

FEATURING HISTORIC INDUSTRIAL IRON FURNACES MARYLAND & PENNSYLVANIA

STEP BACK IN TIME

Of all the factors that contributed to the industrial might of 20th-century America, none was more important than the development of a flourishing iron industry.

Successful iron production in the early decades of the United States required access to raw materials (iron ore, charcoal or coal, and limestone); a source of power (water, and later steam); and transportation (ox carts, roads, and bateaux), as well as skilled labor. Many furnaces employed both African Americans and European immigrants as part of a diverse and skilled workforce. Enslaved Africans, some of whom came from areas where ironworking was an ancient and revered profession, may have brought ironworking skills with them from Africa.

The diagram on the right illustrates the operation of a furnace, typically constructed of local field stone, with the chimney or "bosh" lined with firebrick. The process began by lighting a fire in the stack. Next, fillers poured raw materials in layers into an opening (called the charging arch) at the top of the chimney: first charcoal, then iron ore, then the limestone flux. The job of a filler was one of the hardest and hottest furnace jobs. Heat was regulated and enhanced by air injected into the furnace stack via tuyeres. The intense heat from burning charcoal separated iron from ore and allowed limestone flux to bind with the waste (slag) from the ore. Molten iron would sink to the bottom, puddling at the lowest level in the crucible. Floating just above the molten iron, molten slag formed a separate layer.



MOULDERS

Iron pigs transported by carts make their way to moulders. Here, they are remelted and cast into kettles, frying pans, and ten-plate stoves.

THE WAY WE MADE IRON

 $\downarrow\,$ Furnace Diagram



Once the founder decided it was time to tap the furnace, the clay plug at the bottom of the crucible was knocked out and molten iron flowed into troughs on the sand floor of the casting shed. Guttermen, having already prepared the sand bed, guided the molten iron in the troughs to cool.

Once cooled, the iron pigs were loaded into carts and transported to the next stop in the process, either to be remelted and cast by moulders or refined in a refinery forge by blacksmiths. Some iron was used on the spot to cast household implements such as kettles, frying pans, and ten-plate stoves. After refining, other iron was formed into iron products such as wagon wheel rims, spoons, axes, hooks, hinges, shutter dogs, musket barrels, and munitions.

Moving iron ore from the mines, and the finished products to market, evolved over time. Mule or ox and cart was the earliest technology utilized. In the 1830s, the introduction of railroads dramatically changed transportation methods.

GUTTERMEN With the sand bed prepared, the gutterman guides the molten iron in the troughs to cool.







CATOCTIN FURNACE

12610 Catoctin Furnace Road, Thurmont, MD 21788 240-288-7396 • *catoctinfurnace.org*

Catoctin Furnace was "in blast" by 1776, just in time to provide munitions to General George Washington and the Continental Army. At least 271 enslaved people of African ancestry made up the bulk of Catoctin Furnace's earliest workers, some of whom may have been brought directly from Africa for their valuable iron-working skills. The operation of the furnace depended heavily on the labor of enslaved and freed African Americans until the middle of the nineteenth century when their labor was replaced by that of European immigrants.

Visitors see the original Isabella stack (pictured above), built in 1857. The restored casting shed (where the molten iron was cast into pigs) is a replica reconstructed for the Bicentennial.

The Museum of the Ironworker, located in a restored ca. 1820 worker's house contains exhibits about iron making and daily life in the village. An interpretive trail leads to an overlook near the African American cemetery. Explore the history of the furnace, details regarding the craft of ironmaking, and a glimpse into the lives of the people who lived and labored here.

Nearby are Catoctin Mountain Park and Cunningham Falls State Park with sites of interest including the charcoal trail and a blacksmith shop.

LONACONING FURNACE

35 Main Street, Lonaconing, MD 21539 301-463-6233 • *lonaconingtown.com/ironfurnace*

On May 17, 1839, the iron outlet plug was removed and molten iron ran out of the furnace at Lonaconing. This represented the first commercial run in the United States using bituminous coal and perhaps the first in the world to use the basic coalfired "pig-iron" production method still in use today. Other furnaces went into operation at roughly the same time (no secret process stays secret very long!).

