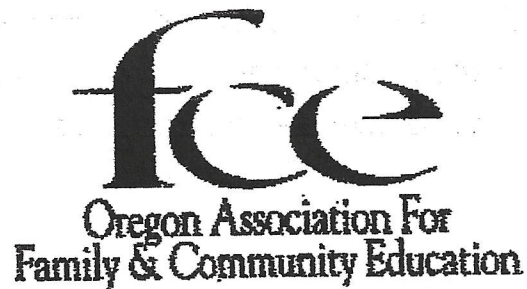


THE GENIUS OF AMERICA

An Oregon FCE Lesson



**Information compiled by
Gay Jarvinen & Kerry Mauk**

The Genius of America

We the people of the United States live in a country that encourages freedom of expression, and rewards innovation and invention. We have our Forefathers to thank for this. They created a government that allows its people to pursue their dreams and visions. Our civilization has advanced, because of our creativity and our ability to problem solve. We are at the forefront of technology.

In our lesson "The Genius of America" we will guide you through a history of American inventiveness. We will be discussing inventions in the fields of communications, transportation, medicine and a potpourri of inventions we call "How to build a Better Mouse Trap". By the end of the lesson, we hope you will have gained a renewed appreciation for how innovative we Americans are.

Communications

About the time the Spaniards were traipsing all over North America, Shakespeare was hand writing his plays and the Gutenberg Bible was being printed in Germany. We were way behind, but things were starting to move fast for the newly named America. Everyone was claiming their piece of the New World and some of everyone else's piece and all of the Native American's pieces. It did not take long before we caught up with the rest of the northern hemisphere. This is where the unique bit comes in. You see, we did not have thousands of years of tradition, generation upon generation that always did it the same way, hundreds and hundreds of years to learn how to live a better life. The Europeans that immigrated to America were people that wanted a

different way of life, they were willing to take that risk for the opportunity to make their life better and what they started there was no stopping.

As the population increased and transportation became easier the need to communicate swiftly and accurately took on a new importance.

The Pony Express

When we talk about communications we have to mention the Pony Express. In the era before electronic communication, the Pony Express was the thread that tied East to West. As a result of the 1849 Gold Rush, the 1847 Mormon exodus to Utah and the thousands who moved west on the Oregon Trail starting in the 1840s, the need for a fast mail service beyond the Rocky Mountains became obvious. In operation for only 18 months between April 1860 and October 1861, the Pony Express nevertheless has become synonymous with the Old West. More than 1,800 miles in 10 days! From St. Joseph, Missouri, to Sacramento, California the Pony Express could deliver a letter faster than ever before. Due to the rapidly expanding telegraph system on October 26, 1861, San Francisco was in direct contact with New York City. On that day the Pony Express was officially terminated.

The electro mechanical relay

This was the device invented by Joseph Henry in 1835 that led to that telegraph system that was a practical and commercial success and was the beginning of the Western Union.

Morse code

The invention of Morse code by Samuel Morse and Alfred Vail in the 1840's revolutionized long-distance communications. In 1844 Morse sent his first telegraph message from Washington, D.C. to Baltimore, Maryland; by 1866 a telegraph line had been laid across the Atlantic Ocean from the U.S. to Europe.

Telephone

Until 1877, all rapid long-distance communication depended upon the telegraph. That year, a rival technology developed that would again change the face of communication - the telephone. Alexander Graham Bell invented his "electric speech machine" in Boston in 1876. By 1878 Bell had set up the first telephone exchange in New Haven, Connecticut, by 1884 long distance connections were made between Boston and New York.

In 1880, the French Government awarded Alexander Graham the Volta Prize of 50,000 francs (worth roughly \$10,000 at the time) in recognition of his invention of the telephone. Bell put this money to good use, setting up the Volta Laboratory in Washington. It was in this workspace that Bell developed one of his most significant inventions: the photophone. The photophone allowed for the transmission of sound on a beam of light, a precursor to modern day fiber optics. Bell believed this device to be his most important invention. He used the photophone to transmit the first wireless telephone message on June 3, 1880.

Typewriter

The first typewriter was invented in 1867 by the American printer and Editor Christopher Latham Sholes. He was helped in this effort by Carlos Glidden and Samuel W. Soule. Their first commercial model was called the "Sholes & Glidden Type Writer" and was later called the Remington Typewriter. It was produced by the gun-makers E. Remington & Sons in Ilion, N.Y. from 1874-1878. The first author to submit a typed book manuscript was Mark Twain.

Liquid Paper

A small but important invention that the typewriter necessitated was Liquid Paper. Invented in 1951 by Bessie Nesmith, a secretary in Texas, it was based on white tempera paint (Nesmith was also an artist) and this was the time before word processors! She began selling her vastly popular invention and soon ran the very successful Liquid Paper Company. Bessie's other claim to fame is her son, Michael Nesmith was a member of the rock group called the Monkees.

Radio

Nikola Tesla invented the first radio, but it wasn't promoted until Guglielmo Marconi did so in 1895. Their work enabled the first radio transmission to occur on December 12, 1901. Tesla was an incredible inventor responsible for many, many amazing devices. The Tesla coil which he invented in 1891, is widely used today in radio and television sets and other electronic equipment. His alternating current induction motor is considered one of the ten greatest discoveries of all. In 1898, at an electrical exhibition in the recently completed Madison Square Garden, he made a demonstration of the world's first radio-controlled vessel. Tesla's device was literally the birth of robotics, though he is seldom recognized for this accomplishment. The inventor was trained in electrical and mechanical engineering, and these skills merged beautifully in this remote-controlled boat. Unfortunately, the invention was so far ahead of its time that those who observed it could not imagine its practical applications. Among Tesla's other

discoveries are the fluorescent light, laser beam, wireless communications, wireless transmission of electrical energy, robotic, Tesla's turbines and vertical take-off aircraft. He also designed the first hydro-electric power plant in Niagara Falls and in 1899 he announced that he received extraterrestrial radio signals. The scientific community did not believe him because, at that time, cosmic radio signals had not been invented!

