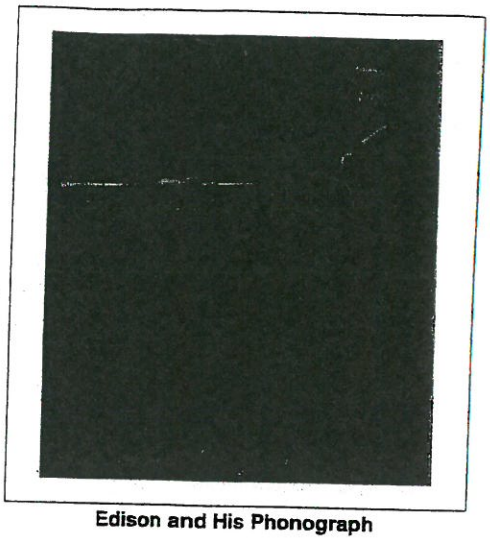
Name: _____

ss: _____

35.5 pt Packet

THOMAS ALVA EDISON

1847-1931



Edison and His Phonograph

Thomas Alva Edison was America's premier inventor of the nineteenth century. He was born in Milan, Ohio, in 1847. His father was a shingle manufacturer at the time that Thomas was born. Shortly thereafter, however, the family moved to Port Huron, Michigan, where Samuel Edison, Thomas' father, ran a grain and lumber business.

Young Tom Edison seemed to be slow in school--"addled" his teachers called him--but this situation seems to have been more the result of Thomas's failure to conform to the rigid rote systems of American schools than any real lack of intelligence. Tom was taken out of school and taught by his mother for some months. The boy had acquired an overwhelming distaste for mathematics, but a consuming interest in chemistry. He established a small business of selling newspapers, tobacco, and candy, and used the profits to buy a small laboratory, which he installed in the baggage car of the train in which he did his business.

During his early teens, Tom read voraciously and studied the art of sending and receiving telegraphic messages. A by-product of his efforts was the development of the habit of staying awake for long periods of time.

In 1868, while working for the Western Union Telegraph Company in Boston, Edison took out his first patent--for an electrographic vote recorder. In the following year, he patented the stock ticker. From money earned in various enterprises, Edison then set up an "invention factory"--a sort of research laboratory for new devices. He was soon acquiring patents in rapid succession. He devised means of creating quadruplex telegraphy (sending several messages at the same time over the same cable). He improved on Bell's telephone by developing a carbon transmitter. After he moved his laboratory to Menlo Park, N.J., he produced the phonograph and followed that fantastic creation with patents for improvement of the device.

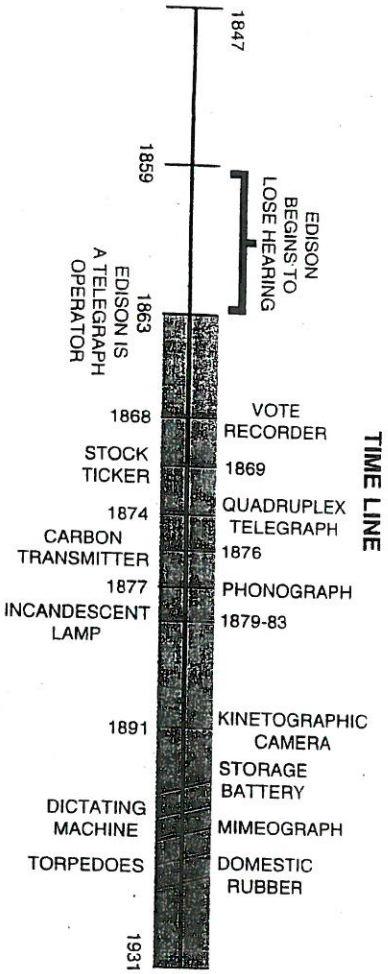
Edison did not invent the incandescent lamp, but he did make one which was usable. Experiments on the electric light had been carried on in England in the 1840s, but Edison perfected the blend between a carbon filament and the vacuum bulb, thus allowing for the first lighting system in New York in 1882.

