



**W**hen the first settlers arrived in North America in the seventeenth century, iron tools, weapons, and cooking implements were staples of Northern European life. Unwilling to rely on imported objects from Europe, the early colonists established their own integrated ironworks in Saugus, Massachusetts in 1646. All of the natural resources needed for iron production were available in abundance in Pennsylvania, and production began in 1716. The high quality of the resources made Pennsylvania iron among the best iron in the world.

The first ironworks were established in Berks and Chester Counties, but by 1767 entrepreneurs saw the potential for great profits in the sparsely populated area west of the Susquehanna. After the American Revolution, 83 new iron works were established in Pennsylvania with 30 percent of

the new growth concentrated in the center of the state.

In the 1770s and 1780s, prominent Philadelphians bought large quantities of land in Centre County. In the spring of

1792, Centre Furnace, located on this site, went into blast and became the first major operation in what was then Northumberland and Mifflin Coun-

## THE Centre Furnace STORY

ties. When Centre County was formed in 1800, it was named for Centre Furnace.

Other businesses quickly followed and by 1850, the “Juniata Iron Region” boasted 48 furnaces and 42 forges. The Region consisted of Blair, Centre, Clinton, Huntingdon, and Mifflin Counties with the greatest concentration of ironworks in Huntingdon and Centre. Until the rise of coal and coke iron making, this Region produced more iron than any other in the nation.

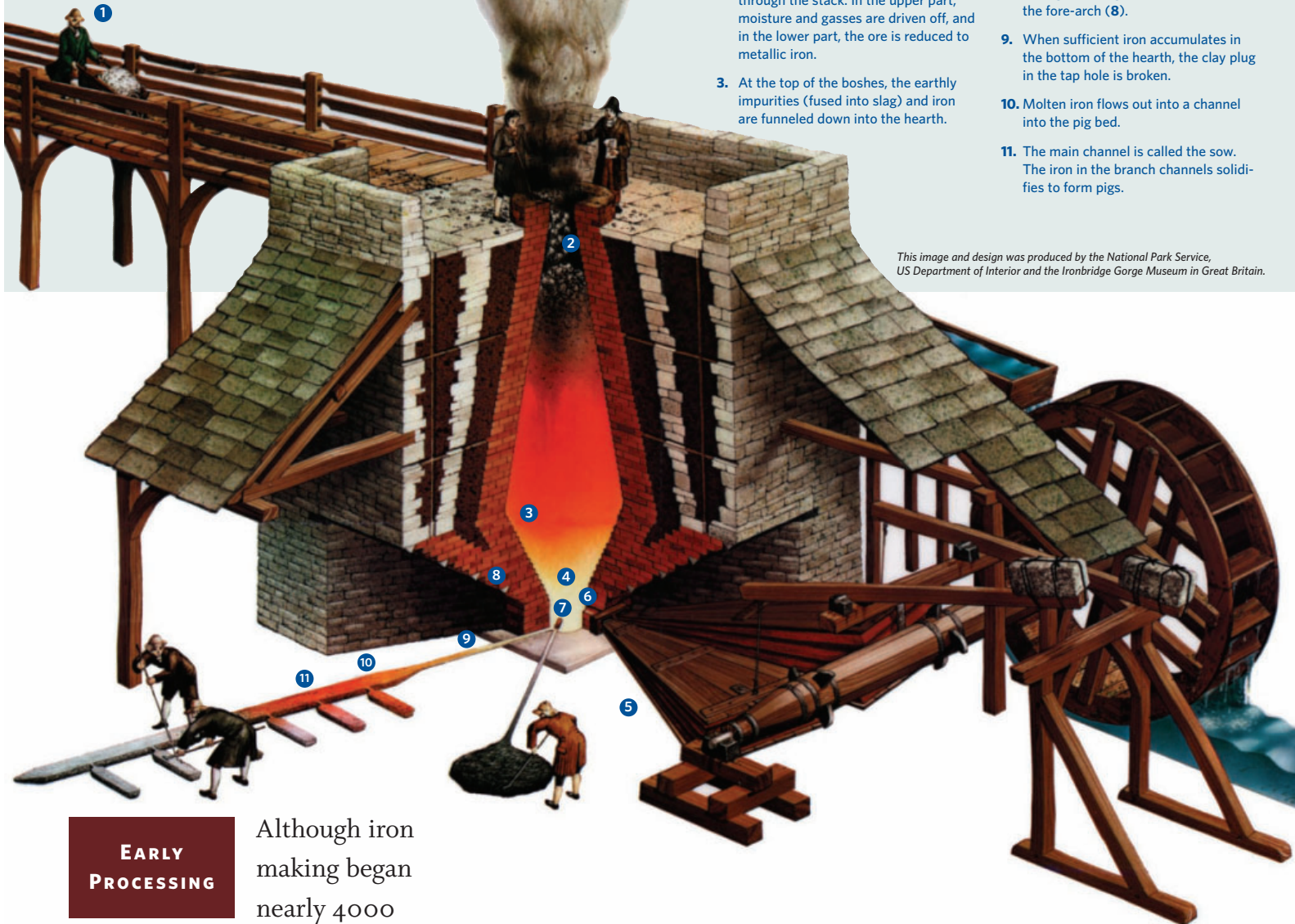
*The Centre Furnace iron stack was used as a limekiln after iron production ceased in the 1850s.*