Chartered as the George's Creek Coal and Iron Company in 1834, Lonaconing's foundation was laid three years later. By 1838, construction progressed with the assembly of the steam engines which would power the air-blast compressors. Next, the furnaces to heat the blast-air stream were tested and the chamber was filled with coal. When set afire, the burning coal cured the masonry work inside the furnace chamber.

Visitors to Lonaconing see an ore cart—perhaps similar to one that on March 22, 1838 "tumbles from the road down to the steam engine plot"—on the Furnace Park grounds. It is likely that the cart's wheels and other parts were cast in the local shop with Lonaconing iron.





FURNACE TOWN

3816 Old Furnace Road, Snow Hill, MD 21863 410-632-2032 • *furnacetown.org*

The only furnace in Maryland ever to make extensive use of bog ore, Nassawango operated for only nineteen years and was reported to be in a dilapidated condition as early as 1859.

Erected in 1830 by the Maryland Iron Company and named for the creek upon which it sits, the Nassawango furnace smelted iron from the abundant bog ore formations in the immediate vicinity. While the furnace produced about 700 tons of iron per year, the quality and distribution of the bog ore may have been the cause of multiple financial failures during the operation of the ironworks.

Nassawango was built as a cold-blast furnace. Thomas A. Spence, a new owner, converted the operation to hot-blast around 1837. The hot-blast technique was new in the United States, having been developed in Scotland only a few years prior.

Today, Furnace Town Historic Site provides visitors an opportunity to stroll the picturesque 25 acre nineteenth century village containing many historic structures including the furnace, blacksmith shop, church, carpenter shop, print shop, and more.

PINE GROVE FURNACE

1100 Pine Grove Road, Gardners, PA 17324 717-486-7174 • dcnr.pa.gov/StateParks/FindAPark/ PineGroveFurnaceStatePark/Pages

Visitors to Pine Grove Iron Works (now Pine Grove Furnace State Park) can explore the furnace stack (built ca. 1771) and many related structures including the mule barn (now the General Store), grist mill (now the Appalachian Trail Museum), chapel, water races, and ore pits including Fuller Lake. A museum in the visitors center contains displays about the industry and visitors may spend the night in the paymaster's office or the stately Ironmaster's Mansion. Surrounded by breathtaking mountain views, the English Tudor-style mansion, which was originally built in 1829, is a popular overnight stop for hikers on the Appalachian Trail.

Nearby Laurel Forge, built in 1830, has vanished although its power supply remains as the park's Laurel Lake. The Works owned 27,000 acres for charcoal fuel, today comprising a large portion of the surrounding Michaux State Forest. For over half a century the works were owned by the prominent Ege family, local ironmasters who also owned Carlisle Iron Works. Pine Grove's role as a stop on the UGRR was under ironmaster William Watts (1845–64). Pine Grove castings included ten-plate stoves, firebacks, boilerplates, and wheels for the Baldwin Locomotive Works. While Pine Grove's final blast occurred in 1895, brickmaking and natural ice harvesting continued into the 20th century.





CORNWALL IRON FURNACE

94 Rexmont Road, Cornwall, PA 17016 717-272-9711 • cornwallironfurnace.org

Cornwall Iron Furnace is the only surviving furnace of its kind in the Western Hemisphere. A National Historic Landmark and a Landmark of the American Society of Mechanical Engineers, Cornwall's picturesque Gothic Revival buildings stand near the remarkable world-class ore mine that operated from the 1730s until 1973. Extant workers' villages, shops, schools, churches, and the Ironmaster's Mansion bear witness to the oncethriving iron plantation.

Cornwall is typical of the charcoal, cold-blast iron furnaces that dotted the Pennsylvania landscape in the eighteenth and nineteenth centuries. As with other furnaces, all the iron ore, wood for charcoal, limestone, and water power necessary for smelting iron were on hand in a favorable setting.