Nor did Edison invent the first successful movie projector--Thomas Armat did--but Edison bought the patent for it and actually began the movie industry.

There are many interesting facets to Edison's life. He invented the vacuum tube, necessary to early radio, but he could see no immediate value to the device and ended his work on it. He worked on the storage battery, the dictating machine, and the mimeograph prior to World War I. During the war, he conducted research upon torpedoes, flame throwers, and periscopes. He also worked with Henry Ford and Harvey Firestone on a project to produce rubber from domestic plants--a project which was revived in World War II.

Edison was a practical inventor. He created items which seemed to him to have an almost immediate use in the home or in business. It is doubtful that he could ever have understood the principles of the Einstein theory or other abstract physical laws. He was, in a way, a "genius," and yet, as he stated it, his inventions came from "two percent inspiration and ninety-eight percent perspiration." He did work twenty hours out of almost every day in his life and set aside only one day a year to be with his whole family--Independence Day.

One must remember that all of this was accomplished with the handicap of severe deafness. The supreme lesson of Edison's courage and fortitude is shown in a single example. He could not hear many of the sounds which came from his own invention, the phonograph. To get the sense of what the recording was like, Edison had to bite the edges of the set in order to obtain vibrations through his teeth. He was, indeed, a remarkable man.



Readings

Dyer, F. L., Martin, T. C., and Meadowcroft, W. H.
Edison, His Life and Inventions

Hammond, J. W.
Men and Volts

Jaffe, Bernard
Men of Science in America

(Note: Hollywood produced several movies on the life of Edison during the 1930s. While there are some exaggerations, on the whole these productions adhere to the outline of Edison's life.)

7pts each ½ each blank

HISTORICAL FACTS

1. Thomas Alva Edison, America's premier inventor of the nineteenth century was handicapped. He was severely _____.

2. He was born in _____ in 1847.

3. His family moved to _____ where Samuel Edison, Thomas' father, ran a grain and lumber business.

4. Young Tom Edison seemed to be _____ in school--"_____" his teachers called him.

5. Tom was taken out of school and taught by _____ for some months.

6. He had a dislike for _____, but a consuming interest in _____.

7. During his early teens, Tom _____ all the time and studied the art of sending and receiving telegraphic messages.

8. In 1868 Edison took out his first patent for an _____.

9. Edison set up an "_____," a sort of research laboratory for new devices.

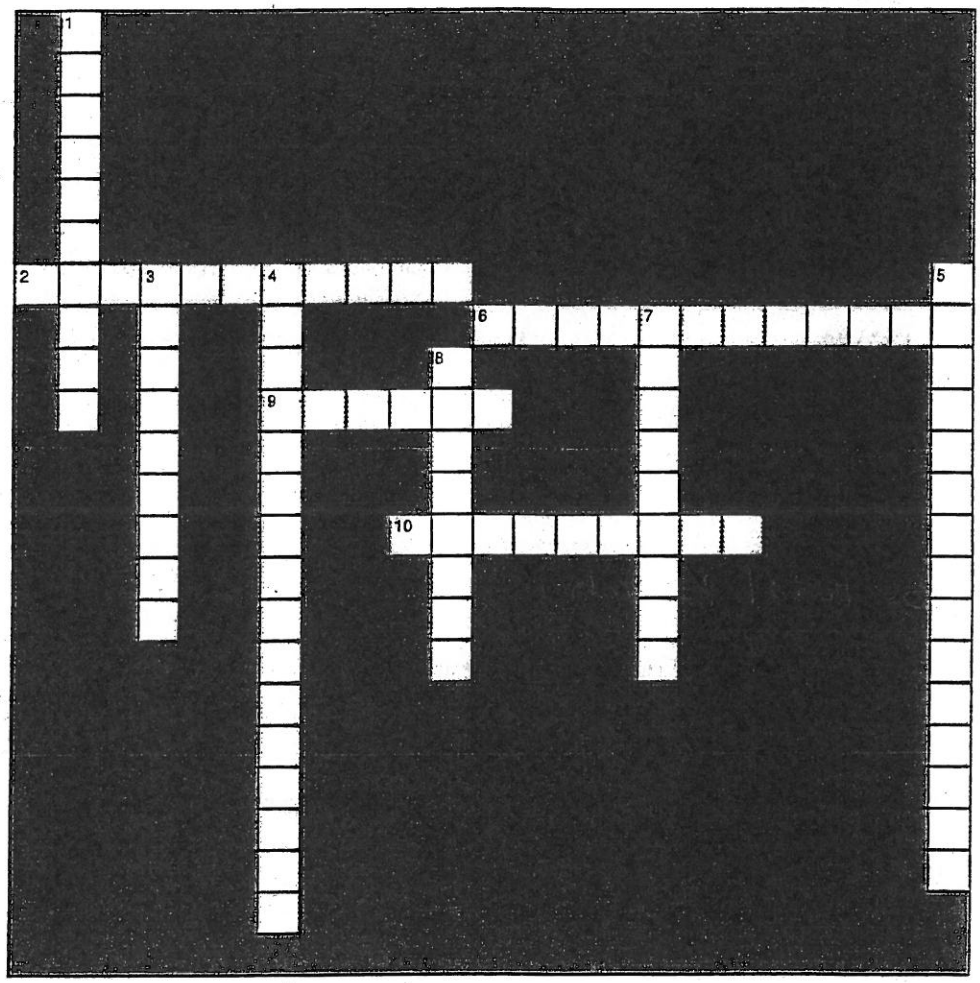
10. Edison did not invent the _____; but he did make one that was usable.

