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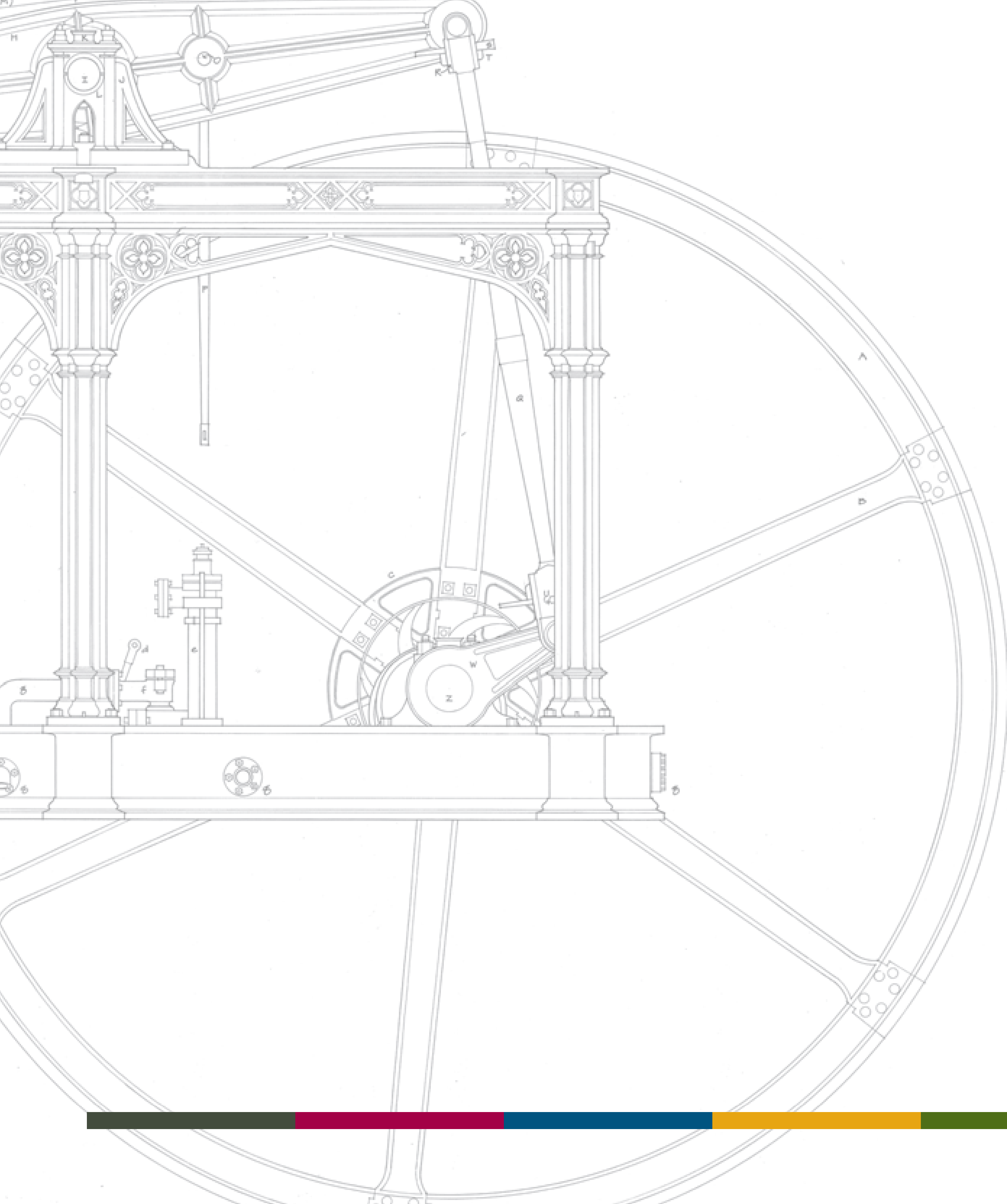
West Point Foundry | Cold Spring, New York

West Point Foundry and the Great Works of Mechanical Engineering before the Civil War