Then came computers!

If you start asking "who invented the computer" you will come up with 101 different answers depending on who and how you ask. So let's just say that the Mark 1 designed by Howard H. Aiken, an engineer working with Harvard and IBM was one of the first computers as we know them today. Computers have gone from devices that took up whole floors of buildings to the smart phones we have in our pockets and the tiny devices that control major portions of our everyday lives, and Americans have been involved in every step along the way

Transistors

The invention of the transistor in 1947 by John Bardeen, Walter Brattain and William Shockley at Bell Labs was a really game changer in what came next. Using transistors, computers came around that could store memory and even run programs. Soon they even had computer languages so that people could change the programs run by the computer when they wanted to. After a while, the focus on computer research came to be on making them smaller, giving us the kinds of computers that we have today.

World Wide Web

No, Al Gore did not invent the internet. The World Wide Web was invented in Switzerland by Tim Berners-Lee in 1990 and only came to America the following year, when Paul Kunz bought the software from Switzerland to Stanford. (A real Pandora's Box moment)!

I have a quote here from Andrew Evans who is a "digital nomad" for National Geographic Traveler Magazine. He is always traveling and always connected on-line, he said "The web has changed humanity more than any invention I know. We are connected in ways that none of us thought possible 20 years ago. Knowledge is more universal than ever before and every day billions of people connect online."

This is, in part, what the genius of America is all about.

Transportation

The American people have always been willing to travel in order to build a better life for themselves and their families, or if it sounds like a challenge.

The first Americans walked across a land bridge from Asia through Alaska to North America, some 14,000 years ago. This theory was based on artifacts and human feces discovered in places such as the Paisley Caves in Lake County, Oregon. Another theory is that around 13,500 years ago, people of Polynesian descent arrived on the west coast of the Americas, in such places as the Channel Islands of California. They came by sea in ocean going canoes. This train of thought is based on human bones found on the islands. All these artifacts were dated using Radio Carbon Dating.

* Radio Carbon Dating was invented by an American, Willard Libby in 1947, at the University of Chicago.

WALKING

We can safely assume that walking was the first form of transportation. But the first Americans improved upon walking in bare feet with an upgrade, sandals. The first sandals are believed to be made of sagebrush bark. Soon, they improved upon these with sandals made of animal hides. Now they could walk in comfort but eventually, they ran into a body of water, too large to walk around. Their solution was to build something that could float across the water. Watching logs float in the river, they gathered some logs, strapped them together and created rafts. Later, they learned to carve out large logs to make the fast and nimble dug-out canoes. Now the waterways of America were at their disposal. They could travel farther and faster than they ever could by walking. They built villages on the banks of rivers. They met their neighbors and began to trade with them, and fight with them. Some of them began growing vegetables and domesticating animals. Then, the Europeans arrived.

HORSE

In 1493, Columbus arrived, for his second visit to North America. He was followed by Spanish Explorers, in the 1500s. Although they were not aware of it, they brought with them an important new form of transportation. This form of transportation would foster a great change in the lives of Americans, the horse. The horse enabled people to

travel much faster than walking and without the limitations of traveling by river. Plowing fields and hauling supplies became substantially easier. In battle, the warrior on horseback had a great advantage over the warrior on foot. He had the advantage of height and he could use the horses' body as a weapon.

BOATS

In the 1700 and 1800s, even with the introduction of the horse, America's waterways remained the most widely used form of transportation. Settlers from Europe arrived by sailing ship and made their homes along waterways. They used canoes, keel boats, rafts and barges to travel along the rivers.

In 1807, Robert Fuller of New York developed the first commercially successful steam powered paddlewheel boat in North America. This was a major advancement in water transportation. It reduced the need to rely on oars, wind, or river currents. The steam paddlewheel boat quickly became a vital instrument for shipping goods and for passenger travel along the great rivers of eastern North America.

* Robert Fuller also invented the first working submarine in 1800. It stayed under water for 17 minutes, and came back up.

In 1803, President Thomas Jefferson ordered Meriwether Lewis and William Clark to travel west. The goal of the Lewis and Clark Expedition was to find an all water route from the Eastern United States to the Pacific Coast. The Expedition began in 1804 and was completed in 1806. Lewis and Clark never found a water route to the Pacific. They did make meticulous maps of their travels. They discovered previously unknown bird and animal species and they met some 300 new Indian tribes. The information they obtained from their trip would be invaluable in future expeditions.

President Jefferson had just purchased 828,000 square miles of property from France, for a total of 15 million dollars. Known as the Louisiana Purchase, this property included what would eventually be 15 states. It added a vast amount of land to the United States. The U. S. Government sold the land in parcels at inexpensive prices. The word spread all through the United States and even in Europe. **IMMIGRANTS WANTED.** This presented a great opportunity for the poor to own their own land. The problem was, they had to get there.

COVERED WAGON

Enter the first travel trailer, also known as the Covered Wagon. The Covered Wagon was thought to be designed by German Wagon Builders from Pennsylvania in 1749. The wagons were about 10 ½ feet long, made of wood, with a canvas cover. It was pulled by

oxen, mules or horses. The Covered Wagon was a store room, bedroom, and protection from the weather and wild animals. This was a hazardous trip. Settlers had to battle wild animals, Indians, rough terrain, lack of water, bad weather, and really big mountains. For safety, they would travel in groups known as Wagon Trains.