11. Edison was a _____ inventor. He created items which seemed to him to have an almost immediate use in the home or in business.

12. His inventions, in his words, came from "_____ _____."

Thomas Alva Edison

Use the information in the biography to help you answer the questions on the following page. Place the answers to the crossword clues in the puzzle below.



Thomas Alva Edison--Crossword Clues

5 pts total
1/2 each

ACROSS

2. Edison's second patent was for the ___ ___.
6. Edison said genius was "two percent inspiration and ninety-eight percent ___."
9. His teachers thought Edison was "___."
10. Edison set up an "___ factory."

DOWN

1. Edison invented the ___ ___, necessary to early radio, but stopped work on it because he could see no immediate use for it.
3. Young Edison had a consuming interest in what subject?
4. Edison didn't invent the ___ ___, but he did make one which was usable.
5. Only day of the year Edison set aside to be with his whole family.
7. Edison was a ___ inventor, and created items that had immediate uses.
8. Edison was handicapped by severe ___.

Thomas Alva Edison--Crossword Clues

ACROSS

2. Edison's second patent was for the ___ ___.
6. Edison said genius was "two percent inspiration and ninety-eight percent ___."
9. His teachers thought Edison was "___."
10. Edison set up an "___ factory."

DOWN

1. Edison invented the ___ ___, necessary to early radio, but stopped work on it because he could see no immediate use for it.
3. Young Edison had a consuming interest in what subject?
4. Edison didn't invent the ___ ___, but he did make one which was usable.
5. Only day of the year Edison set aside to be with his whole family.
7. Edison was a ___ inventor, and created items that had immediate uses.
8. Edison was handicapped by severe ___.

Date: 6pts total ½ each Name: _____

Thomas Alva Edison

Unscramble the words below. They are all associated with this hero in some way.

Scrambled List	Unscrambled List
1. RTCEOEDERVOR	_____
2. FOEMREASRHWTL	_____
3. RTAAGOSTTBYEER	_____
4. NOAPHHGOPR	_____
5. DTPOOERES	_____
6. GPOMRIMAHE	_____
7. CNMHTICGAIAETIDN	_____
8. CCSIREKKTOT	_____
9. ENCNASETILNCPDAM	_____
10. RECEIPOSPS	_____
11. SRBRUTDEBEOMCI	_____
12. UEUMUCTVBA	_____

Word List

VOTE RECORDER	TORPEDOES	MIMEOGRAPH
DICTATING MACHINE	STORAGE BATTERY	PHONOGRAPH
FLAME THROWERS	DOMESTIC RUBBER	STOCK TICKER
VACUUM TUBE	INCANDESCENT LAMP	PERISCOPES

INVENTIONS

Thomas Edison was called the Wizard of Menlo Park because he and the people working in his Menlo Park, New Jersey, laboratory produced over 1,000 inventions after the Civil War. The greatest was the electric lightbulb. Edison also invented the phonograph and one of the first motion picture cameras.

