning how to be a soldier.

The most famous Donald Duck propaganda film was *Der Fuehrer’s Face* (1943) which showed Donald being forced to work for the Nazis in Nutzi land. The cartoon follows Donald as he works in a ‘Nutzi’ base assembling artillery and being forced to salute every picture of Adolph Hitler he sees. As the cartoon becomes darker and darker, Donald eventually wakes up from what happened to be nightmare and thanks God that he is a citizen of the United States. This cartoon was used to show kids and adults alike how terrible life as a Nazi was and how lucky everyone was to a citizen of the USA. It also won the Oscar for best animated film that year, the first and only Donald Duck cartoon to do so. Donald Duck starred in the most

propaganda cartoons during this period of war for Disney Studios. The reason the cartoons starred Donald Duck instead of Mickey Mouse, was in order to distance the mouse from Nazi propaganda, which depicted non-Aryans as rats or mice. Disney also wanted Mickey to avoid bad press with sometimes controversial films. Mickey did however star in videos educating Americans with things they could do at home to help with the war effort. These types of films also starred characters such as the Seven Dwarfs and Bambi. These characters bought war bonds, saved scrap metal, and fought in the volunteer army during the war.

In addition to the cheerful cartoons starring ducks and mice, Disney produced a powerful film called *Education for Death: the Making of the Nazi* (1943) which followed the life of Hans, a young German boy in Nazi Germany. The point of the film was to show how horrid the life of Nazis was, how children were molded into Nazi youth and eventually into soldiers who died in combat. Cartoons such as these were not as well received as those from studios such as Warner Bros. because of the incredibly dark and almost scary scenes being shown to children. Even though cartoons like *Education for Death* weren't as well liked, they were incredibly effective, leading the youth of America to be anti-Nazi. Disney, however was not the most prominent animation studio during the war. This was actually Warner Bros. studio.

By 1940, Warner Bros. had established itself as the leading producer of animated films and would continue to be for the next two decades. Throughout the war, about seventy percent of cartoons released by Warner Bros. contained war themes or were war-related, which was the highest from any studio. Warner Bros. war campaign began in 1941 with Porky Pig in *Meet the Doughboys*. Following Porky Pig, characters such as Bugs Bunny and Daffy Duck made appearances. Whether it had to do with Hitler or the Japanese, the famous icons made the Axis powers a laughingstock.

Warner Bros. also developed short films without any of their characters, depicting the enemy with many stereotypes that today are considered horribly racist. An example of this is their cartoon *Tokio Jokio* (1943). In this picture, the Japanese are portrayed using racist stereotypes of the time such as having thick glasses, buck teeth, being short, not being very smart, and being colored yellow. This was not as frowned upon as it is today because of the attack on Pearl Harbor. Americans were looking for revenge on the Japanese after the attack and the studios of the time only helped fuel the people's rage. However, Warner Bros. was not the only studio to create racist films like this, with Disney having films such as *Commando Duck* (1944), and Paramount's Superman cartoon titled *Japoteurs* (1942). The amount of racism in *Tokio Jokio* resulted in it being banned from television due to the fear of angering Japan's allies. Not all of Warner Bros. cartoons were as racist as these, but one particular character has a strange history behind him.

Warner Bros., unlike Disney, created a character used primarily for the war named Private SNAFU, which stands for Situation Normal All Fouled Up. In 1943, Frank Capra, who was the chairman of the U.S. Army Air Force First Motion Picture Unit came up with the idea for Snafu and pitched it to Disney. Disney's price was too high, however, so when Warner Brothers pitched a price that was two-thirds below that of Disney's, Capra jumped on the opportunity. Snafu starred in 27 cartoons teaching soldiers the rules of the war in foolish ways. Voiced by the famous Mel Blanc, with Theodore "Doctor Seuss" Geisel as the main writer, Snafu was America's worst soldier but was the favorite of enlisted GIs. Snafu's films were very popular among the soldiers until 1944, when Snafu cartoons stopped being produced. This was because of the film *Going Home* (1944), which started with a shot of a movie screen with the words "U.S. Secret Weapon Blasts Japs" which sounded too similar to the Manhattan Project, the top-secret project to create the world's first atomic bomb. This scene resulted in conspiracy theories about whether the project plans had been leaked landing the scientists and the animators alike in hot water. Animators at Warner Brothers by mere chance almost revealed a secret that would change war, and the world, forever. This shows how animators were more involved in the war than they thought themselves.