STAGECOACH

Another vital form of transportation was the Stagecoach. The Stagecoach went where no other form of transportation would go. It provided a way for passengers and cargo to travel to towns from California to Missouri. It was safer than traveling alone, but just barely. It was a cramped, bouncy ride, with stops every 12 miles or so. The Overland Mail and Express Co. moved people and mail by stagecoach, from 1862 to 1866. They sold their company to Wells Fargo in 1866. Stagecoaches were robbed so often that Wells Fargo had a standard form for reporting robberies. Even so, stagecoach service remained in operation to the 1900s.

RAILROAD

A revolutionary invention would literally, change the American Landscape forever. It was the Steam Locomotive. In 1829, an American fellow, by the name of John Stevens proved that the Steam Locomotive was a viable form of transportation. In 1830, the first railroad was built. It was the Baltimore and Ohio Railroad. It proved to be an efficient way to move people and cargo. From then on, railroads were built all over the Eastern United States. In 1849, Asa Whitney, a wealthy merchant, made a proposal to the United States Congress, to build a transcontinental railroad from Chicago to the Pacific Coast. In 1862, the U. S. Congress passed The Railroad Act, and the construction began. The project was completed on May 10, 1869, in Promontory, Utah. It was considered one of the greatest technological triumphs of the 1800s.

The completion of the transcontinental railroad provided a safer way to travel. A flood of settlers moved west. Goods and equipment needed by the fast growing western United States were easily transported by train. Towns sprung up along the railroad line. The railroad was to be the principle form of long distance travel in the United States, up until the end of World War II in 1945.

CAMELS

The United States government had a problem. They had miles of desert and badlands to patrol in the southwest territories and horses were not able to handle the heat and lack of water. What was the solution? In 1850, Major Henry Wayne and Lieutenant David D Porter, of the U.S. Army, suggested the U.S. Government obtain Camels from the Arabian Peninsula and transport them back to America. The senator from Mississippi,

Jefferson Davis, thought it was a great idea, and he was able to get Congress to appropriate funds to send Wayne and Porter to the Mid East to obtain camels. In 1856, the two men set out in the Navy ship, "Supply" to Saudi Arabia. They brought back 33 camels and delivered them to Indianola, Texas. The handlers and their camels walked through the main street of Indianola, to the corrals. The town's people thought the circus had come to town. These camels turned out to be much better adapted to the badlands than horses. In 1857, another shipment of 41 camels was delivered to Texas. Then, the Civil War occurred. After the war, the U. S. Government wanted nothing to do with any project supported by Jefferson Davis, who had been the President of the Confederate States of America. So, the financial support for the camels was cancelled. The camels were left on their own. They became wild. Many were killed by ranchers. It was thought that they had all died out, until in 1920. Some camels showed up in Los Angeles, California. In true southern California style, the citizens of Los Angeles built a corral for them in the middle of town and took care of them, for the rest of their lives.

AUTOMOBILE

The most life altering invention in transportation in the United States was, hands down, the Automobile. The first automobile built in the States was a horse buggy with a four horse power single cylinder engine. It was assembled by Charles and Frank Duryea in 1893. It had no brakes. They had to run it up on a curb to stop it. These brothers formed the first U. S. auto company, called Duryea Motor Wagon Co. Several new automobile companies followed, such as Cadillac in 1902, and Chevrolet in 1911. By the way, we can thank the Thomas B Jeffery Company for giving us a steering wheel instead of a joy stick to drive with. Thank you, Mr. Jeffery.

In 1900, Americans owned eight thousand cars. By 1920, Americans owned eight million cars. What caused this increase in popularity? It was the assembly line. A man named Henry Ford successfully developed an assembly line to build his automobiles. His company could build a Model A in 93 minutes. His cars were basic and you could choose the color, as long as it was black. But Ford's cars were inexpensive and America fell in love with the automobile.

The only problem with America's new form of transportation was the roads. Outside of the major cities, the roads were awful. They were pot holed and dusty, muddy and grooved from horse buggies. People brought the problem to the government. The first road project was actually spurred on by bicycle enthusiasts.

They wanted the roads improved for their bicycle excursions. In 1921, the Federal Highway Act was funded to pave roads. During the depression in the 1930s, many road projects were implemented by President Roosevelt, as part of his plan to put people back to work. In 1956, President Eisenhower signed the Federal Aid Highway Act. This began the first major interstate road project.

In the 1950s, the automobile became the most popular form of transportation in the U.S. Working people began to move out of the crowded cities into small towns. They would commute to work in their cars. This signaled the birth of the "Suburbs" and the "commuter". By the year 2009, there were over 254 million cars in the U.S.

AIRPLANES

In 1903, Wilbur and Orville Wright made history. They flew the first manned, sustained and controlled flight. Air flight was born. At first it was a novelty. It was just a form of entertainment at local fairs and expeditions. Eventually, the value of the airplane was revealed. In 1918, the first Air Mail Service began in the United States. In 1920, a regional airline, with scheduled flights opened in Florida. Ford Motor Company bought the Stout Aircraft Company and began the first successful intercontinental airline with twelve passenger airplanes. The first flight attendants were hired in 1926. They were young men and their job consisted of calming the passengers, and assisting with the luggage. In 1930, the first female flight attendants made their appearance. They were very popular with the mostly male passengers. The female flight attendants were renamed, Stewardesses. Jet airplanes were introduced in the 1950s. By the 1960s, the price of flying was reduced and air flight became all the rage, in America. In 2010, according to the International Air Transport Association, there were 2,400 million people flying in 36,800,000 flights around the globe.