Edison was not the only inventor hard at work between the middle 1800s and into the early twentieth century. Alexander Graham Bell invented the telephone in 1876. Guglielmo Marconi (gool-YEL-moh mar-COH-nee), an Italian, invented the wireless telegraph, which led to radio. The American press gave huge coverage to Marconi's experiment in which a signal from England was received in North America. And Dr. John Kellogg invented cornflakes! His first cold cereal went along with other inventions that made food easier to keep and prepare, such as home canning and refrigeration.

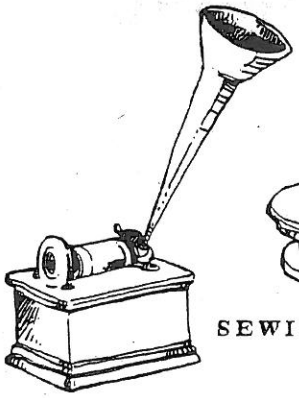
These and many other inventions helped a great change to come about called the Industrial Revolution. This revolution was a change from work done by hand to work done by machines. The Industrial Revolution was first set in motion in England, where the steam engine was invented. The first American factories, built in the early 1800s in New England, spun yarn and wove cloth using power from a wheel turned by water. Beginning in the middle 1800s, steam engines powered factories, boats, and trains. In Pennsylvania, Edwin Drake first drilled for oil that was used to grease the engines and served as a valuable fuel. Trains began to roll on steel rails instead of iron because the new Bessemer process created long-lasting steel more quickly and cheaply than old-style steel. Strong steel lay at the heart of many inventions, from the typewriter to the skyscraper to the barbed wire used especially by farmers and ranchers in the west.

Across

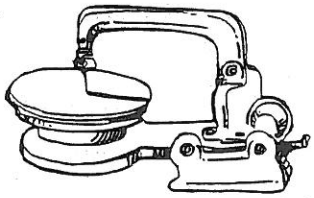
½ each 9pts total

2. Last name of the inventor of the cornflake
6. The Industrial _____ expanded in the United States after the Civil War.
9. Kind of wire used to keep animals in or out
12. Edison invented the _____bulb.
14. This invention helped people talk over long distances.
15. Process that made steel quicker and cheaper to produce
16. Edison was called this as a nickname.
17. Tall building based on a steel frame
18. Last name of first person to drill in the earth for large amounts of oil

