Hopewell Furnace

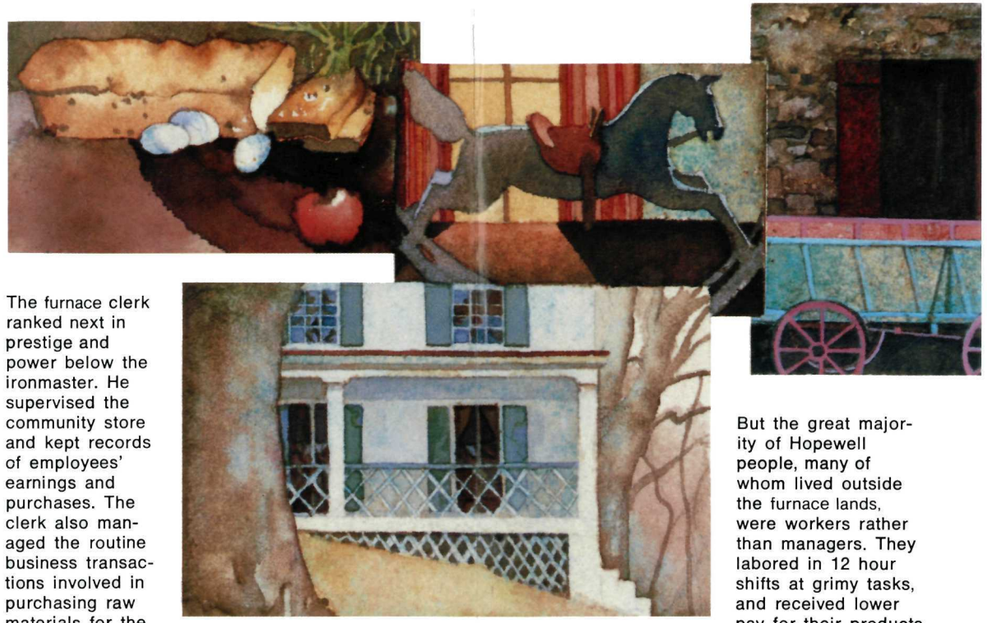
National Historic Site, Pennsylvania

The People

The life of Hopewell Furnace, from its origin during the Revolutionary decade to the last iron production over a century later, was dominated by the night and day operation of its massive furnace. The constant splashing and creaking of the waterwheel and the familiar roar of the forced air blast reached the ears of every inhabitant. Ever-present charcoal dust and the flickering red glow that nightly blanketed the village provided constant reminders of the source of community prosperity. When the furnace ceased to function in hard times, the very silence and the darkness of the night spoke an ominous message to every resident.

Yet for all their shared experiences and fortunes in the shadow of the furnace, the lives of Hopewell's people varied significantly according to their skills, responsibilities, and inherited social positions. A clear-cut paternalistic hierarchy in human relationships characterized village society.

At the top of the social and economic pyramid was the owner of the furnace and the approximately 5,000 acres surrounding it. Some owners hired an ironmaster to reside at the "Big House" and manage the furnace operations. Others lived there themselves. Owner Clement Brooke resided at Hopewell for many years. From his comfortable home overlooking the entire furnace community, the ironmaster made policy decisions, assumed responsibility for the successful operation of the enterprise, and largely controlled the lives of villagers. He and his family lived in the fashionable style of country gentry, acquiring fine clothing, furniture, and other luxuries considered appropriate to his rank. He drew a sizable household servant staff from among the wives and daughters of furnace workers.



The furnace clerk ranked next in prestige and power below the ironmaster. He supervised the community store and kept records of employees' earnings and purchases. The clerk also managed the routine business transactions involved in purchasing raw materials for the furnace, as well as production and sales of its iron products. He was, in effect, the chief liaison officer between the owner-managers and their labor force; between entrepreneurs, suppliers, and customers.

Just below the clerk in the furnace hierarchy came the "founder" who performed another highly important task. He was responsible for the efficient operation of the furnace. The founder had immediate oversight of the iron workers and was accountable for the quality of their product. A good founder received relatively high wages and enjoyed considerable prestige in the community.

But the great majority of Hopewell people, many of whom lived outside the furnace lands, were workers rather than managers. They labored in 12 hour shifts at grimy tasks, and received lower pay for their products in the form of credit notations at the store. There were no paid holidays or sick leave. Accidents were common in early industrial settings like Hopewell. The fiery hot, noisy, smelly furnace defined the conditions of workers' lives even more directly than it did those of their supervisors.

The skilled artisans of the community enjoyed greater prestige and earnings than the lower echelon woodcutters, miners, teamsters, and household servants. The crafts practiced by the blacksmith, molders, and "keepers," with considerable artistry and skill, were intimately related to some aspect of community life and the earning of a livelihood. When the colliers found themselves with spare time during their vigil at the charcoal hearths, they often wove split wood baskets. This was not for entertainment or show, but to fill the recurring need for coal containers in the ironmaking process, and to earn an extra 33 cents per basket.

