THE CONSTITUTION OF THE UNITED STATES OF AMERICA

GREAT AMERICANS AND THEIR ACHIEVEMENTS

LESSON 04 SESSION 06

4.15 Eli Whitney, a pioneer of modern industry

4.15.1 Invention of the cotton gin.

A school-teacher from Massachusetts living in Georgia in 1793 invented a machine called the cotton gin, by use of which a negro could easily clean 300 pounds of cotton a day, demonstrating thereby, as no previous invention had done, the value of machinery in replacing or augmenting manual labor. The whole question of cotton production and cotton manufacture was changed through the use of this invention.

Previous to the invention of the cotton gin, cotton yarns were spun and woven into cloth by hand in private homes. Necessarily, by this slow method of manufacture, but small quantities of cotton were used.

4.15.2 Development of cotton industry.

So rapid was the development of the industry, stimulated by this new "gin," that within the next 20 years exports of cotton to Liverpool increased tenfold.

As a result of this invention a cotton factory was erected in Massachusetts to produce cloth like that made in England. Here was constructed the first loom operated by water power in America. In 1814 there was built at Waltham, Mass., the first cotton mill in the world, in which the raw material direct from a Whitney cotton gin was spun into thread, woven into cloth, and printed with colors, all under one roof.

4.15.3 Influence on country.

The production of cotton was stimulated and made one of the leading industries of the country. Cotton exports enormously increased; allied industries developed; communities grew rapidly into cities.

The invention of the cotton gin created unforeseen social, economic, arid political conditions; it largely put a stop to the discussion of slavery; the southern planters

and northern manufacturers of cotton found it to their mutual interest to keep the Negro in bondage, since by his labor they were rapidly growing rich.

Due to climatic conditions the manufacture of cotton goods was carried to New England, thus opening a new channel of employment, causing in following years a radical change in the nationality of the citizens of these Northern States.

4.15.4 Interchangeability of mechanical parts.

While Whitney was the inventor of the cotton gin, because of the theft of his model and tools from the shed in which he conducted his experiments, he was not enabled to perfect his invention.

He instituted the interchangeability of parts which has greatly influenced modern industry. In 1798 he secured a contract from the Government for the manufacture of firearms, being "the first to effect the division of labor by which each part was made separately." It was from this invention that he made his fortune.

4.16 Robert Fulton, a pioneer of steam navigation

It is proper and fitting to designate Robert Fulton as the pioneer of modern transportation by reason of his success in driving the *Clermont* in the year 1807, against the current of the Hudson River from New York City to Albany.

4.16.1 Other inventors.

It is true that no less than eight men had at various times and places propelled boats by steam power prior to this accomplishment by Robert Fulton, yet none of them carried out their experiments to a successful issue.

Fulton's success was largely due to his cleverness and ingenuity coupled with the fortunate circumstance of a partnership formed with Robert Livingston, a man of wealth, also interested in solving the problem of steam navigation.

4.16.2 Legislative grant.

Livingston was so sure of final success through his own various experiments as to induce the Legislature of the State of New York to pass a bill granting exclusive right to navigate the waters of that State by steam power upon condition that a boat of 20 tons be driven by steam at a minimum speed of 4 miles an hour against the current of the Hudson, this feat to be accomplished within one year from the date

of grant. He failed in his effort. Later ho was appointed minister from the United States to France.

4.16.3 The "submarine".

In 1803, while in Paris, Fulton demonstrated his "submarine" in the River Seine. Encouraged by the success of this experiment, Fulton and Livingston ordered a steam engine from Watt & Boulton in England, to be shipped to America, where Fulton found it on his return in 1806.

4.16.4 The "Clermont."

In the following year the Clermont was built and launched in East River. Its successful trip opened the way to a complete revolution of water transportation. Within the next few years, so rapid was the adoption of this new method of travel, steamboats came into use upon the principal rivers and the Great Lakes, rendering splendid assistance in establishing easy communication between distant sections of our country traversed by the great waterways.

4.16.5 Progress in water transportation.

To fully appreciate the value of the contribution made by Fulton and Livingston to the economic development and enrichment of America, one has only to review the remarkable progress made in water transportation, contrasting the present accomplishments with those of 100 years ago.

Through his vision, patience, and persistence he found success where others had failed, and in so doing opened the way to the rapid development of this mighty agency in the advance of civilization.

4.17 Samuel F. B. Morse, a pioneer of modern communication

Without our present facilities of communication, modern civilization could not continue. Deprived of telegraph, telephone, and radio, the wheels of industry would be stopped and the economic welfare of nations destroyed. We cannot too greatly emphasize this benefaction conferred upon all people through the accomplishment •of Samuel Morse and the brilliant men who followed him with improvements upon his basic invention, the telegraph.