SPACE EXPLORATION

Americans have always been in the forefront of space exploration. In 1947, Chuck Yeager broke the sound barrier, flying faster than the speed of sound in his rocket, the bell X-1. The Saturn 5 rocket was launched in 1967. It carried Apollo Astronauts and Skylab into space until 1973. It was created by NASA. It is the tallest, heaviest, and most powerful rocket ever successfully used. It launched Americans into one of their proudest moments, when Neil Armstrong and Edwin Aldrin stepped onto the moon, on July 20, 1969. They were the first earthlings to step onto another world. In 1981, we decided to build a reusable space ship, something more on the lines of an airplane. NASA came up with the Space Shuttle in 1981. It went on 135 missions. In 2004, Space Ship One, the first privately funded aircraft, capable of leaving Earth's atmosphere, made its first manned flight with Mike Melvill as her pilot, in California.

CONCLUSION

Through necessity, and vision, Americans have solved their transportation challenges. Being who we are, we will continue to meet our transportation needs.

Medical

Now we thought we would look at the medical side of things. Medicine was pretty primitive here a couple of hundred years ago, although the invention of medicines dates back centuries. The Egyptians were using remedies to fight diseases and also performed basic surgeries 5000 years ago. Hippocrates, from Greece, was considered the father of medicine and is best known for his Hippocratic Oath that doctors to this day, still take.

Americans started to make a noise in the medical field mostly with the last hundred years or so and their contributions, both big and small, were all significant.

Civil War Nurses

In June 1861 Mary Ann Bickerdyke a recently bereaved widow, accompanied a load of food, clothes and medical supplies to Cairo on behalf of her church. When Bickerdyke saw the poor conditions of the hospital in Cairo, she took a room in town and immediately began a determined cleanup effort that quickly spread to the other five military hospitals in the area. The nurses of the Civil War left a heritage far beyond a country's gratitude for bodies salvaged and spirits renewed. Observing the difference they had made, both the public and the medical community finally came to recognize nursing as a legitimate profession.

Surgical Gloves

At Johns Hopkins Hospital, in 1894, five years after that institution opened. William Stewart Halsted, the hospital's first surgeon in chief developed and introduced rubber surgical gloves.

The Iron Lung

Dr. Philip Drinker and Dr. Charles F. McKhann in 1929 invented the "Iron Lung" which made a huge difference to the sufferers of polio and was an example of biomedical engineering long before the field was even conceptualized.

Q-Tips

Leo Gerstenzang decided to create a manufactured cotton swab after observing his wife wrapping a piece of cotton on the end of a toothpick. In 1923 they were first marketed under the name "Baby Gays" and later were renamed "Q-Tips."

Band-Aids

Josephine Dickson married a man who worked for a company that manufactured gauze and adhesive tape called Johnson & Johnson. Josephine apparently was accident prone. During the first week that she was married to Earle Dickson, she cut herself twice with the kitchen knife. After that, it just went from bad to worse. It seemed that Josephine was always cutting herself. One day her husband had an idea. He sat down with some tape and gauze and a pair of scissors. He cut the tape into strips and stuck a little square of gauze in the middle. From then on, whenever Josephine had an accident, ready-made bandages were on hand for her to use quickly and without a lot of fuss. At Johnson & Johnson they heard about these new bandages and soon the company was making them to sell on a small scale. Four years later, in 1924, the company installed machines for mass producing the new product, and the trade

Disposable Catheters

Those of us that need, can thank David S. Sheridan who worked in the flooring industry in Brooklyn in 1908, for his invention of disposable catheters. In the late 30's, according to The Times Union of Albany, he got the idea to make catheters when a friend predicted that the war brewing in Europe would cut off the supply of the devices from France, their main provider. Over the years, he started four catheter companies that created several thousand jobs. He held or shared more than 50 patents, and was a major medical philanthropist.

BLOOD BANK

The idea of a blood bank was pioneered by Dr. Charles Richard Drew (1904-1950). Dr. Drew was an American medical doctor and surgeon who started the idea of a blood bank and a system for the long term preservation of blood plasma (he found that plasma kept longer than whole blood). His ideas revolutionized the medical profession and saved many, many lives. Dr. Drew set up and operated the blood plasma bank at the Presbyterian Hospital in New York City, NY. Drew's project was the model for the Red Cross' system of blood banks, of which he became the first director

Dr. Drew died on April 1, 1950, after a car accident in rural North Carolina. Although there is a legend that he died as a result of being denied a blood transfusion and medical care from a "whites-only" hospital, Dr. Drew got immediate medical attention, in part from the other doctors (his friends) who were in the car accident with him (but were less severely injured). Dr. Drew was admitted to a mixed-race hospital, but died after being treated for massive internal injuries. A U.S. postage stamp was issued in 1981 to honor Dr. Drew.

Artificial Heart

Another life changing invention was the Artificial Heart, although invented by Dutch-born medical researcher Willem J Kolff, it was an American doctor, Robert Jarvik who in 1982 completed the design to the first permanently-implantable artificial heart with an internal power system that ensured it consistently beat at least 100,000 times a day pumping blood through the body.

Pacemaker

In 1950 a Canadian electrical engineer invented the Pacemaker but his device was too large to be implanted inside a human body. A greatly improved version was designed by New York medical researcher Wilson Greatbatch in the late 1950's making it implantable and powered by a corrosion-free lithium battery.

Since then Americans have been front and center in the medical fields contributing to the vastly improved health care with which we are familiar today. Some of the innovations that are currently being developed or have recently arrived include:

Mini ultrasound

Created by George K. Lewis, a Cornell biomedical engineering graduate student the mini ultrasound, which is claimed to be the world's smallest ultrasound device, sends low-intensity ultrasound to the skin. This can relieve pain and may also be used to deliver various drugs. The device may soon be available to everyone suffering from arthritis or other pain.