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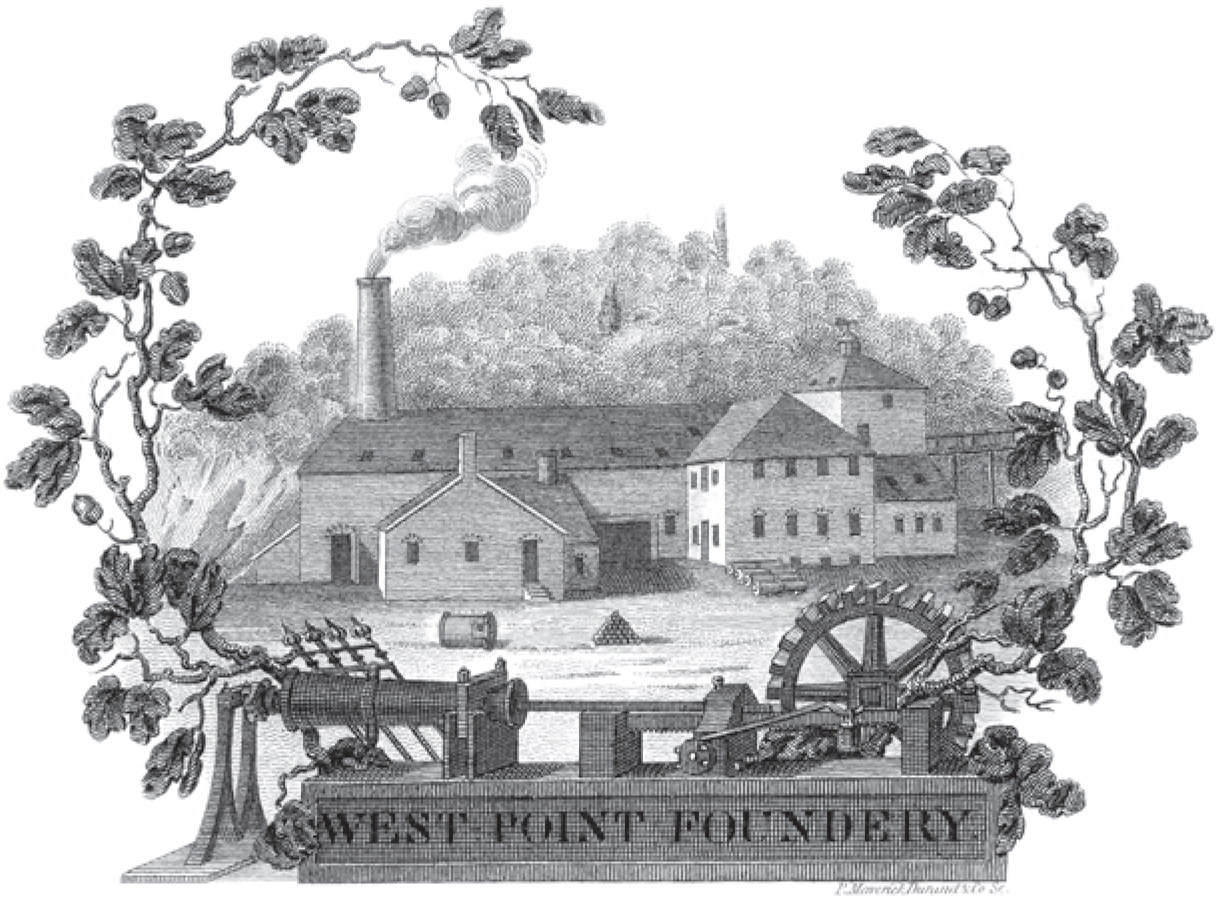
West Point Foundry and the Great Works of Mechanical Engineering before the Civil War