# Ironmaking Explained

## KEY TO ILLUSTRATION

1. Men and boys on the charging bridge tip raw materials from baskets and barrows into the blast furnace.
2. The furnace works continuously with iron ore and charcoal descending through the stack. In the upper part, moisture and gasses are driven off, and in the lower part, the ore is reduced to metallic iron.
3. At the top of the boshes, the earthy impurities (fused into slag) and iron are funneled down into the hearth.
4. Slag floats on top of the metal.
5. The water-powered bellows blows air into the hearth through the tuyere (6).
7. At intervals the slag is drawn off through the slag notch at one side of the fore-arch (8).
9. When sufficient iron accumulates in the bottom of the hearth, the clay plug in the tap hole is broken.
10. Molten iron flows out into a channel into the pig bed.
11. The main channel is called the sow. The iron in the branch channels solidifies to form pigs.

*This image and design was produced by the National Park Service, US Department of Interior and the Ironbridge Gorge Museum in Great Britain.*



## EARLY PROCESSING

Although iron making began nearly 4000

years ago in Asia, the Europeans made the greatest advances in technology by building the first blast furnace in England circa 1490. Shaped like a pyramid with the top point removed, it had a cone-shaped interior called a “bosh” where the iron and other ingredients were heated. The furnace stack, and the process, remained the same for hundreds of years, and making iron at Centre Furnace followed the same principles as those that preceded it.

**Iron making required four main raw materials: iron ore, limestone, trees and water.**

**IRON ORE** — Iron exists in nature as ore, a combination of iron and other elements such as hematite or magnetite. Common in Centre County, this type of iron ore contained a low percentage of impurities which produced pig iron of an exceptional quality. Since it was found at or near the surface, the principle method for obtaining it was to “open cut” or surface mine it. Referred to locally as “raising the ore,” it was the method most commonly used throughout the region. Miners took the ore from ore pits or banks. Many of them were in the Barrens, which encompassed a large area from present day Park Forest to Scotia and into Halfmoon Township. Please see the hearth for an example of Centre County iron ore.