The overall role of this form of propaganda was encouraging the general populace in America to do all they could to help with the war effort. The popularity of the studios' characters was the main reason their cartoons were so widely appreciated. By portraying the enemy in laughable ways, the creators encouraged the public to dislike the enemy and made the war seem more comedic than serious. The animation studios and the U.S. government used the golden age of animation to sway public opinion, boost morale, and to help with the overall war effort.

Sam Agro

A History of Space Exploration as a Result of the Cold War

Neil Armstrong holds a title that no other human has — or ever will — achieve: he is the first man to step on the moon. Mankind's utter obsession with space is the source of countless technological breakthroughs, many of them well-known and credited with the origination of modern science. Astronomical tools date back as far as 8000 B.C. with the Warren Fields calendar, proving that, for a long time, humans have been trying — and succeeding — to chart the skies. The first time mankind utilized space was during the 1960s. Hot in conflict, the Soviet Union and the United States engaged with each other in the Cold War. Each sought to out-weaponize the other, and the competition facilitated immense scientific growth for the entire planet. Mankind's first brush with space came in the form of *Sputnik I* in 1957, a Soviet satellite, about the size of a beach ball. Shortly after, the United States launched *Explorer I* in 1958. These achievements were met with furious efforts from both sides to weaponize space, although both sides grew amicable and even worked together to foster the future of human space travel. Since this time, space has become essential to the prosperity of technology. The politics of space remain a gray area, as does its weaponization. The innate competition of the space race between the Soviet Union and the United States is what provided the drive that was needed to develop space technology at a much

faster rate than the two countries would have otherwise.

Before World War II, progress of space exploration by the United States was hindered by the government's lack of interest. However, after the technology of the Soviet Union and Germany

began to improve and show promise, the United States finally had a reason to develop its own space technology. Fear of national security threatened the nation, and America's sudden priority was to eclipse the Soviet Union in technology. It would be false, however, to entirely accredit the Cold War with the United States' improvement of its technology. Space's presence in the world of science-fiction brought interest into the homes of every American. The first federally-funded American space research program came in the form of the National Advisory Committee for Aeronautics, which, albeit small, was founded in 1915 to keep up aeronautics research after the Orville brothers' flight.

The Soviet Union successfully launched its *Sputnik I* on October 4, 1957, effectively beginning the space race. *Sputnik I* was a crude, but functioning, artificial satellite that immediately caught the interest of the world. It was equipped with nothing but a radio transmitter that relayed beeps to anyone who was listening, but this was enough to frighten the American government. As a direct result of this strike by the U.S.S.R., American legislation passed the *National Aeronautics and Space Act* (known as the *Space Act*) in 1958, which created the NASA program. Two weeks after the Soviets launched the *Sputnik I*, they launched the *Sputnik II*, with a live dog onboard. The United States launched the *Explorer I* in 1958, which, like the *Sputnik*, served as its country's first successful space endeavor; however the *Explorer I* contained scientific instruments which measured the radiation environment in moon orbit. These radiation detectors discovered the first radiation belts found above the moon's atmosphere, later named the Van Allen Belts. NASA launched two more *Explorer* models, but the *Explorer II* failed. The *Explorer III* launched successfully and was in low lunar orbit until June 16 of 1958. Having lost the race to low lunar orbit, the United States aimed to be the first to the moon. In 1958, NASA's *Pioneer 0* exploded on its launch pad. America then fell behind, especially having lost *Pioneers 1, 2, and 3*. The Soviet Union quickly made progress — it is credited with the first solar orbit, the first impact on the moon, and the first photographs of the moon from a lunar orbit. However, NASA's *Ranger 7* was the first to capture clear close-ups of the lunar surface during its flyby of 1965.

President John F. Kennedy galvanized the American public with his speech at the beginning of 1961. It is at this speech dedicated to rallying the nation around a similar cause that Kennedy said, "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to Earth." Kennedy's speech captured the hearts of the already-enraptured citizens and energized the patriotism which led Americans to their ultimate success. Kennedy's speech also made obvious a contest with the Soviet Union, should they choose to compete. Because of Kennedy's assertion that the project would be completed in the sixties, a timer was put on the project which heightened the competitive and nationalist nature of the race. Nevertheless, many citizens questioned and even criticized the government's decision to get involved with the space race. The moon itself and space were very foreign things to humankind in this age, and many were unsure of the claims that NASA made.