Today, visitors explore the five-acre site which includes remnants of the original eighteenth-century industry incorporated into the nineteenth-century furnace building. Other historic structures include a wagon shop, a blacksmith shop, an abattoir, and the charcoal barn now refitted as a visitor center. In close proximity but not part of the site are the Ironmaster's Mansion, several workers' villages, and the Cornwall Iron Ore Mine. The site is administered by the Pennsylvania Historical & Museum Commission and is supported by the Cornwall Iron Furnace Associates.

HOPEWELL FURNACE NHS

2 Mark Bird Lane, Elverson, PA 19520 610-582-8773 • nps.gov/hofu

In 1938, the Secretary of the Interior designated Hopewell Furnace as part of the National Park Service. While it is neither the oldest, the biggest, nor the last charcoal iron furnace in blast in the United States, Hopewell showcases a nearly complete early American industrial village and landscape. For more than a century, from its beginnings in 1771 to its final blast in 1883, Hopewell exemplified the technological growing pains of a Nation destined to become an industrial giant.

There are many remarkable buildings within the cultural landscape of Hopewell including a working 22-foot diameter "breast" water wheel, cast house, blast machinery, working blacksmith shop, the restored Ironmaster's Mansion, and the Bethesda Church.

The idyllic scene today is only a pale reminder of the historical community that flourished in the 1830s and 40s when Hopewell was a busy industrial complex of nineteenth century manufacturing. Visitors may explore the National Historic Site's 848 acres and historic structures which illustrate the business, technology, and lifestyle of our growing nation.



Antietam Iron Works

ADDITIONAL IRON FURNACE SITES

The following sites are interesting to visit but may not have extant furnaces or extensive explanatory signage. Please verify site hours before visiting.

ANTIETAM IRON WORKS

3768 Harper's Ferry Road, Sharpsburg, MD 21782 canaltrust.org/pyv/antietam-ironworks

Workers at Antietam Iron Works cast, bored, and proved cannon. In 1831, a nail factory and rolling mill were added. John Brien, owner of Antietam and Catoctin Furnaces, operated Antietam with at least 60 enslaved workers. While the works suffered damage during the Civil War, it was rebuilt and operated until 1881. Today, remnants of the ironworks include a dam and race, a possible wheel pit or building foundation, the furnace stacks (all on private property), and a picturesque four-arch stone bridge. Built by John Weaver in 1832, the bridge is still in use.

THADDEUS STEVENS BLACKSMITH SHOP & CALEDONIA FURNACE

Caledonia State Park, 101 Pine Grove Road, Fayetteville, PA 17222 • 717-352-2161 • dcnr.pa.gov/StateParks/ FindAPark/CaledoniaStatePark/Pages/default.aspx

Thaddeus Stevens entered the iron business with the opening of Maria Furnace at Fairfield in Adams County. In 1837, finding better iron ore in Franklin County, Stevens built Caledonia Iron Works and this blacksmith shop. Partially destroyed by soldiers before the Battle of Gettysburg, the shop was restored in 1938 by the Works Progress Administration. It represents the consumer end of the extensive iron industry along this early western expansion thoroughfare. Thaddeus Stevens, a member of the US House of Representatives, was an ardent abolitionist who purportedly employed escaped slaves in his ironworks.

CARLISLE IRON WORKS FURNACE

109 Bucher Hill Road, Boiling Springs, PA 17007 visitcumberlandvalley.com/listing/carlisle-ironworks-furnace/1145

Built in 1760, the Carlisle Iron Works Furnace in Boiling Springs remains in excellent condition. One of the earliest blast furnaces, it was founded by John Rigbie & Co and later operated by Michael Ege, a well-known ironmaster. Members of the Ege family were also associated with Pine Grove Furnace and Catoctin Furnace.

MARY ANN FURNACE

Codorus State Park, 2600 Smith Station Road, Hanover, PA 17331 • 717-637-2816 dcnr.pa.gov/StateParks/FindAPark/ CodorusStatePark/Pages/default.aspx

Built in 1762, Mary Ann Furnace is believed to be the first charcoal furnace built on the western side of the Susquehanna River. The furnace supplied cannonballs and grapeshot for the Continental Army and employed Hessian soldier prisoners to run the ironworks while many of the available workforce were off fighting the British. Nothing remains of the ironworks except memories, but artifacts from the furnace operations can be seen at the Codorus State Park visitor center complex.