**TREES** — In order to be useful, iron ore must be smelted. The fuel that powered this process was charcoal, commonly referred to simply as “coal.” Great quantities of trees are needed to make charcoal, and Centre County had

a seemingly endless supply of forest tracts. The most common process of making charcoal was to burn it in “heaps.” The men, called colliers, carefully and tightly stacked up to 50 cords of wood (25 cords = 1 acre of land) in a large rounded conical pile, like the one pictured here, and sealed the pile with leaves and dirt. The collier lit the stack and let the pile smolder for two weeks until pure carbon charcoal was all that remained. Evidence suggests, however, that the charcoal used at Centre Furnace was sometimes burned in “pits” rather than heaps. Regardless of the method, approximately an acre a day was consumed for this reason and



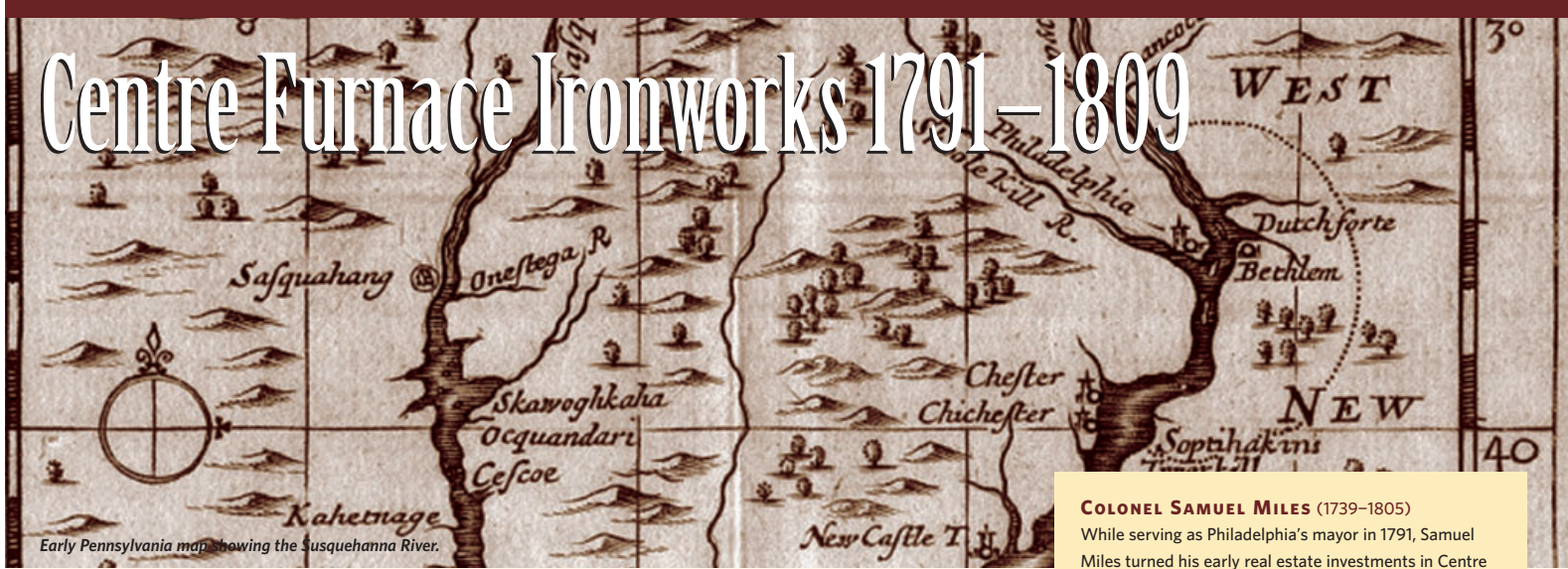
the workers had to travel further from the furnace stack as the supply was nearly decimated. Please see the hearth for an example of charcoal.

**LIMESTONE AND WATER** — When iron ore and charcoal are tipped into the stack, limestone is usually added to act as a fluxing agent that aids in the removal of impurities from the ore. While Centre County is rich in limestone, it was not always used at Centre Furnace. Instead, the iron ore was simply “roasted” with charcoal before charging it into the stack.

Flowing water from Willy Brook, now called Thompson Run, powered a water wheel which pumped two large bellows. The bellows pumped the air through pipes called “tuyeres” into the furnace. The pressurized air kept the fire at the necessary 2700° Fahrenheit.