On April 12, 1961, Yuri Gagarin became the first man in space aboard the Soviet Union's *Vostok I*. However, due to concerns regarding the effects of weightlessness on the human body, the ship's manual controls were locked and entirely under the control of ground personnel. Having completed a single orbit, the spacecraft reentered the atmosphere and landed in Kazakhstan one hour and forty-eight minutes after launch. The ship was intended to eject the Soviet cosmonaut at an altitude of seven kilometers from sea level, and while there are no government records supporting that this did occur, subsequent reports confirm that it actually did. Less than a month later, the *Mercury-Redstone 3* carried the first American into space, Alan B. Shepard, Jr. The

objective of the *Mercury-Redstone 3*, also known as the *Freedom 7*, was also to determine the effects of weightlessness on the human body. The mission was successful.

In very quick succession in 1966, the Soviet Union experienced two monumental successes — on February 3 the *Luna 9* landed on the moon, and on March 1 the *Venera 3* probe landed on the surface of Venus. The *Luna 9* was the first probe to make contact with the moon's surface and stay intact, and also the first to send back detailed, high-resolution images of the lunar surface. Before its landing, the American NASA program worried that a ship or probe would sink into the surface of the moon, but the *Luna 9*'s successful voyage helped to alleviate its fears. The *Venera 3* was the first man-made probe to visit a celestial object other than the moon. Although its journey to the Venetian surface was successful, its communication systems malfunctioned shortly before reaching the planet, and was never recovered.

Following these immense successes, both countries began to experience difficulties as they grew closer to putting a man on the moon. The United States experienced a disaster with the *Apollo 204*, the first of all Apollo missions to be manned. Two weeks prior to launch in preflight testing, the command module of the launch vehicle caught fire, and all three of the designated astronauts asphyxiated of smoke inhalation. This disaster led to a complete reworking of all subsequent Apollo models, and NASA's Associate Administrator for Manned Space Flight, Dr. George E. Mueller, announced that this mission would be renamed to *Apollo 1*. Interestingly enough, there are no designated *Apollo 2* or *Apollo 3* missions. Just three months after the *Apollo 204* disaster, the Soviet catastrophe came in the form of *Soyuz 1*, also known as the “Devil Ship.” The ship, piloted by colonel Vladimir Komarov, was launched on April 23 of 1977 without issue, and there was no indication of failure by the Soviet government until the *Soyuz 2* launch — expected to take place the next day — was cancelled. Shortly after the cancellation, the government declared that the mission was going according to plan. Komarov was ordered to complete an emergency reentry when the parachute lines tangled prior to landing. Colonel Vladimir Komarov was the first person to die during an in-flight space mission. Although the Soviet government claimed the crash was due solely to the tangling of the lines, Western experts determined that the *Soyuz 1* had in-flight issues, including an unstable orbit and mechanical failure. Having experienced these deaths, the innate threat of danger was suddenly very real for the United States and the Soviet Union.

In 1969, the United States finally celebrated the conclusion of the space race with its *Apollo 11* mission, the first manned space mission to the moon. Seven years after Kennedy's speech galvanizing the American public around the topic of space travel, and three years after his assassination, his vision was realized. *Apollo 11* launched from Cape Kennedy in Florida on July 16, 1969, carrying a crew of three: Commander Neil Armstrong, Command Module Pilot Michael Collins and Lunar Module Pilot Edwin "Buzz" Aldrin. Four days later, Armstrong and Aldrin donned their spacesuits and became the first men to walk on the moon. Armstrong

himself is credited with the famous quote, "...one small step for a man, one giant leap for mankind" on July 20, 1969. The lunar module landed in the Sea of Tranquility and left behind a commemorative plaque signed by President Richard Nixon bearing the names of the three *Apollo 204* astronauts and two other American cosmonauts who died during in-flight voyages.