Implantable devices

A new generation of implantable devices is being introduced which are so small that they can travel through our blood stream and are powered wirelessly by electromagnetic radio-waves. These devices travel by blood stream and reach the target site in the human body and perform various diagnostic and therapeutic procedures like, performing microscopic imaging study of the target tissue, removing a blood clot or after being implanted at or near the site of tumor emitting targeted radiation at the malignant cells not only to significantly prolong survival of the cancer patients but also avoid the deleterious effects of conventional radiation therapy for cancer.

GPS Shoes

There are GPS Shoes, a great solution for Alzheimer's and Dementia Patients, who would quite commonly wander off on their own. The GPS tracking device in the shoes would inform the Caretaker that the Patient is gone and where they can be located. These shoes are actually available, now. Of course, to be truly effective, you do have to remember to put them on.

ThermoDock

ThermoDock is an infrared device, which can be plugged into iPhone and then directed at the forehead to record its temperature. This device does not have to be in contact with the body surface to record its temperature hence you can also check the temperature of your coffee without bringing your iPhone in contact with it. This device can also record the ambient, room and outdoor, temperatures.

Building a Better Mouse Trap

It the world of inventions, imagination is everything. Americans have been using their imaginations to supply us with inventions that have made our lives easier, healthier, and more interesting. This last group of inventions is a potpourri of creations, we call “building a better mouse trap”.

Steam Power

When Man harnessed the power of steam, he opened the door to the Industrial Revolution. When he boiled water and pushed the steam from the water into a smaller hole, which had the force to move a piston, which turned a wheel, he had power that he could control. Steam powered ships, train locomotives, tractors, automobiles, industrial machinery, and electricity. Steam is still used to create electricity.

Electric Light Bulb

The electric light bulb literally took us out of the darkness. We were no longer limited to working during the daylight. In the late 1800s, some 22 people around the world were attempting to develop a functional light bulb. An American, Thomas Edison managed to develop a viable light bulb in 1878. At the Chicago World’s Fair of 1893, the electric light bulb was showcased for the world. But it wasn’t Thomas Edison’s light bulb that was on display. He was miffed because he lost the bid to supply the electricity to the fair, so he would not permit his light bulb to be used. Instead a company called Westinghouse, created their own version of Edison’s bulb for the exhibition. Soon, electricity and the electric light bulb were indispensable.

Mail Order Catalogs

In the late 1800s, Chicago was the fastest growing city in the United States. It was situated on the Great Lakes. There was a canal built, that connected the Great Lakes to the Mississippi River. To top it off, the Transcontinental Railroad went through Chicago. It was the perfect place for a retail store to open a mail order business. Aaron Montgomery Ward came up with the idea to send out a mail order catalog offering a variety of products that could be ordered from one company. His first catalog was distributed in 1872. He bought products from various manufacturers and offered them to his mail order customers. This saved his customers time and shipping fees. In 1888, another company from Chicago began to offer a mail order catalog. The name of that company was Sears and Roebuck. Ordering merchandise by mail or now day, by E mail is as popular today as it was in the late 1800s.

Toilet Paper

Soon the public discovered that the free mail order catalogs had another use. This delayed the need for Mr. Gagetty's invention. Joseph Gagetty invented toilet paper in 1857, but he couldn't get anyone to buy it. Beside the fact that the paper was rough and scratchy, the public received mail order catalogs for free. Why buy toilet paper? Finally in 1890, Clarence and E. Irwin Scott of the Scott Paper Company came up with toilet paper on a roll. Eventually, it became popular and a necessary item.

Refrigeration

Refrigeration is one of the most important inventions of all time. It is a vital part of all of our lives. The concept of refrigeration was discovered in 1805, by Oliver Evans, but the first refrigerator was built by Jason Perkins in 1834. Refrigerators did not become practical until electricity came to the average home.

Refrigeration improved our health. When we began to transport food in temperature controlled freight cars, it would arrive at grocery stores, fresher. Meat and produce could be shipped farther without spoilage. This allowed for a greater variety of food. According to the History Channel, people grew an average of four inches after the refrigerator became a necessary kitchen appliance.

Sewing Machine

The lock stitch bobbin sewing machine was invented in 1833 by Walter Hunt, but he never patented his invention. Elias Howe patented it in 1846, but he never built one. Finally, Isaac Singer built and sold sewing machines using Howe's patent. Howe discovered the patent infringement and filed a lawsuit against Singer and other sewing machine manufacturers. On July 1 1854, the Federal Commission ruled in favor of

Howe. Every sewing machine manufacturer was ordered to pay Howe royalties. This was great for Mr. Howe and really bad for Mr. Hunt.

Safety Pin

Walter Hunt (remember him, he invented the sewing machine) needed to pay off a debt to a friend, so he decided to invent something. He took a piece of brass wire and he created a safety pin. He learned his lesson from the sewing machine mistake, and patented his safety pin in 1849. He sold his safety pin invention to the W.R. Grace Company for \$400.00. This was about \$10,000.00, today. He paid back his friend and kept the remaining \$385.00. The safety pin became a staple of modern life and made W.R. Grace Company millions of dollars in profit.

Talk about a man that can't win!

Microwave Oven

Sometimes an invention is discovered by accident. In 1945, Percy Spencer of Maine, worked for a company called Raytheon. He was working on an active radar machine, when he noticed that his Mr. Goodbar candy bar, which was in his pocket, began to melt. He realized that the microwaves in the radar were heating up his candy bar. He began to experiment with cooking, using microwaves. In his first test, he cooked popcorn. In the second test, he cooked an egg, which exploded all over his assistant. The Microwave Oven was born.