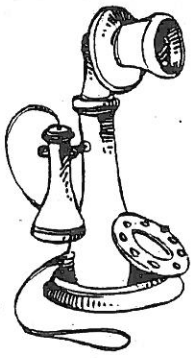
Some Inventions of the 19th Century



PHONOGRAPH, 1863



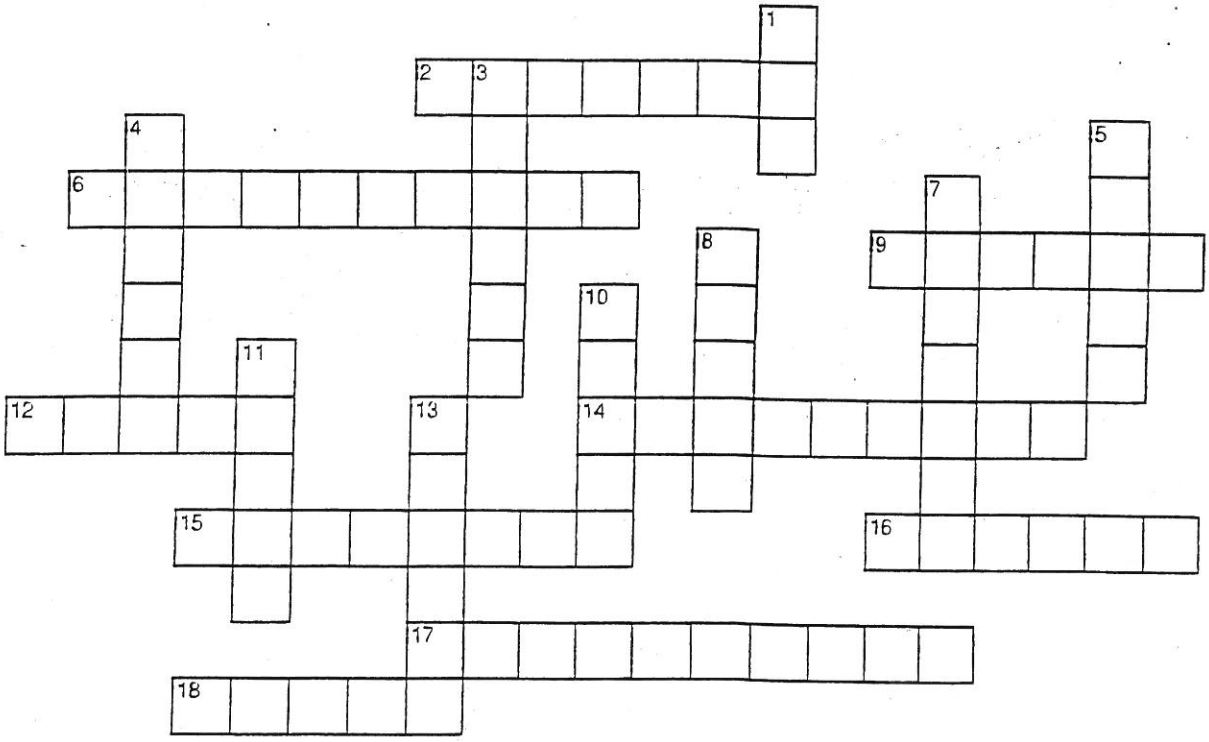
SEWING MACHINE, 1846



TELEPHONE, 1876

Down

1. Initials of the inventor of the telephone
3. Last name of the inventor who, with his laboratory partners, invented over 1,000 things
4. With a _____ machine, clothes could be made more quickly.
5. Substance that powered engines in the second half of the 1800s
7. Last name of the inventor of the wireless telegraph
8. Made of steel, these were laid all over the United States after the Civil War.
10. Substance that powered the first American factories
11. Strong, long-lasting material used in many inventions
13. Oil was used to _____ engines so they would run smoothly.



Word List:

AGB Drake light Sewing telephone
barbed Edison Marconi skyscraper water
Bessemer grease rails steam
Kellogg Revolution steel wizard

Name _____ Date _____

20

Granville T. Woods

African-American Inventor

Known as the "Black Edison," the brilliant Granville T. Woods devoted his life to improving transportation and communication through his inventions.

At one time, Granville T. Woods (1856–1910) was among the most respected African Americans in the nation. His inventions helped several companies make huge leaps forward in communications and electronics. In addition to the patents other companies bought from him, Woods held over 60 patents in his own name.

On the Road Woods was born in Ohio five years before the outbreak of the Civil War. Even though he lived where slavery was illegal, racism was still a problem. African Americans had to struggle for opportunities. During the day, Woods worked in a shop that made tools and parts for machinery. In the evenings, he attended a segregated school.

By the time he was sixteen, Woods decided to make his own way in the world. He moved to Missouri and worked on the railroads as an engineer and fireman. From there, he moved to Illinois, where he worked in a steel mill and a machine shop. After Illinois, he moved to New York City to continue his education in mechanical engineering. Just as he had as a young boy, Woods worked in a machine shop by day and went to school at night.

In 1884, Woods moved to Cincinnati and opened a machine shop with his brother. In the same year, he filed a patent for his first invention. He had designed a steam boiler furnace more efficient than any that then existed.

Helping People Woods's next invention was a transmitter that helped send messages along telephone wires. He sold this patent to a large telephone company. The company also bought Woods's third invention—a device that allowed voices to be transmitted over wires that had previously been used to send Morse code.