4.17.1 Opening of the Erie Canal.

Morse trained himself to think. Of all the thousands whose attention was engaged by the opening of the Erie Canal in 1825, he alone caught the significance of the passage of time in relaying the message heralding that event. The signal was delivered by cannon placed at intervals between Buffalo and New York City, the successive reports of which, conveyed from one emplacement to the next, consumed one and a half hours of time in delivering the message a distance of 500 miles.

4.17.2 Invention of the telegraph.

Reason and logic compelled him to believe that electricity made to travel many miles over a copper wire in an instant of time could by some method be interrupted in its passage so as to produce certain signals susceptible of interpretation.

Busy in his profession as an artist in London, Italy, France, and at home, the idea of the control of electricity ever persisted in his mind. With the passage of years his patience was rewarded with the invention of a crude telegraphic instrument and a system of dot and dash signals to be used therewith. Forming a partnership with Alfred Vail, they labored together in the perfection of the device until their funds were exhausted.

4.17.3 Appropriation from Congress.

Undismayed, their persistent appeal to Congress for assistance was finally rewarded with an appropriation of $80,000 for the erection of a telegraph line a distance of 40 miles between the cities of Baltimore and Washington. With the completion of its construction, on the morning of May 24, 1844, in the presence of the chief officers of the Government, in the Supreme Court room of the Capitol, Professor Morse, operating the key of his instrument, successfully transmitted to the wonder of all present that first and memorable message, "What hath God wrought?"

4.17.4 Improvement and amplification.

Morse was a man of vision. He predicted the day when telegraph lines would span the earth and bridge the seas, yet even his far-seeing mind could never have encompassed the stupendous results which have come from his creation as a rich boon to all mankind.

Men great in scientific accomplishments have followed with improvements and amplifications upon his invention. Alexander Bell and associates applied his principle in perfecting the telephone; Thomas Edison improved the technique as telegraph operator and inventor, following his own powers of deduction into still broader fields. Marconi and others enriched his creative efforts in the field of wireless communication. Each passing year witnesses' other improvements and accomplishment, all a living testimonial to Samuel Morse, the man of vision, who, standing apart from the crowd, sold himself to a great idea, persisted against all odds until his efforts were crowned with success.

4.18 Capt. John Ericsson, a pioneer of the modern battleship.

John Ericsson, a native of Sweden, directed his inventive genius to improvements in steam navigation. He claimed the invention of the screw propeller but was unable to prove priority.

Coming to the United States in 1839, he built the first screw propeller warship, the *Princeton.* This was the first steamship ever constructed with her boilers and engines below the water line and was the beginning of the steam marine of the world.

4.18.1 The "Monitor."

Ericsson would probably have remained unknown to the nation at large had it not been for his achievement during the Civil War. Using the revolving turret patents of Theodore Ruggles Timby, he combined a structure with all machinery below the water line, leaving the turrets alone exposed to attack. This small vessel, known as the *Monitor,* called in derision "The Yankee Cheese-Box," in its victory over the *Merrimac* made Ericsson famous in a day.

4.18.2 The Navy and Merchant Marine.

This caused a revolution in naval development among the world powers, increasing the effectiveness of fighting ships, thereby greatly strengthening the offensive and defensive forces of nations in proportion to their naval tonnage.

Through the genius of John Ericsson, the modern navy and merchant marine has become one of the greatest factors in the development and security of nations.

4.19 Maj. Walter Reed, the conqueror of yellow fever

Maj. Walter Reed, a surgeon in the United States Army, conducted a long series of experiments in Cuba and discovered the source of yellow fever to be in the Stigomyia

mosquito. The dream of his youth had been to bo permitted to alleviate in some degree the sufferings of humanity, and all his efforts, without a thought of self, were spent in striving toward this goal. Within a few months after this discovery, Havana, which had been ravaged by this disease for more than 150 years, was cleared of the disease.

4.20 Maj. Gen. William C. Gorgas, conqueror of malaria

Through the efforts of Maj. Gen. William C. Gorgas, who was in command of the medical and sanitary organizations of the United States Army in Panama, this pestiferous district was converted into a healthy region. The French enterprise on the Isthmus of Panama was completely wrecked by the fevers common to that region; 75 per cent of the employees from France died from the disease within a few months after they had landed on the Isthmus. As a result of the intensive efforts of Doctor Gorgas the situation was conquered, and Panama has become one of the healthiest spots on the continent.