Tupperware

Tupperware was invented by a chemist named Earl Silas Tupper in 1946. He was looking for a use for a waste product from oil refineries. After he created those landmark air tight containers, he could not get anyone to buy them. Finally, in 1951, a housewife from Florida, named Brownie Wise began to throw Tupperware parties, and the rest is history.

The Brownie Camera

George Eastman, founder of Eastman Kodak Company, introduced the Brownie Camera in 1900. It was easy to use and it only cost one dollar. It brought the ability to take pictures to the average American. By 1907, more than a million people had a Brownie, including Ansel Adams. The Brownie Camera was produced until 1970. How many of you had a Brownie Camera?

The Future of Innovation

We have talked about America's past and the contributions that Americans have made to our world. We have shown how Americans, unfettered by thousands of years of tradition, have gone where no man has gone before! But, what lies ahead for this great country? The world's population is growing faster than ever before. We are depleting our natural resources. Are we going to have enough food and fresh water for everyone? The climate is changing, whether from global warming or just the natural process of our world. We have enclosed a quiz to test your knowledge, of the condition of the world's fresh water.

So, what does the future hold? We don't know for sure, but we can tell you about some innovations that are on the horizon and some that are way out there. What we can be sure of, is change will come.

Google Glasses

You think talking and texting on your cell phone causes problems, well Google has come up with an alternative, Google Glasses. These are glasses you wear and all the information that you would usually see on your smart phone screen, comes up on the inside of the glasses. They respond to voice commands such as "take a picture", "give directions", and "send a message". These glasses are currently being tested by 8,000 volunteers and I am sure they will be on sale soon.

Interactive Contact Lenses

Researchers have made progress toward interactive contact lens displays. The developers envision hundreds of pixels embedded in a flexible lens to produce complex holographic images. For example, drivers could wear them to see journey directions or their vehicle's speed, projected onto the windscreen. Also, the lenses could be used to play video games.

Transportation

The automobile of the future will drive itself. We will enter our destination in the computer and the car will do the driving. This will eliminate traffic accidents, getting lost, and back seat drivers. A new form of transportation, which is actually being tested on a small scale, is a pneumatic tube. Humans would travel in the tubes through

specially constructed tunnels, using air pressure. It works on the same principle as the pneumatic tubes that are currently used by banks at the drive up windows. The ET3 Company of Langmont, Colorado claim, that these tubes will be able to transport people from New York to Los Angeles in 45 minutes. What a ride that would be.

Air travel will have a new look. No more walking through the airport to find your flight. You will be loaded into the passenger compartment of your plane at the airport entrance. Then the passenger compartment will travel by rail to the mother airplane and attach to it. Then, similar to automobiles, airplanes will be piloted by computers. One idea on the drawing board is a transparent airplane. It will be made of a material that will allow the passengers an unobstructed view in every direction. I don't know about you but that's more sightseeing than I care to do.

Solar Sail Ships

Solar Sail Ships might be the first spacecraft to take human technology to distant stars. Giant sails propelled by the Sun's rays or by a laser's energy could be the most viable option for interstellar spaceflight, in the not too distant future. This is according to James Benford, a physicist associated with Icarus Interstellar, a non-profit group devoted to finding a way to travel to other star systems.

Vacation of the future

Do you like spending your vacations on a cruise ship? In the future, you could cruise on a Cruise Space Ship. These Space ships will cruise around the galaxy. The Ship could be names "The Galaxy Princess". It could make a port of call at the Moon, where you could play golf or go for a hike on one of their many hiking trails. Then it's off to Mars for a special sunlight dinner. What a way to get away from it all.

Replaceable You

The same technologies driving the revolution in personal electronics (smart phones) are ushering in a new era in bionic limbs and organs. Prosthetics are improving so quickly that one inventor boldly predicts that disabilities will be largely eliminated by the end of the 21st century.

Cancer Diagnostic Testing

A 16 year old named Jack Andraka, from Crownville, Maryland has turned cancer research on its ear. He has developed a new, rapid and inexpensive method to detect an increase of a protein that indicates the presence of pancreatic, ovarian and lung cancer during its early stages. This means a higher likelihood of a cure. Professor

Maitra, Professor of Pathology, Oncology and Chemical and Biomolecular Engineering at Johns Hopkins School of Medicine, is very enthusiastic about Andraka's future. He told the Baltimore Sun, "You're going to read about him a lot in the years to come. What I tell my lab is," Think of Thomas Edison and the light bulb. This kid is the Edison of our times. There are going to be a lot of light bulbs coming from him."

Money of the Future

Coin and currency, debit cards and credit cards, will be obsolete. You will be able to transfer your money instantly, using your computer, which will be the size of a credit card. This technology already exists. In the future, we will have no need to carry identification. A scan of your eye or a sample of your DNA will confirm your identity, without question. There already exists a new "I Phone" that recognizes you by your fingerprint.

Smart Homes

A German company has released one of the world's most advanced and expensive showers. It projects a light show while you wash. Perfume is sprayed into the air, while the user is immersed in mist and water. You can even program the shower to vary the temperature of the water, spraying out of the numerous shower heads. In other words, one shower head could spray cool water, while at the same time another shower head sprays hot water. I am sure this must have some kind of health benefit and could be a medical deduction on your taxes. With a \$32,000.00 price tag, you might need that deduction.