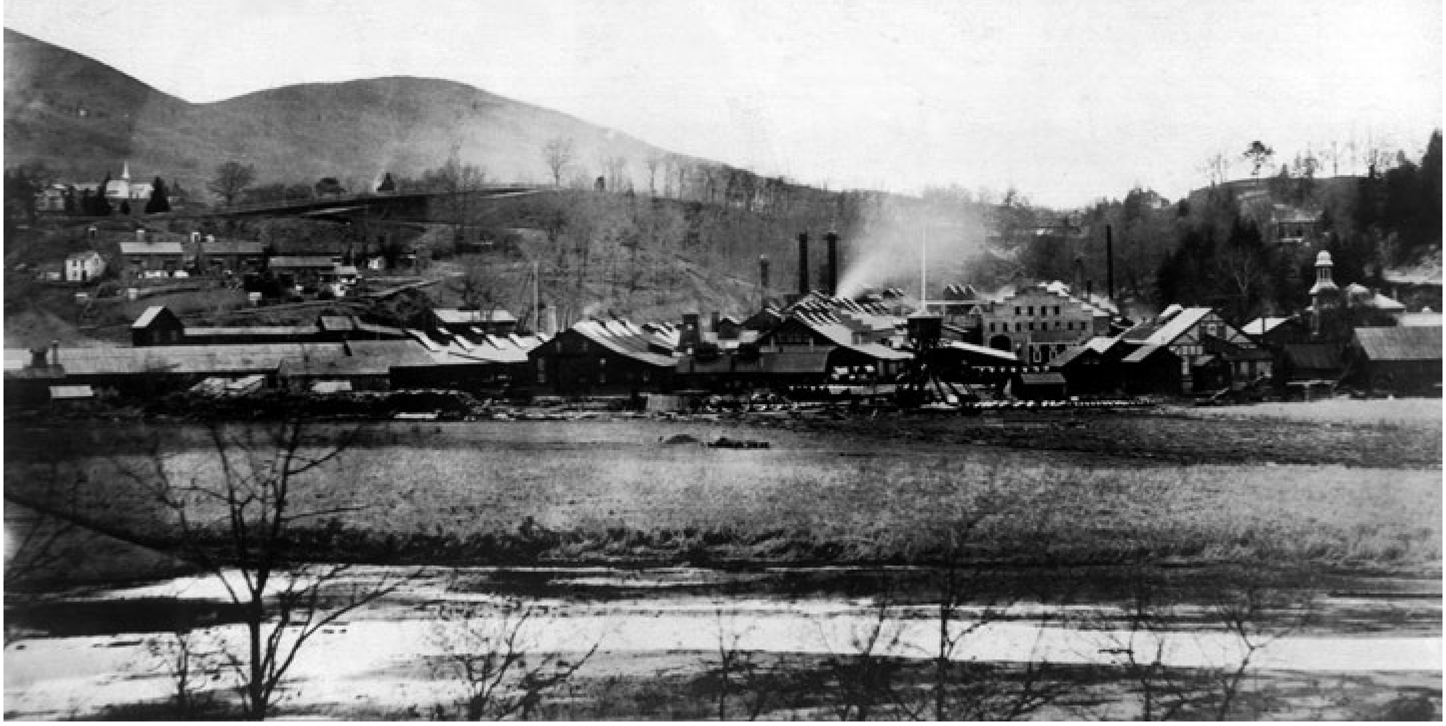
Text by: T. Arron Kotlensky
Edited by: Terry S. Reynolds, Steven A. Walton, Reed Sparling
Cover: Photographic view of the West Point Foundry from Constitution Island, late 1860s. Image courtesy of the Putnam History Museum