Similarly, the crafts customarily practiced by women had an important subsistence value. Some skilled women received wages as seamstresses, cooks, or candle-dippers at the ironmaster's house. But others performed these tasks, along with soapmaking, carding, and spinning, in the small tenant houses, for the use of their own families. Many women and children were credited for farm work at harvest time, and a few were employed as woodcutters and miners. Some women of the area, often widows, operated their own furnace-related businesses or farms, buying and selling everything from ore to stoves or agricultural products.

Many black workers were employed at Hopewell, and some were probably slaves. They received equal pay with white wage earners for the same tasks, but usually blacks worked at the less skilled jobs. Living quarters were not segregated, nor was the school. There is some evidence that ironmaster Clement Brooke was interested in abolitionism. Since the forests of southeastern Pennsylvania often sheltered runaway slaves, some of the blacks employed at the furnace may have been fugitives. Many of them worked only a few days or weeks and then moved on, possibly to safer areas further north.

On warm days, the younger children of Hopewell amused themselves by wading in French Creek, and some earned small amounts by retrieving bits of iron from the slag heaps. Before a one-room schoolhouse was built in 1836, most received a rudimentary acquaintance with the three R's from tutors. Young children of the ironmaster and clerk mixed freely with the sons and daughters of workers, but they went on to more advanced studies in accordance with their social position. For workers' older children the most important education took place in daily contact with adults, beside whom they usually learned some phase of village work. In a kind of servant-apprentice role, boys often learned to perform the tasks of their fathers, and girls acquired their mothers' domestic skills.

The social life of the community, as well as its work, ebbed and flowed with the rhythms of the furnace. When a long "blast" ended and the furnace shut down temporarily for relining—and even at times when it operated—the people sought relief from its demands. In all seasons, most "entertainments" took place in the open air. The men enjoyed hunting and fishing excursions, while ice skating and sleighing provided winter fun for nearly everyone. "Frollicks" combined work with play. Sometimes a host invited friends to a "chopping frollick," and provided liquor for all comers who helped cut the seasonal wood supply or clear the land. Hopewell's inhabitants also looked forward to Election Day celebrations, the county militia muster, and the Fourth of July, when some combined civic and patriotic duties with considerable quantities of whiskey, all night dancing, and sometimes fighting. For Hopewell workers, then, life in the shadow of the furnace was a mixture of hard work and lusty play.

The ironmaster and his family enjoyed more refined, and more expensive, leisure time activities. They ordered books on many subjects to pass occasional quiet days. Family members traveled regularly by carriage to visit friends and relatives in Philadelphia or New York, and they gave parties to entertain visitors at the Big House.

The Process

The iron industry was already well established in the colonies by the time of the Revolution, with a total production exceeding that of England. Beginning with the Iron Act of 1750, the mother country had attempted to curtail the manufacture of finished iron products by the colonists. Mercantile trade policy called for the provinces to supply England with raw materials which would then be turned into manufactured articles and resold to colonial buyers. But the expanding appetite of the colonies for iron products created a lucrative and immediate market that American ironmasters could not ignore. The money in ironmaking lay in selling the illegally finished products rather than in shipping raw pig iron to England. Despite the British regulations, which were poorly enforced, Mark Bird began casting stove plates soon after his new furnace was built in 1771. And when the Revolutionary War began, Hopewell helped meet patriot needs for armaments and ammunition.

Molded or cast iron articles were the end products of a relatively simple process—one that was first developed in the ancient world. The raw materials needed—iron ore, limestone, and hardwood forests for charcoal—were all readily available in the Hopewell area. Miners dug the ore from nearby open pit mines and washed it in the stream. Teamsters hauled it to the furnace.

Charcoal-making was a more exacting, and dirtier, operation. Woodcutters chopped 25 to 50 cords of hardwood billets for each circular "hearth" in the woods. The hearth was simply a round, level area 30 to 40 feet in diameter, cleared of debris, roots, and stumps. There from April to November, skilled colliers stacked the billets at an angle against a central wooden chimney. They covered the rounded cone-shaped structure with thin "lapwood," or sticks, over which they spread layers of leaves and dust to keep out excess air. Finally, they filled the chimney from the top with chips of dry kindling, and then ignited it. After covering the top, colliers constantly watched and tended the smoldering "pit" to assure slow, even burning. About 2 weeks later, the process was completed. Fresh charcoal was raked out, partially cooled, and taken by wagon to the furnace.