Power House Dynamics, a Maine based company, has unveiled the Total Home Energy Management program. This program monitors the energy use, energy cost and carbon footprint of a home, minute by minute. Thanks to its detailed tracking, the system can tell you when your energy use spikes and why, allowing you to alter your consumption. It also monitors your appliances, letting you know if maintenance is needed. It clues you in to when it is time to chuck your old appliance and replace it with a more energy efficient one. New features are constantly being added, as the company identifies and addresses the needs of the customers. For example, when the defrost cycle in a customer's refrigerator wasn't working properly, the system was notified and provided an alert.

Housekeeping Robots

For years Scientists have promised us a "Housekeeping Robot". We have grown up watching "Rosie", the housekeeping robot from the TV show "The Jetsons", and wondering when "Rosie" will be a reality. Here we are in the 21st century and we are still pushing vacuum cleaners and manually dusting the furniture.

Good news, all is not lost. Inventors are hard at work trying to perfect a housecleaning Robot. One prototype unveiled by research scientists in Germany is a one armed, three fingered, wonder that can tidy up the house, then serve drinks at a dinner party. It can even operate other appliances. It has numerous sensors, to prevent it from inadvertently (and painfully) clamping its hand around you arm. Users can direct the robot via a touch screen on its serving tray, or by voice commands, or even by body gestures.

Many researchers are working to develop a household robot. Electrolux Design Lab held a contest to come up with ideas for appliances of the future. One concept was an automatic cleaning system that consists of hundreds of mini robots. The System decides which area of your home needs cleaning and it sends out the mini robots to clean it. This is going to be a popular appliance.

Smart Toilet

Yes, smart toilets currently exist, but even smarter ones are in development. Their purpose is to keep us healthy. Some toilets, in Japan, already perform urinalysis to see if users have diabetes. Soon, there will be toilets able to detect things like drug use and pregnancy from your urine, and colon cancer from your stool. Heck, they'll even be able to give us diet and exercise advice. But, will we heed it?

Conclusion

Of course, the future is anyone's guess. It could go in any number of directions. Innovations could appear that we would never have dreamed of. However, over the last 400 years America and Americans have come from hunter gathers to where we are today. We have gone from a tangled wilderness to this great nation. We have done in hundreds of years what it took other nations thousands to do. Does this make us unique, does this make us exceptional or just a product of our times?

Bibliography

Wikipedia.org

Airplanes
Middle Ages
Radiocarbon Dating
Automobile Industry
Inventions by American
First Oregonians/Paisley Caves
Railroads in America
History of the Horse
Camels in America
Steam Paddle Wheels
Electricity
Light Bulb
Sewing Machine
Rockets
Space Travel
First Americans
Lewis and Clark Expedition
U.S. Pacific Railroads 1887
Microwave Ovens
Future Airplanes
Future Automobiles
Chicago World's Fair
NASA
Future Airplanes
Future Automobiles
Chicago World's Fair
NASA

News/National Geographic/Sept 3, 2003

Discoverseaz.com/history/horse

Packnboxnow.com/library/covered wagon

Memory.loc.gov

Library.thinkquest.org/cortez

National Geographic.com/Lewis and Clark

National Geographic Magazine, October 2013

<http://history-computer.com>

www.history.com

www.voicenation.com

www.nps.gov/poex/historyculture

The Franklin Institute

The Tesla Society

www.pbs.org/tesla

Department of Physics, University of Illinois

National Geographic Traveler

www.neatorama.com

[Miriam Kramer Space.com](http://www.miriamkramer.com)

Geoff Brumfiel – Smithsonian

http://en.wikipedia.org/wiki/Jack_Andraka

Amanda Crawford, Bloomberg Businessweek – google cars

Bloomberg Businessweek, Innovation & Design

[Futuretechnologiesinc.com](http://futuretechnologiesinc.com)

Lighting Control Benefits & Possibilities

Powerhouse Dynamics

Smithsonian magazine, September 2013

FRESHWATER QUIZ

As the Earth's temperature rises, climate extremes like flood and drought become more common. How much freshwater do we have and how is the changing climate affecting our supply?

1. Which of the following has been linked to climate change?
 - A. Droughts
 - B. Flooding
 - C. Melting ice caps
 - D. All of the above
2. Where is the largest volume of ice outside the Polar Regions?
 - A. South Island, New Zealand
 - B. Andes Mountains, South America
 - C. Rocky Mountains, U.S.
 - D. The Tibetan Plateau.
3. Which century was the wettest of the last millennium?
 - A. 12th
 - B. 16th
 - C. 19th
 - D. 20th
4. What is now believed to have caused the collapse of Akkad, the world's first empire?
 - A. Floods
 - B. Ocean current changes
 - C. Droughts
 - D. Falling temperatures
5. Which country, (the world's biggest economy) is perilously low on water?
 - A. South Africa
 - B. Australia
 - C. Pakistan
 - D. Chile
6. In how many years will 1.8 billion people be living in regions of severe water scarcity?
 - A. 15
 - B. 35
 - C. 50
 - D. 100

7. Once admired by Mark Twain for its clarity, which U.S. body of water is now clouding up?
- A. Lake Tahoe
 - B. Mississippi River
 - C. Rio Grande
 - D. Lake Minnetonka
8. What percentage of the Earth's freshwater is locked in ice?
- A. 10
 - B. 35
 - C. 50
 - D. 70
9. As the rising temperatures melt ice caps around the world, which South American city could see its water supply disappear by the end of the century?
- A. Caracas, Venezuela
 - B. Quito, Ecuador
 - C. Cusco, Peru
 - D. All of the Above
10. Which species is threatened by the increased winter flow in freshwater streams due to global warming?
- A. Salmon
 - B. Atlantic Mackerel
 - C. Crawfish
 - D. Striped Bass

Just to put the last 200 years or so in perspective. Food for thought to think what the world would have been like without these American inventors.