MUSSELMAN-VESTA IRON FURNACE CENTER 26 Furnace Road, Marietta, PA 17547

717-314-4060 • rivertownes.org/musselman-vesta The Musselman-Vesta Iron Furnace Center, located in a restored two-story building, is one of the last vestiges of the iron industry that flourished along the Susquehanna River until 1930. It serves as an ideal location to learn about and explore the surrounding area including the Northwest River Trail linking Columbia and Marietta. In 1917, the furnace produced ferromanganese steel for use during World War I. The Musselman-Vesta building is an educational center with an HO scale diorama of the anthracite furnace complex, the Pennsylvania Canal and Railroad, and the operation of the "hot blast" furnaces.

HAMPTON NATIONAL HISTORIC SITE

535 Hampton Lane, Towson, MD 21286 410-823-1309 • *nps.gov/hamp*

Initially a tobacco plantation, industry began at Hampton in 1761 when Col. Charles Ridgely and his two sons established the Northampton Ironworks. Just 15 years later it provided much needed material for the American Revolution, creating great wealth for the Ridgelys, who depended on the labor of enslaved Africans, indentured servants, convict laborers, and British prisoners of war. The ironworks, once located about a mile north of where Hampton Mansion (completed 1790) stands, continued to be the principal basis of the family's wealth through the 1820s. Hampton was then a very large plantation, with fields of grain, orchards, and herds of livestock, along with the ironworks, mining, marble and limestone quarries, mills, and mercantile interests. The 63-acre core of the estate is now Hampton NHS, where visitors can tour original slave quarters, farm buildings, gardens, and the Georgian mansion with its extensive collection of art and artifacts.

MONT ALTO CHARCOAL IRON FURNACE

PA 233, One mile east of Mont Alto, PA 17237 717-352-2161 • dcnr.pa.gov/StateParks/FindAPark/ MontAltoStatePark/Pages/default.aspx

The Mont Alto Charcoal Iron Furnace was built during 1807 by Col. Daniel Hughes and his two sons, Samuel and Daniel. The abolitionist John Brown, while staying in Chambersburg and using another name, visited the iron works. The Ironmaster's Mansion, now known as the Weistling Hall, is on the Mont Alto Penn State University campus. A circular pavilion, modeled after the historic carousel structure built for Mont Alto Iron Company families, stands within the park. Mont Alto is the oldest (established 1902) Pennsylvania state park still in the system.

BIG POND FURNACE

Lat: 40.053512°, Long: -77.404612°

Furnace Hollow Road, South of intersection with Hogshead Road, Cumberland County, PA

Big Pond Furnace was built in 1836. Later owners, the prominent Ahl family, refurbished the operation but before it restarted in 1880, a fire caused by freshly made charcoal permanently destroyed the operation with a loss estimated at \$20,000 (more than one half million dollars today). The stack partly collapsed in 2011 exposing interesting features including the pristine firebrick lining. A head race can be followed through the adjoining state forest.



Finely cast iron products such as this 1766 Mary Ann Furnace jamb stove were made at furnaces along the Iron Road.

MAP KEY

The Iron Road Driving Tour

Additional Iron Furnace Sites Iron Furnace Sites

Major Interstates, Highways & Routes



THE IRON ROAD



For more information, go to *catoctinfurnace.org/ironroad.* Learn more about each historic iron furnace site, plan your trip, and uncover discounts to local hotels and restaurants.

This brochure was made possible by a grant from the Tourism Council of Frederick County Tourism Reinvestment in Promotion and Product (TRIPP) program and funding from donors of the Catoctin Furnace Historical Society.

The Catoctin Furnace Historical Society commemorates, studies, interprets, and preserves the rich history of the early American industrial village through the architecture, art and artistry, cultural traditions, cultural landscape, lifeways, and foodways of the diverse workers.

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