With supplies of all the ingredients on hand, the founder directed the charging of the furnace. Workmen called "fillers" dumped approximately 15 bushels of charcoal into the tunnel head, and then added 200 to 300 pounds of ore and several shovelsful of limestone. At approximately half hour intervals day and night they repeated the process. Periodically, the founder tapped the furnace, draining off the molten iron and the slag residue. Two skilled "keepers" assisted and temporarily relieved the founder during the blast.

The quality of the iron produced was as important as the amount. The owner-managers of Hopewell profited more from a high quality product that could be cast into saleable articles than they did from the less pure pig iron. The founder controlled quality by regulating the precise balance of the ingredients and the blast of air. When he tapped the furnace, the founder decided whether the molten iron met the demanding standards for casting. If it did, he rang the casthouse bell, calling in the skilled molders to ladle the fiery liquid into their waiting sand molds. But if the flow contained too many impurities, it was run out into pig bars on the ground. The pigs were then shipped to a forge and hammered into usable shapes. The founder's reputation, as well as his pay, was based on the percentage of high quality casting iron his furnace produced.

Molders, too, were paid according to both the quality and the quantity of their individual work. And they received higher wages for casting more intricate and difficult designs. The mold was made by compacting a special sand around both halves of a wooden pattern. This required great care and precision, in order to keep stray grains of sand out of the pattern space.

Hopewell workers manufactured a wide variety of cook-ware and other iron products for a growing America. But stoves were the most frequently molded articles at Hopewell throughout most of its history. Many different types, including the famous "Franklin fireplace" for combined heating and cooking, were produced in the casting house. Some dealers furnished their own casting patterns, which carried the retailers' names rather than Hopewell's. The final assembling of the stoves was often handled by the retail dealer. Among the customers for those stoves assembled at the furnace were the villagers themselves, who applied their earnings toward the purchase. By 1844, Hopewell molders had produced over 65,000 stoves for the homes of the land.

But Hopewell's prosperity had reached its zenith by the mid-1830's. Except for a brief boom during the Civil War, the rural manufacturing community, with its time-honored method of charcoal smelting, became increasingly obsolete. The expense of transporting goods to market posed formidable problems for the village, which was located far from the expanding urban centers of distribution.

But the most serious problem stemmed from the growth of modern industrial technology. The development of new smelting methods utilizing hotter-burning anthracite coal and heated air blasts meant that high quality iron could be produced more rapidly and with less expense. New ironworks were generally located near the growing urban markets, since they no longer required vast hardwood forests for fuel. One by one the rural charcoal furnaces closed down. Hopewell's last attempt to remain competitive—the construction in 1853 of an anthracite furnace—failed to halt the decline. In 1883, the furnace "blew out" for the last time. And the remaining villagers turned their steps toward the cities in search of work—victims themselves of industrial progress, along with their sustaining furnace and an earlier, rural way of life.

A Tour

We suggest that you stop first at the visitor center, where exhibits, illustrated programs, and examples of cast iron products help tell the story of Hopewell, its people, and its product. Then follow the numbered tour guide through the site.

1 Historic roads*
The 1757 Valley Forge-Reading wagon road passed just below the present visitor center. After 1825, it also connected with the Schuylkill Canal.

2 Cooling shed and charcoal house
Wagons loaded with fresh charcoal were dumped by pulling out bottom boards. Stokers then stored the fuel in the charcoal house.

3 Anthracite furnace
This ruin represents Hopewell's attempt to modernize in an age of industrialization. But the new furnace failed because it could not successfully smelt Hopewell ore.

4 Charcoal hearth
Colliers made charcoal on hearths like this from spring throughfall. About an acre of hardwood forest was required for a day's operation of the furnace.

5 Water wheel and blast machinery°
Water from Hopewell Lake, 1,200 feet upstream, flowed through the West Head Race to turn this wheel, which operated the blast machinery. Rods attached to the wheel's axle moved pistons inside the wooden tubs, forcing air into an equalizing box. From this box, the blast of cold air passed through the pipe to the furnace, fanning the flame and speeding the ironmaking process.

6 Connecting shed° and bridgehouse.
Fillers carried charcoal, iron ore, and limestone through the bridgehouse and dumped it into the tunnel head at the top of the furnace. Approximately 6 tons of raw materials went into the furnace daily, producing nearly 3 tons of molten iron in 24 hours.

7 The office store*
This store was the nerve center of the village. The clerk kept records and sold most articles needed by Hopewell residents and neighbors. Some items were ordered from Philadelphia. Note the feed and flour bins in the adjoining shed before leaving.

8 Cast house°
Here in front of the furnace "cast arch" the molten iron either flowed into a pig bed or was ladled into sand molds. From 1845 until its final blast, Hopewell produced only pig iron. In the front cleaning shed, workers brushed sand particles off the castings before they were boxed for shipment.