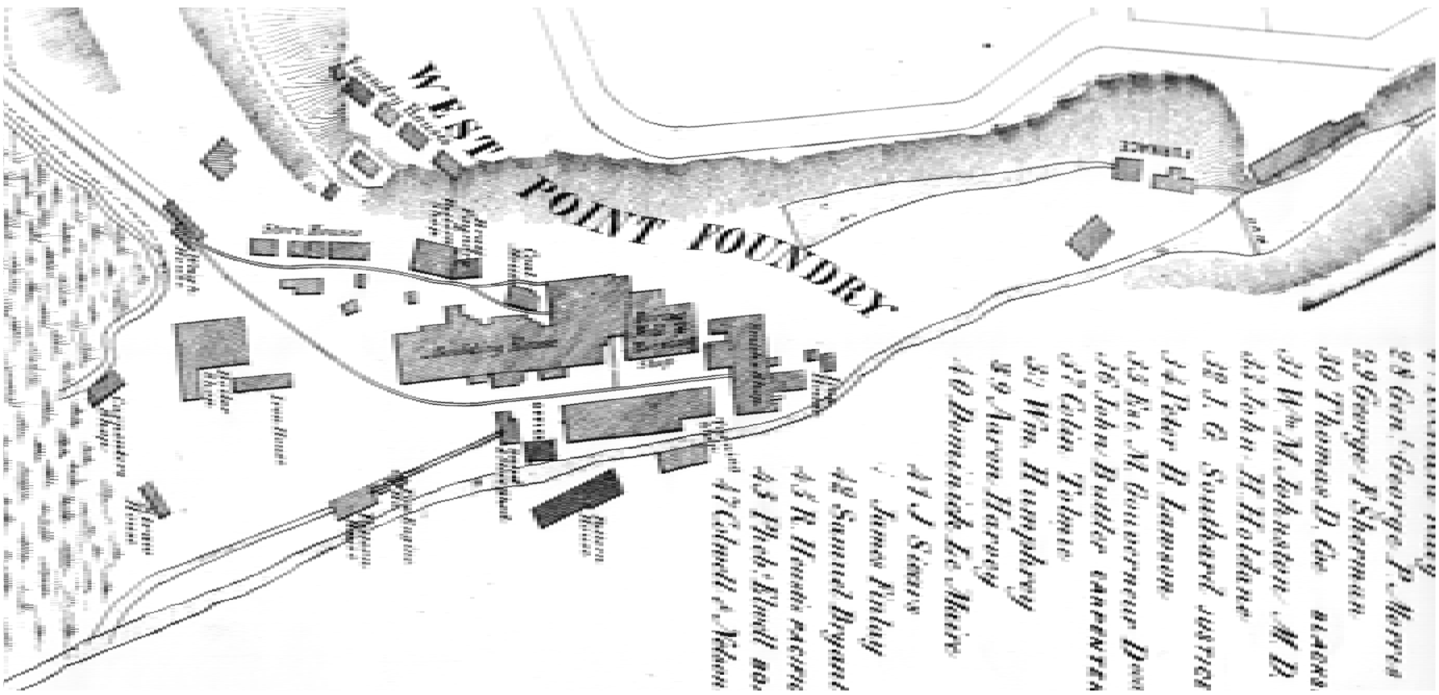
In 1817, a circle of young but rising business and military leaders set about establishing a cannon foundry in the Hudson River Valley of New York. Organized by a well-traveled, New York City mercantile agent named Gouverneur Kemble (1786-1875), they pooled their resources and connections to form the West Point Foundry, a private industrial venture built to meet a national need for ordnance in the wake of the War of 1812. Under Kemble's leadership, and later that of Robert P. Parrott (1804-1877), the West Point Foundry became a renowned maker of cannon—both in quantity, and, after overcoming early struggles, quality—a reputation that it famously upheld through the Civil War.

But the versatile enterprise that Kemble and his associates assembled made more than armaments. In the decades before 1870, the West Point Foundry (WPF or simply, the Foundry) was one of few places in the nation that combined heavy iron casting, machining, and forging work to produce the largest classes of steam engines and industrial equipment, or what economists call *capital goods*. It specialized in no particular market: In any given month, the WPF could finish machinery for water-powered mills; blowing engines for blast furnaces; stationary steam engines in a wide range of sizes; marine engines for river, coastal, lake, and oceangoing vessels; or the first American-built railway locomotives. The WPF's flexibility to design and manufacture the more complex machinery of the antebellum period made it a hub of know-how and talent. In its first two decades, the Foundry expanded from roughly 60 skilled engineers, craftsmen, and laborers to more than 400, making it one of the largest firms of its kind. But in the era following the Civil War—with a collapse in demand for ordnance, diversifying competition, the emergence of cheaper iron and steel in other regions, and perhaps above all, an uncooperative economy—the WPF waned, and all iron-working ceased at the site by 1911.

Top: Engraving from WPF letterhead, dated to 1821. Image courtesy of the Putnam History Museum (PHM).
Bottom: Sketch of the WPF (1832) by Thomas Kelah Wharton from Constitution Island. Image courtesy of the New York Public Library.