1801, Modern Suspension Bridge, James Finley

1853, Potato chips, George Crum

1856, Condensed Milk, Gail Borden

1879, Electric Light Bulb, Thomas Alva Edison

1885, Photographic Film, George Eastman

1887, Disc Record, Emile Berliner 1877, Phonograph, Thomas Alva Edison

1861, Machine Gun, Richard Gatling

1885, Skyscraper, William Le Baron Jenney

1897, Cotton Candy, William Morrison & John C. Wharton

1894, Mousetrap, William C. Hooker

1903, Airplane, Wilbur and Orville Wright

1905, Ice pop, Frank Epperson

1912 the electric traffic light by Lester Wire, a policeman from Salt Lake City.

1926, Liquid-Fuel Rocket, Robert H. Goddard

1929, Sun glasses, Sam Foster 1937, Edwin Land, Polarized sun glasses

1929, Frozen Food, Clarence Birdseye

1930, Chocolate chip cookie, Ruth Wakefield

1937, modern day digital computer was invented by George Stibitz while he was working at Bell Labs.

1938, Nylon, Wallace H. Carothers 1956, Pantyhose, Ernest G. Rice

1945, Nuclear Bomb, J. Robert Oppenheimer

1945, microwave oven, Percy Spencer an engineer from Maine who was working on the magnetron for radar sets at Raytheon, found out that the microwaves had melted the chocolate in his pocket.

1950, Credit card, Ralph Schneider & Frank X. McNamara

1950, Disposable Diaper, Marion Donovan

1954, Nuclear Submarine, Hyman Rickover

1955 TV remote control designed by Zenith's Eugene Polley

1958, Integrated circuit, 1947, Transistor, Jack Kilby William Shockley

1958 Jet Airliner, The Boeing 707-120 debuts as the world's first successful commercial jet airliner.

1960, Magnetic stripe card, Forrest Parry

1960 the first LASER was built by Theodore H. Maiman, at Hughes Research Laboratories in Malibu, California.

1962 the use of Light Emitting Diodes for lighting and image displays by Nick Holonyak Jr., a consulting scientist at General Electric Company in Syracuse, New York.

1965 Compact Disk, by inventor Jack Russel

1968, Lunar Module, Tom Kelly

1969 Smoke Detector, by Ralph Smith and Kenneth House

1971 Waffle-sole running shoes, by Bill Bowerman, the track coach at the University of Oregon. Three years later Bowerman's company, Nike, introduces the Waffle Trainer, an instant hit.

1971 Email The first email was sent in 1971 using ARPANET, by Ray Tomlinson.

1973 The first the mobile phone was developed by a team headed by

1981, Space Shuttle, George Mueller

1982 – the Internet Protocol Suite of the US National Science Foundation

1980s the personal computer

The computer mouse – funded by the US Government

The Charge Couple Device for cameras the United States Air Force

1994 GPS became operational – the United States Air Force

The list is far from complete but could not be finished without one more invention:

2003 Doggles, goggles for dogs, can be tinted or prescription and designed to fit the shape of a dog's head. Several practical and medical uses have been reported. Invented by Kenneth and Veronica Di Lullo

ANSWERS FOR THE FRESHWATER QUIZ

1. D. Increasing temperatures are already affecting rainfall patterns and melting glaciers, causing too little water in some regions and too much water in others. Later this century, if warming continues, flood and droughts could become more common and less freshwater will be available.
2. D. Sometimes called the Third Pole, the Tibetan Plateau has nearly 37,000 glaciers on the Chinese side alone. The plateau, the highest and largest in the world, supplies water to nearly a third of the world's people. Unprecedented warming is causing 95% of the plateau's monitored glaciers to shed more ice than they're adding.
3. D. Last century, the 20th, was the wettest of the millennium. But that time, during which Americans build a civilization in the desert, has given way to recent drought. While trees in the West dies off and burn in wildfires at an unprecedented rate, subdivisions continue to sprout, and water managers are set to face hard times ahead.
4. C. Once blamed on politics, the collapse of Akkad, founded 4,300 years ago just south of modern-day Baghdad, is believed to have been caused by devastating drought. According to climate scientists, rainfall in the region dropped dramatically right around the time that the empire disintegrated.
5. B. Both the world's most arid inhabited continent and its 15th biggest economy, Australia is confronting the limits of natural resources in an era of climate change. Though Australians have routinely weathered dry spells, years of drought in the last decade have been the most devastating in the country's 117 years of recorded history.
6. A. In just 15 years, 1.8 billion people will live where water is scarce. Today, nearly 900 million people have no access to clean water, and with 83 million more people on Earth each year, water demand will keep going up.

7. A. Though the popular tourist spot still awes visitors with its clarity, old-timers and scientists can see a difference: Lake Tahoe is clouding up. According to researchers, dullness could be caused in part by warming of the lake due to climate change and a subsequent shift in nutrient mixing.
8. D. Nearly 70% of the planet's freshwater is frozen in ice sheets, glaciers, permanent snow cover and permafrost. As ice retreats due to rising temperatures, seasonal water supplies are projected to decrease in mountain regions, home to more than one-sixth of the world's population.
9. A. The Peruvian city of Cusco, ancient capital of the Inca Empire, relies in part on runoff from the glaciers of the Quelccaya ice cap to provide water in summer. If the ice cap continues to melt at its current rate, it will be gone by 2100, leaving thousands of people who rely on it for drinking water and electricity with a source of either.
- 10.A. Early snowmelt due to global warming will increase the rate of winter flow in freshwater streams, causing the fast-moving water to scour riverbeds when delicate salmon eggs and young are present. Summertime flows, in turn, will be reduced, possibly leading to a decline in freshwater habitat for adult salmon.