9 Tuyere (twee-air) arch
Proceed under the bridgehouse. Here you can see how the air blast entered the furnace. To hear its swoosh, place your ear near the pipe as the wheel moves the pistons. The fire burned above this tuyere, and the molten products collected below.

10 Blacksmith shop°
Here the blacksmith hammered red hot wrought iron into tools, hardware, and horseshoes for the community. Notice the period tiles on the shop roof, which have runoff grooves made by the potter's finger in the soft clay before baking.

11 Tenant houses*
Survivors of several dozen company-owned houses front the old mine road beyond French Creek. The first one is furnished. Similar houses were scattered over the 5,000 acres of furnace properties. But many workers lived near-by in their own houses.

12 Stone bridge*
On the way to the barn, you pass a stone bridge under which French Creek once flowed. Now only the tail-race water, which comes from the wheel, flows under it to the creek beyond.

13 Barn°
Horse-drawn wagons transported the products and supplies of the village. This large barn sheltered less than half of the necessary horses and their feed in 1830, and the remainder had to be hired. Stables are below; hay and grain mows above.

14 Spring house
Cool spring water supplied the Big House. The trough in the middle room served as a refrigeration unit. Hired women heated water at the fireplace for laundering, butchering, and cleaning.

15 Bake ovens and kitchen
When wood fires brought the ovens to baking temperature, coals were raked out and the dough inserted on a long paddle-like baker's peel. In the back-basement kitchen, furnished with period cooking utensils, servants cooked for workers who boarded in the Big House.

16 Big House
The owner, or his manager, lived with his family in the Big House, which was conveniently located for the oversight of workers and furnace operations. The 19th-century furnishings reflect the life-style of the family.

17 East head race* and garden
Returning to the visitor center, you cross a race that powered the water wheel before 1853. A garden of flowers, herbs, vegetables, and fruits once grew on these terraces. The ruins of a greenhouse are to the right as you go up the steps.

*Restoration
°Reconstruction

Mark Bird: Forgotten Patriot

When Mark Bird built Hopewell Furnace on the headwaters of French Creek in 1771, he probably had no realization of the role he and his iron would play in the forthcoming struggle for independence. The American Revolution was the setting for Bird's chief accomplishments. Like other ironmasters of his day, Bird resented the threat of British interference in colonial iron manufacturing. He took a leading part in patriot politics as a member of the Pennsylvania Committee of Correspondence and delegate to the Provincial Conference of 1775. When war broke out, Bird served in a multiple capacity. He was a colonel in the Berks County militia, providing uniforms, tents, and provisions for 300 men. As deputy quartermaster general in February 1778, Bird shipped General Washington's hungry troops at Valley Forge 1,000 badly needed barrels of flour.

In addition to his military career, Bird was a member of the Pennsylvania Assembly, the Provincial Convention of 1776, and judge of the Berks County Court. He also supplied armaments, including cannon, shell, and shot, from his furnaces and forges for the Revolution. For at least some of these shipments he was reimbursed by the Continental Congress. Bird was a brother-in-law to two other ironmasters, both of whom were signers of the Declaration of Independence: James Wilson and Charles Ross.

After the war, Bird borrowed heavily to build a large ironworks on the Delaware River. He overextended himself, however, and was forced into bankruptcy, losing both the Hopewell and Birdsboro properties by 1788. He died in North Carolina in 1814, a ruined man. But the story of the furnace he built at Hopewell had only begun.

Visiting Hopewell Furnace

Hopewell Furnace has been restored as closely as possible to its appearance in 1820-1840 by the National Park Service. During July and August, activities depicting village trades and crafts are presented. The site is open daily except January 1, Thanksgiving Day, and December 25. Hopewell Furnace is located about 6 miles (9.7 kilometers) south of Birdsboro on Pa. 345. It is 10 miles (16.1 kilometers) from the Morgantown interchange on the Pa. Turnpike, via Pa. 23 East and 345 North. Inquiries regarding the site should be addressed to the Superintendent, 2 Mark Bird Lane, Elverson, PA 19520, or telephone (215) 582-8773. Camping, picnicking, and swimming facilities are available at French Creek State Park adjoining the Hopewell Furnace Site.

Your Safety

Please stay on established tour routes and do not climb on the unstable anthracite furnace ruins, fences, and other historic structures. The sharp slag can cause severe, jagged cuts. Do not enter fenced areas or feed or handle livestock. Those allergic to bee and wasp stings should be careful; about 30 visitors are stung each year.

The Department of the Interior

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

PLEASE DO NOT SMOKE IN THE HISTORIC AREA

TAKE PRIDE IN AMERICA

National Park Service U.S. Department of the Interior

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ILLUSTRATED BY BOBBI TULL

National Historic Site, Pennsylvania

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