Inventors and Scientists: Eli Whitney

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An engraving based off of a painting of inventor Eli Whitney, circa 1820-1830. Photo: Wikimedia Commons

Synopsis: Eli Whitney invented the cotton gin, a device that highly streamlined the process of extracting fiber from cotton seeds. With the patent for his device being widely pirated, Whitney struggled to earn any payment for his invention. He later went on to pioneer “interchangeable parts” systems of production.

Early Life

Eli Whitney was born on December 8, 1765, in Westboro, Massachusetts. He grew up on a farm, yet was attracted to machine work and technology. As a youth during the Revolutionary War, he became an expert at making nails from a device of his own invention. He later crafted canes and ladies’ hatpins, recognizing opportunity when it arose.

Creation Of Cotton Gin

Whitney attended Yale College from 1789 until he graduated in 1792, and considered becoming a lawyer. Upon graduation, Whitney was hired to be a tutor in South Carolina. On his way to his new position via boat, he met Catherine Greene, the widow of a Revolutionary War general. Once Whitney found out that his original tutoring salary was to
be halved, he refused the job and instead accepted Greene's offer to read law at her Mulberry Grove plantation. There he met Phineas Miller, another Yale graduate, who was Greene’s fiancé and manager of her estate.

Greene soon learned of the lack of a money crop in the immediate area. Though green-seed cotton was widely available, it took hours of manual labor to properly clean the seed and extract the fiber. With Greene’s support, Whitney built a machine that was able to quickly and efficiently clean the cotton. His machine used a system of hooks, wires and a rotating brush.

When Whitney demonstrated his new cotton gin (“gin” being short for engine) to some fellow inventors, the reaction was immediate. The device could clean more cotton in an hour than what could be produced by multiple workers in a day. Local planters took to the widespread planting of green-seed cotton, immediately straining existing methods of production.

**Pirated Patent And Slavery**

Whitney and Miller patented the gin in 1794. They planned to install gins throughout the South and charge farmers two-fifths of resulting profits. However, farmers began creating their own version of the gin. Whitney spent years in legal battles. By the turn of the century, he agreed to license gins at an affordable rate. Southern planters were ultimately able to reap huge financial windfalls from the invention while Whitney made almost no profit, even after he was able to receive cash settlements from various states.

By the mid-1800s, Southern cotton production had risen by a stratospheric amount from production in the previous century. More than 1 million bales of cotton were produced by 1840. With people needed to harvest the crop, greed fueled a dehumanizing slaveholding culture, with around one-third of the U.S. Southern population enslaved by 1860.

**Interchangeable Parts**

Whitney’s next big venture would involve the production of weapons and championing the interchangeable-parts system. With a potential war with France on the horizon, the government looked to private contractors to supply firearms. Whitney promised to manufacture 10,000 rifles within a two-year period of time, and the government accepted his bid in 1798.

At the time, muskets were usually built completely by individual craftsmen, with each weapon having its own distinct design. Setting up base in Connecticut, Whitney built machines that would allow workers to slice metal using a pattern, producing one particular, specific part of a weapon. When put together, each part, though made separately, became a working model.
Whitney still faced many challenges with this new system. After the first few years of production, he was able to produce only a fraction of the promised order. It took 10 years for him to complete the manufacture of 10,000 arms. Yet even with the delay, Whitney soon received another order for 15,000 muskets, which he was able to supply in two years.

There is record of other inventors having come up with the idea of interchangeable parts. In addition, there is some skepticism on how truly interchangeable each musket piece was that came from the initial Whitney machines. Nonetheless, Whitney is credited with pushing Congress to support weapons production and helping to spread a manufacturing system that has influenced modern assembly lines. His pursuits have often led him to be called “the father of American technology.”

Whitney also constructed a group of worker residences that would come to be known as Whitneyville, Connecticut. He instituted a series of moral guidelines meant to promote harmonious employee-employer relations, with roots in Puritanical beliefs. The guidelines he presented would later be ignored as industrialization took on a harsher regard for worker well-being.

**Personal Life**

In 1817, Whitney wed Henrietta Edwards. The couple would have several children, with Eli Whitney Jr. continuing to work in his father’s manufacturing business as an adult. The elder Whitney died on January 8, 1825, in New Haven, Connecticut.
Quiz

1. Read the sentence from "Creation Of Cotton Gin."

Local planters took to the widespread planting of green-seed cotton, immediately straining existing methods of production.

Which word is MOST similar in meaning to "straining" as it is used in the sentence above?

(A) improving  
(B) demanding  
(C) implementing  
(D) weakening

2. Read the sentence from "Pirated Patent And Slavery."

Southern planters were ultimately able to reap huge financial windfalls from the invention while Whitney made almost no profit, even after he was able to receive cash settlements from various states.

Which of the following BEST explains the meaning of "windfalls?"

(A) unexpected burdens  
(B) sudden advantages  
(C) necessary cutbacks  
(D) successful lawsuits

3. Which of the following BEST describes Whitney’s reaction to farmers creating their own versions of the cotton gin?

(A) unimpressed  
(B) appreciative  
(C) optimistic  
(D) begrudging

4. What led to an increase in slaveholding between 1840 and 1860?

(A) the lack of laborers available for tobacco harvesting  
(B) the large amount of cotton being produced  
(C) the automation of weapons manufacturing  
(D) the need for soldiers in the potential war against France