A hive of activity during its most prosperous years, the Foundry stood out as a spectacle of industrial creativity with few equals. Those fortunate to get a tour witnessed a rambling cluster of shops, sheds, yards, and offices, enclosing scenes of incandescent molten iron and machine tools at deafening work, with heaps of coal, cinder, slag, iron castings, and finished goods scattered where space allowed. At its core, the integrated layout encompassed a foundry shop for making iron castings, carpentry shops for shaping wooden casting patterns, a boring mill and machine shops for finishing iron, a blacksmith shop for forging and shaping wrought iron, a boiler shop for fabricating steam boilers, and a nearby blast furnace for reducing ore to pig iron. And regardless of experience or background, every person at the WPF worked in close quarters with others, sharing hardships and breakthroughs, all the while dwelling close by in their homes and neighborhoods of Cold Spring, a community that grew and prospered with the Foundry.



Top: Photographic view of the WPF from Constitution Island, likely taken in the later 1860s. Image courtesy of PHM.
Bottom: Detail of the WPF from a ca. 1854 map of the Village of Cold Spring, credited to John Bevan. Image courtesy of PHM.

Turning Opportunities into Industrial Hardware

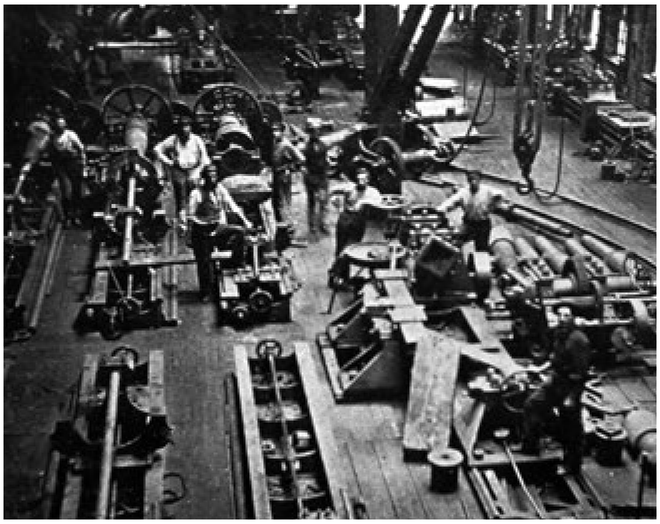
Waterpower and Terrain

Apart from its secure inland location, Gouverneur Kemble and his partners in the West Point Foundry Association favored the hamlet of Cold Spring for its power and shipping potential. At the direction of Kemble, engineers James Muirhead and William Young began laying out the site in late spring 1817 just south of the small river landing community, 45 miles north of New York City and nearly opposite the United States Military Academy at West Point. They arranged the shops together on the narrow floor of a deep ravine carved by Foundry Brook—a setting that offered both space for work and flowing water to do work. They oversaw the construction of a series of stone dams and raceways to divert water from the upper reaches of the brook to vertical waterwheels at the blast furnace and shops below. In addition to the Cold Spring site, the Foundry's early leadership built a steam engine and machine assembly shop in Manhattan at the northeast corner of West and Beach streets on the Hudson River. In the late 1830s, they consolidated their skilled workforces in Cold Spring, closing their New York City location.

"The Gun Foundry" (1864-1866) by John Ferguson Weir, depicting the interior of the WPF foundry shop during the Civil War. Oil on canvas. Image courtesy of PHM.

How the West Point Foundry Worked

The defining work of the Foundry—making iron castings—was performed in the moulding and casting shops, or taken together, the actual *foundry shop*. Here, skilled tradesmen called *moulders* made two-part sand molds from wooden patterns. After removing a pattern, they carefully closed the two halves together and filled the cavity with remelted pig and scrap iron drawn from hearth-like reverberatory furnaces or tall, vertical cupola furnaces. By 1839, the foundry shop's reverberatory furnaces (or *air furnaces* as they were commonly known) were fueled with bituminous coal from mines around Richmond, Virginia, while their cupola furnaces consumed anthracite coal from northeastern Pennsylvania, shipped to the Hudson River via the Delaware & Hudson Canal. The WPF could also cast bronze but on a smaller scale than other foundries dedicated to copper alloys.