This success inspired Woods to start his own company, Woods Electric. In 1887, the government granted him patents for seven more inventions. One would save thousands of lives. It was a device that warned train engineers when another train was coming in the opposite direction on the same track. Woods also created systems that would allow trains to be powered by overhead electric lines. These lines would provide power to American cities' first subways and trolleys.

Not all of his inventions were so serious, however. Woods created a series of electric tracks for miniature cars at amusement parks. These rides are still popular at theme parks all over the United States. For farmers, Woods invented an incubator that kept eggs at stable temperatures. This invention helped the poultry industry and made chickens and turkeys a more important part of the American diet.

At the turn of the century, Woods returned to New York City. He saw a city that was being transformed by the power of electricity. But most of the electric wires were extremely dangerous, and electrocutions were common. Woods set out to make sure that the new technology was as safe as possible. In 1900, he invented a device called a circuit breaker that greatly reduced the number of people who were shocked by the city's wiring.

Challenges Unfortunately, Woods's inventions and patents were not always treated with respect. In 1892, a wealthy white man accused Woods of stealing one of his inventions. Woods knew that the man would try to use his wealth to scare him into giving up before the case went to court. Woods also knew that U.S. courts did not always treat African Americans fairly. Even so, Woods refused

to be intimidated. When he would not back down, the man's business threatened to get involved. Woods fought back. He claimed that the company was attempting to steal his inventions and patents.

Woods's charges were the chance the company was looking for. They filed charges in court against Woods, saying he was guilty of libel—that is, saying things about a person that are not true. The court sided with Woods's accusers. The judge then ordered Woods arrested because when he was questioned about the case, he had no money in his pockets. He was charged with vagrancy, a law that applies to beggars who are harassing people.

Woods sat in a cell for several days before his jailers released him. This was not the end of Woods's legal problems, however. Thomas Edison also filed a lawsuit against Woods. He claimed that Woods had stolen one of his inventions for train communications.

Woods successfully won the lawsuit. Even so, the suit cost him a great deal of money. Trying to make things right between them, Edison offered Woods a job. Woods declined, however, because he was not sure he could trust Edison. From that point on, Woods was extremely careful about which companies he approached with his inventions.

In all, Woods was responsible for thirty-five inventions that modern scientists credit as being crucial to the way electronic devices operate today. Even so, the lawsuits took their toll. Historians note that much of Woods's money was spent on legal defenses.

Pauper's Funeral By the time Woods reached the age of fifty-four, his health began to fail. But he had no money to get the medical attention he needed. He had spent most of his money defending himself against those who had tried to take unfair advantage of him. A friend helped Woods to New York's Harlem Hospital on January 28, 1910. Two days later, the great inventor was dead. In spite of his contributions to society, Woods died penniless.

A meager service was held and he was buried in St. Michael's Cemetery on February 3. There was no wife or family to attend because he had never married. It was a sad ending for one of the brightest men ever to serve his country in the field of science and technology.

During the Civil Rights Movement of the 1960s, African Americans became eager to learn more about their past. Their research led to the rediscovery of Granville T. Woods and his work. In 1969, an elementary school in New York City was named after Woods. In 1974, the governor of Ohio, where Woods had been born, officially recognized his contributions to the fields of science and technology. Today, universities all across America recognize Woods as one the fathers of modern electrical science.

Name: _____

Class: _____

Granville Woods
Questions

1/2 1. How many patents did Woods hold in his own name?

1 2. Where and when was Woods born?

1/2 3. He was born a free man to free parents, but _____ was still a problem.

1/2 4. The school he attended at night was segregated. What does this mean?

1/2 5. When he was sixteen he moved to Missouri and worked in what industry?

1/2 6. In Illinois he worked in a steel mill and mechanics shop. He then went to New York to learn more about _____.

1 7. *In what year* did he patent his first invention? *What was that invention*?

1/2 8. What company did Woods start?

1/2 9. His 1887 patent saved many lives. What was it?

1/2 10. How did an invention of Woods' impact America's cities?

1/2 11. What important device did Woods invent in 1900?

1/2 12. Why did Woods not become wealthy from his inventions?

1 13. How old was he when he died, and under what conditions did he die?

1/2 14. How did Woods become well known again many years after his death?