As the Cold War came to a close, the Soviet and American space programs came together in an amicable moment of scientific agreement. NASA's administrator at the time, Thomas O. Paine, reached out to the Soviets and pushed for a cooperative mission. Prospective projects grew more likely as Paine exchanged letters with the Soviet president of the Academy of Sciences, Mstislav V. Keldysh. In 1971 at a summit in Moscow, Soviet and American engineers confirmed the possibility of a joint test flight. Although the Americans were met with some rebuttal, the two countries drafted a final agreement and decided that the test flight was a "go." On July 17, 1975, the *Soyuz 19* and the *Apollo* hard-docked in Earth orbit, and both crews warmly greeted each other; they shared a meal, exchanged gifts and took congratulatory calls from Soviet Communist Party General Secretary Leonid Brezhnev and the U.S. President at the time, Gerald Ford. When the *Apollo* undocked on July 19, it created the first man-made solar eclipse, and the *Soyuz* was able to take the first pictures of the sun's corona. This joint mission was instrumental in the process of mending the relationship between the Soviet Union and the United States.

Despite the thawing tension between the two global superpowers, the politics of space still remained a gray zone. In 1962, the United Nations General Assembly settled the issue with an official clause to its Resolution 1962: "[3] Outer space and celestial bodies are not subject to national appropriation by claims of sovereignty, by means of use or occupation, or by any other means." This was in direct response to a Soviet probe carrying a pennant which landed on the moon; however, tenure of moon-based space stations was still granted to its country of origin. The General Assembly also concurred that "States parties shall not install...[nuclear] weapons on celestial bodies, or station such weapons in outer space in any other manner." The weaponization of such a diverse and foreign group of celestial bodies was clearly forbidden, and with good reason: now that a country's rate of development was measured in its ability to launch a vehicle into orbit, each country would do its best to overtake its competitors.

Described as one of the "most ambitious engineering undertakings in history," the International Space Station was a joint project conceptualized by Russia and the United States. The station was constructed of individual pieces which were launched by their countries and assembled while in orbit, and its first module, the *Zarya*, was launched by Russia on November 20, 1998. The ISS's primary agencies are those representing Japan, Russia, the United States, Europe, and Canada. Today, the ISS is used primarily for research, but its countries are preparing for the first commercial docking which will come as soon as this year. Sam Scimemi, director of the ISS Division at NASA Headquarters, stated that, "We want to utilize the space station to expose the commercial sector...ultimately creating a new economy in low-Earth orbit for scientific research

[and] technology development.” The simple fact that space travel will be open to a commercial audience speaks numbers to its newfound ubiquity and relative ease, compared to the time of its conception.

On June 10, 2003, the Mars rover *Spirit* (MER-A) was launched, and a month later, its twin rover *Opportunity* (MER-B) was launched as well. The two modules landed safely on the Mars surface within twenty days of each other in January of 2004. NASA Control lost communications with the *Spirit* in May of 2010, with a general consensus that it was due to an extremely low internal temperature. More recently and well known is the Mars rover *Curiosity*, which landed on the Martian surface on August 5, 2012. The *Curiosity* was one of two parts of its mission, the other being the Mars Science Laboratory, whose purpose was to assess whether or not Mars ever had the potential to carry microbial life. The *Curiosity* is the most advanced rover of its kind, and it possesses the largest and most advanced instruments for scientific studies ever sent to the Martian surface. The *New Horizons* interplanetary space probe launched from Cape Canaveral, Florida on January 19, 2006. It is the world’s first extrasolar probe and is also the furthest man-made object from the Earth. The *New Horizons* completed a flyby of Pluto, its original mission, in July of 2015, and finished its mission relaying information back to the NASA scientific headquarters.

As time goes on, space exploration precipitates massive technological advancements in many fields. Technology “snowballs” as it improves, and the technology of space is no exception. Just as the technology of the 1990’s gave way to that of the 2000’s, space programs around the world will continue to grow and improve their designs today to help perfect the technology of tomorrow.

The Cold War influenced American space and aeronautical technology in ways previously unthought of. The relationship between the Soviet Union and the United States is what facilitated the scientific growth of the 20th century, which continues to influence modern prospects. The United States promoted federal science funding in competition with the Soviet Union, which precipitated its scientific development. New economies and alliances which came from this union are still maintained today. Although each country had their own difficulties and casualties in discovering what it means to be a nation of space, understanding of failure is what ultimately brought them from the pits of ignorance to the glimmer of hope and science. It is important to recognize that the betterment of humanity stems from the common knowledge of the universe and each other, and equally important that the global community understands that it is the Cold War which brought about the impetus of the United States’ — and the world’s — knowledge of space.