Workers completed the fitting and shaping of iron in adjacent shops: in the boring mill and machine shops, they chiseled, filed, bored, and machined castings to final dimensions, while in the blacksmith shop they worked wrought iron into parts and assemblies with water-powered trip and tilt hammers and, later on with steam-driven drop hammers. Power for the boring mill and machine shops was largely generated by a towering 36-foot diameter backshot waterwheel that measured eight feet in width. Built of timber and iron and enclosed in the mill itself, the boring mill waterwheel was reputed to be the largest in the country at the time of construction. By 1840, the WPF had added stationary steam engines for additional power but continued to rely on waterpower throughout its long history.

Whether generated by water or steam, line shafting and leather belts directed power to lathes, planers, punches, and boring and milling machines. The WPF also had a shop for constructing boilers for the steam engines it made. Large castings and assemblies were lifted inside the shops with manual and powered timber jib cranes. By the Civil War, a five-foot gauge rail tram connected the shops together and with the Hudson River Railroad via a short spur line. The designers of the WPF favored locally quarried gneiss stone and later on, red brick from Hudson River Valley brick-makers in the construction of their most active shops, with frame construction saved for smaller buildings and sheds where fire was less of a hazard.

Top: Photographic view of the interior of the WPF machine shop during the 1860s-1870s period. Image courtesy of PHM.
Bottom: "Forging the Shaft" (1874-1877) by John Ferguson Weir, depicting the interior of the WPF blacksmith shop. Oil on canvas.
Painting in the collections of the Metropolitan Museum of Art, New York.

A Close and Ideal Waterway

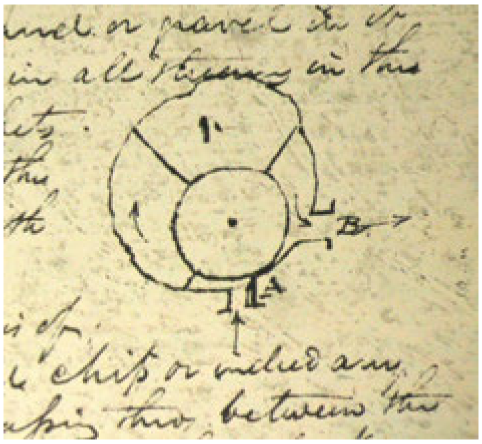
With its deep channel and link to the nation's premiere trading port, the Hudson (or *North* River as many still wrote of it in the 1840s) was key to the success of the WPF. The early layout included a nearby 300-foot dock built out into the river, giving access to one of the busiest routes in American commerce. The dock received river sloops that delivered commodities like coal, casting sand, fire brick, and pig, bar, and boiler iron, and carried away heavy goods south to New York City or north toward Albany. A year before the Hudson River Railroad completed its rail line into Cold Spring in 1849, the WPF replaced the original dock with a new, 600-foot dock, later dubbed the "Long Dock." More trade vessels and those with deeper draft, like schooners and steamers, could now call at the WPF; even so, sloops that called Cold Spring home, like the *Victorine* and *Kitty Van Tassell*, remained essential to the work of the Foundry.

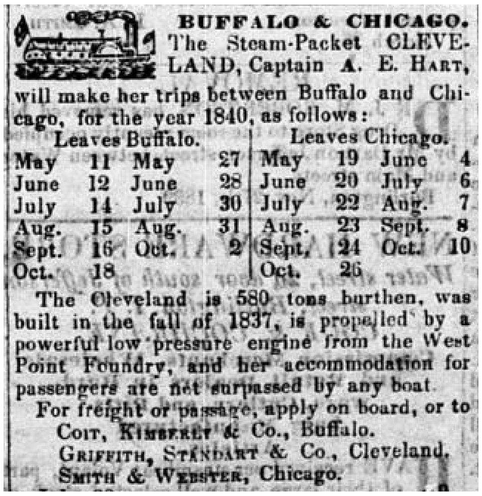
Iron from the Landscape

Even with the Hudson River nearby, the WPF's leaders did not take extended trade for granted, remembering well the British blockade of the War of 1812. They were particularly keen on self-reliance for ensuring the supply *and* quality of an essential commodity: pig iron. In the first decade of operation, they built a blast furnace in the upper reaches of the ravine to make the high-carbon iron alloy necessary for its castings. Beginning its first season of operation in October 1827, the WPF's stone-clad blast furnace measured a then-impressive height of 40 feet, with its air blast generated by an unusual water-powered "bellows box" blowing engine. The Cold Spring furnace smelted a blend of iron ores, but chiefly magnetite drawn from nearby mines in the Hudson Highlands, consuming hardwood charcoal made by colliers in the surrounding rugged woodlands of Putnam County. Many of these mine sites and charcoaling pits can still be found in nearby Fahnestock and Harriman State Parks.