*Stacking a charcoal pit.  
Photo courtesy of the Pennsylvania Historical and Museum Commission.*

# Centre Furnace Ironworks 1791–1809

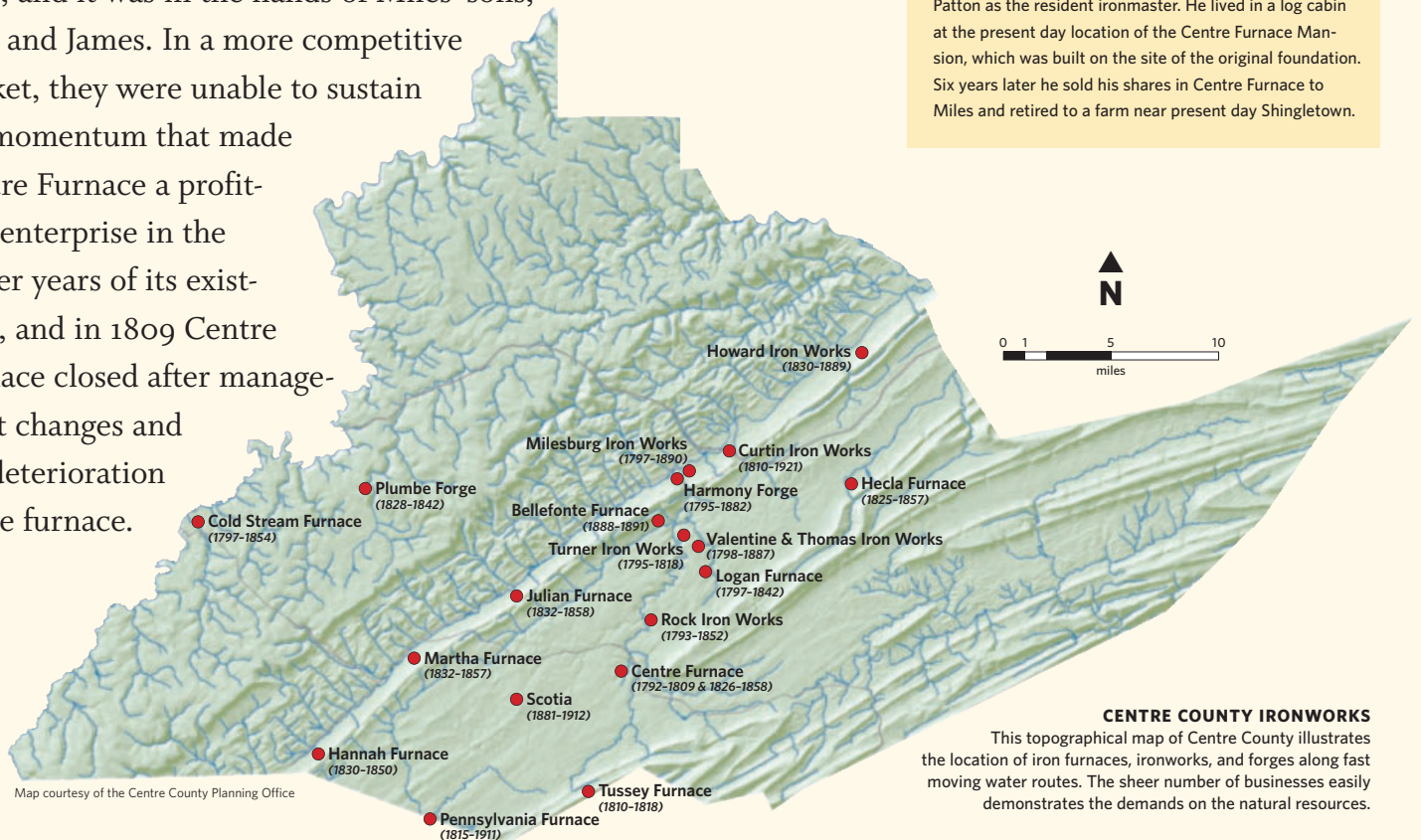


Early Pennsylvania map showing the Susquehanna River.