Producing on average 30 tons per week of graphite-rich gray pig iron, the Cold Spring furnace remained in service until June 1844, when it was deemed too costly to operate. In later decades, the WPF drew largely on pig iron produced by the firm's other furnaces in nearby Orange County, like the anthracite-fueled Greenwood No. 2 furnace completed in 1854; later renamed the Clove furnace, the site is open to visitors courtesy of the Orange County Historical Society. But during the several years that the Cold Spring furnace was in blast, spectators of the WPF could watch across a single site the integrated actions of unrefined iron ore turned into complete, sophisticated iron goods by the action of waterpower. This was an industrial setting unlike any other in the nation.

Painting of the WPF blast furnace (1865) by John Gadsby Chapman. Oil on panel. Image courtesy of PHM.





BUFFALO & CHICAGO.
The Steam-Packet CLEVELAND, Captain A. E. HART, will make her trips between Buffalo and Chicago, for the year 1840, as follows:

Leaves Buffalo.				Leaves Chicago.			
May	11	May	27	May	19	June	4
June	12	June	28	June	20	July	6
July	14	July	30	July	22	Aug.	7
Aug.	15	Aug.	31	Aug.	23	Sept.	8
Sept.	16	Oct.	2	Sept.	24	Oct.	10
Oct.	18			Oct.	26		

The Cleveland is 580 tons burthen, was built in the fall of 1837, is propelled by a powerful low pressure engine from the West Point Foundry, and her accommodation for passengers are not surpassed by any boat.
For freight or passage, apply on board, or to
COIT, KIMBERLY & Co., Buffalo.
GRIFFITH, STANDART & Co., Cleveland.
SMITH & WEBSTER, Chicago.