## THE STORY BEGINS

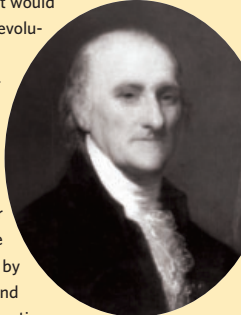
While the resources were plentiful, the success of Centre Furnace was not insured. Soon after it went into blast in 1792, it became clear that transportation of the iron to profit-bearing markets was going to be difficult. The price per ton was high in Pittsburgh, but the iron had to be transported via pack horse over rough terrain, which limited the quantity that could be shipped. The trip to Baltimore was far less difficult, but the price was quite low and cut into the profit margin considerably. However, several forges were soon established in Centre County, some by Miles and Patton, and Centre Furnace iron was processed locally.

By 1806, the original founders of Centre Furnace had passed away, and it was in the hands of Miles' sons, John and James. In a more competitive market, they were unable to sustain the momentum that made Centre Furnace a profitable enterprise in the earlier years of its existence, and in 1809 Centre Furnace closed after management changes and the deterioration of the furnace.



Map courtesy of the Centre County Planning Office

**COLONEL SAMUEL MILES (1739–1805)**  
 While serving as Philadelphia's mayor in 1791, Samuel Miles turned his early real estate investments in Centre County into a thriving business when he co-founded the first major ironworks in what would become Centre County. A Revolutionary War Colonel who served under George Washington, Miles was considered to be a fierce patriot, an excellent businessman, and one of the "richer men in the state." While he never resided in Centre County, he was represented in the area by his sons, Joseph and John, and invested heavily in iron production at Centre Furnace as well as iron casting in Milesburg, a town he founded in 1793.



Gilbert Stuart (American, 1755-1828)  
 Colonel Samuel Miles  
 Oil on panel  
 The Corcoran Gallery of Art, 09.11

**COLONEL JOHN PATTON (1745–1804)**  
 Although there are no extant images of Patton, who was also a Revolutionary War veteran, he was described as a man of "noble appearance and carriage, six feet tall with red hair and hazel eyes, and with polished manners." He moved to the region in 1789 to establish and build a furnace which became operational in May of 1792 with Patton as the resident ironmaster. He lived in a log cabin at the present day location of the Centre Furnace Mansion, which was built on the site of the original foundation. Six years later he sold his shares in Centre Furnace to Miles and retired to a farm near present day Shingletown.

**CENTRE COUNTY IRONWORKS**  
 This topographical map of Centre County illustrates the location of iron furnaces, ironworks, and forges along fast moving water routes. The sheer number of businesses easily demonstrates the demands on the natural resources.

# Centre Furnace Ironworks 1826–1858

The Centre Furnace Mansion in the 1880s. Panel design by David Lembeck.

## THE SECOND ERA

On February 26, 1826 it was announced in the *Bellefonte Patriot* that Centre Furnace would once again be operational in May of that year. John Miles, Samuel Miles' son, and Joseph Green Sr. entered into a partnership to begin iron production with Joseph Green Jr. as the manager. In 1828 it was sold to another partnership that included General James

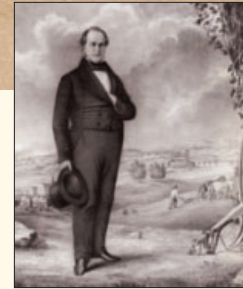
Irvin who became the sole owner in 1838. Soon after, he rebuilt the failing blast system and eight years later he replaced the entire furnace. This is the stack that still stands on East College Avenue and Porter Road.

In 1842 his brother-in-law Moses Thompson moved into the Centre Furnace Mansion with his family and assumed the role of ironmaster. Although Centre Furnace ceased production in 1858, a member of the Thompson family lived in the Mansion until 1912.



### THE DECLINE OF CENTRE FURNACE

The decision to stop making iron in 1858 was expected and unavoidable. The depletion of resources close to the stack required the costly transportation of ore and charcoal over greater distances. When easily mined iron ore from Minnesota's Mesabi Range became available and could be shipped east via the Great Lakes, and a new process (Bessemer) was invented for converting molten pig iron inexpensively into steel, the demise of central Pennsylvania's charcoal iron industry was inevitable.



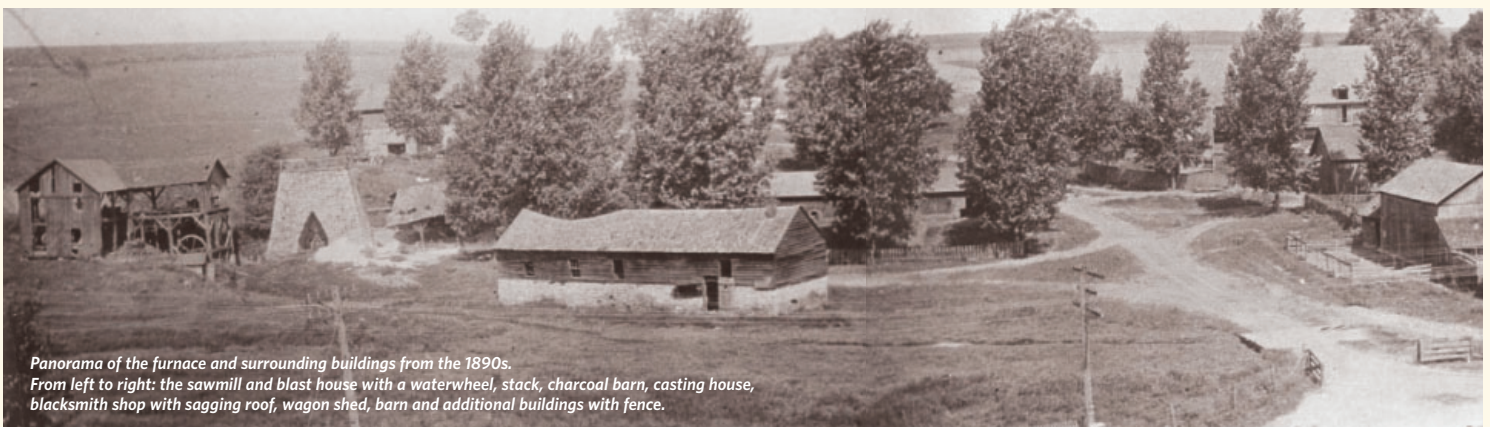
### GENERAL JAMES IRVIN (1800–1862)

Born in Linden Hall, Irvin was a prominent industrialist and politician who was known for his significant contributions to the improvement of transportation facilities. His abundant business and charitable ventures hastened his financial downfall in the panic of 1857, and he left Centre County to become a shopkeeper in Philadelphia. When his health began to fail, he returned to Hecla and died on November 26, 1862. Remembered as a "kind hearted and benevolent man who possessed high character and broad, practical intelligence" he was the most prominent figure in the second era of the history of Centre Furnace.



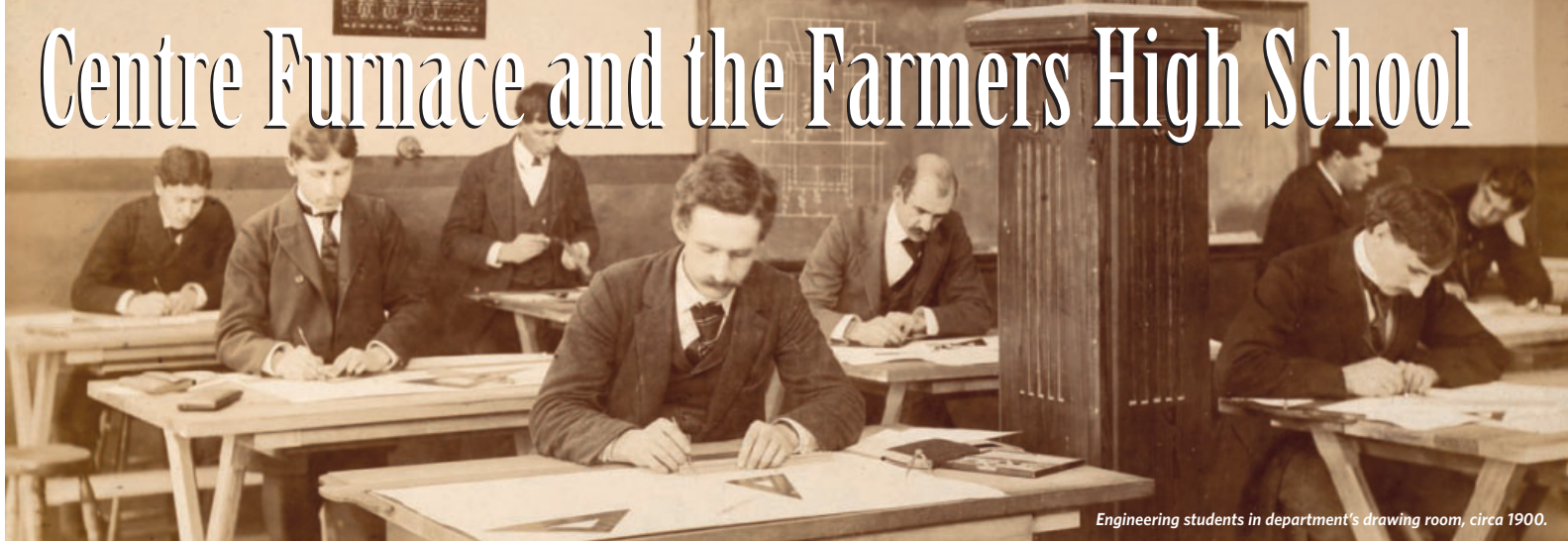
### MOSES THOMPSON (1810–1891)

Unlike his brother-in-law and business partner, Thompson was not a politician but a farmer, and he invested heavily in real estate. This allowed him to survive the financial panic of 1857, and at the time of his death he was the largest land owner in the County. He served as Treasurer for Penn State during its difficult early years and held official school business in the Centre Furnace Mansion on a regular basis. The interpretation of the Centre Furnace Mansion focuses on the Thompson family due to the duration of their ownership of the property and the important role they played in the history of Centre County.



Panorama of the furnace and surrounding buildings from the 1890s. From left to right: the sawmill and blast house with a waterwheel, stack, charcoal barn, casting house, blacksmith shop with sagging roof, wagon shed, barn and additional buildings with fence.

# Centre Furnace and the Farmers High School



Engineering students in department's drawing room, circa 1900.

## AGRICULTURE AND EDUCATION REPLACE IRON

The promotion of agriculture and the sharing of information was the impetus for the call of a new Farmers' High School by the Agricultural Society of Pennsylvania in 1855. James Irvin and Moses Thompson offered 200–250 acres of Centre Furnace land if the Society would choose Centre County as the location. While other offers from across the state included

more land, Centre County was chosen due in part to Irvin's political connections and the "safe" location in the center of the state with an equal distance to Philadelphia and Pittsburgh. The Mansion served as the hub of business and social affairs of the school, and the ratification papers were signed on the premises making the Centre Furnace Mansion the "birthplace of the Pennsylvania State University."



### ORIGINAL "OLD MAIN"

The Farmer's High School opened to students on February 19, 1859. It became the Agricultural College of Pennsylvania in 1862, the Pennsylvania State College in 1874, and the Pennsylvania State University in 1955. The original "Old Main" served as the dormitory, class rooms, library, and offices for the staff.



Students working next to Old Main circa 1860.