A Pivotal Source of Engineering and Talent

Overcoming Distance

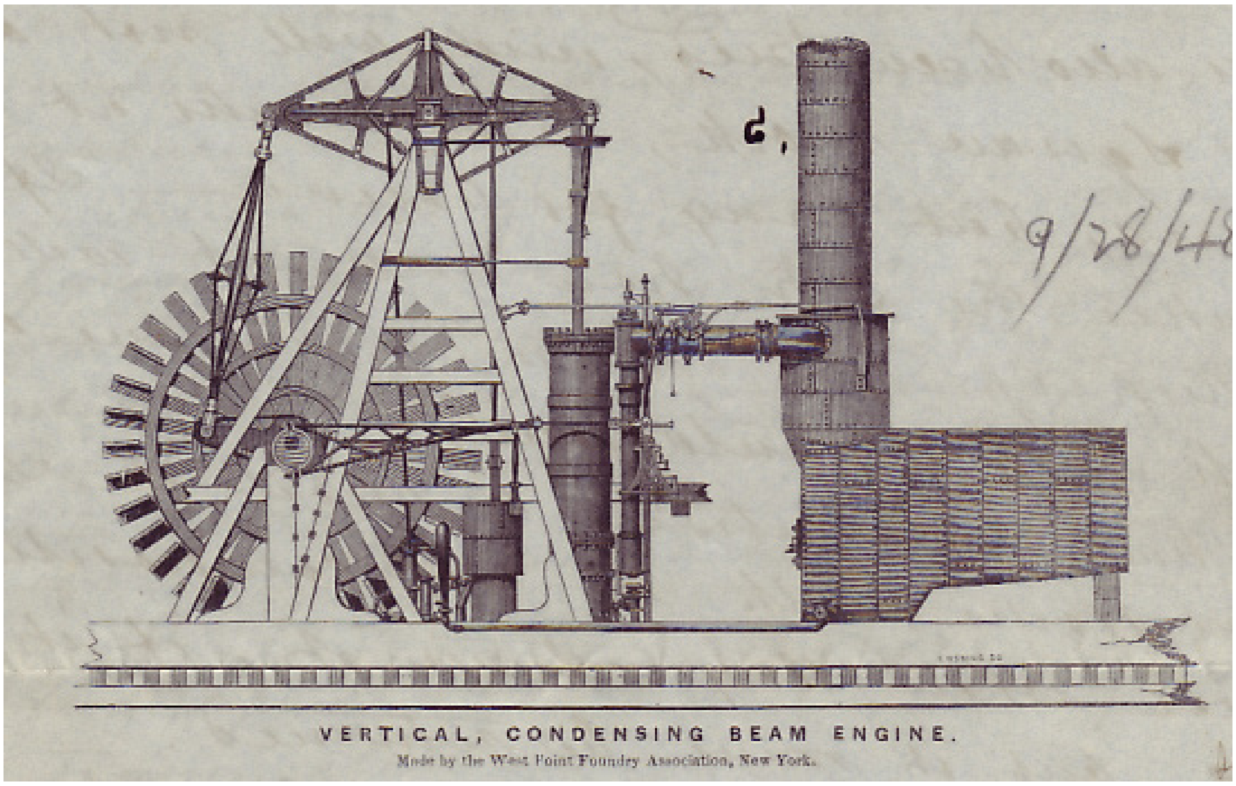
The WPF gained a footing in engineering work just as canal construction in the United States grew in the 1820s. In its first years of operation, the Foundry is reputed to have contributed iron hardware for locks on the Erie Canal (first built between 1817 and 1825). Its completion in 1826 of remarkable pumping machinery for watering the highest level of the Union Canal in eastern Pennsylvania is better documented. But by the late 1820s, the engineers of the Foundry were quickly accruing experience and wider attention with the marine engines they made, like those for three Hudson River steamboats built in Albany—the *Victory* (1827), the *DeWitt Clinton* (1828), and the *Ohio* (1829). By 1841, they had completed engines for at least another nine of some 100 steamboats in service on the Hudson River, including the *Rochester* and the ill-fated *Swallow*, two steamboats that frequently raced one another between Manhattan and Albany. But amidst its work in expanding steam navigation, the WPF made its most noted contribution to mechanical engineering when it completed in 1830 the first American-built locomotive for revenue service, *The Best Friend of Charleston*, for the South Carolina Canal & Rail Road Company. The WPF would build 10 more locomotives over the next five years, including the *DeWitt Clinton* and the *Experiment* (later renamed *Brother Jonathan*), both for the Mohawk & Hudson Railroad in Albany. The *DeWitt Clinton* and the revolutionary 4-2-0 *Experiment* were designed by John B. Jervis (1795-1885), one of the most recognizable names in American engineering of the nineteenth century.

Water for Growing Cities

In the late 1830s, Jervis also served as the chief engineer of the first Croton Aqueduct after finishing engineering work on the Mohawk & Hudson Railroad and, before that, the Delaware & Hudson Canal. Spurred by a major cholera epidemic in 1832 and the Great Fire of 1835, the Croton Aqueduct was key to meeting New York City's rising demands for clean water, sanitation, and fire-fighting. A key component of the Croton Aqueduct, the High Bridge over the Harlem River, was completed by 1848 with two 36-inch diameter conduits made from 2,750 tons of iron pipe cast by the Foundry. The WPF also made cast iron pipe for New York City itself, as well as Boston and New Orleans, and it likely supplied many other cities as their water needs grew. Apart from cast iron pipe, the WPF also built water-pumping engines for New Orleans and Jersey City, New Jersey.

Expanding Industry

Despite a depressed economy following the Panic of 1837, the WPF bolstered national industrial growth into the 1840s with a wide range of heavy capital goods. Apart from competing in markets for stationary and marine steam engines, the Foundry supplied air and water pumps for excavating railroad bridge caissons, sugar mills for the Caribbean, cotton presses for the American South, and machinery for making paper and milling flour, rice, cottonseed oil, and lumber. More remarkably in these challenging years, the WPF produced a 60-horsepower steam-powered blowing engine for the Lonaconing Furnace in western Maryland, the first commercially successful coke-fueled blast furnace in the nation (1839), and similar machinery for the twin blast furnaces of the nearby Mount Savage Iron Works, the first dedicated American rail mill (ca. 1844).



Greater Power from Water

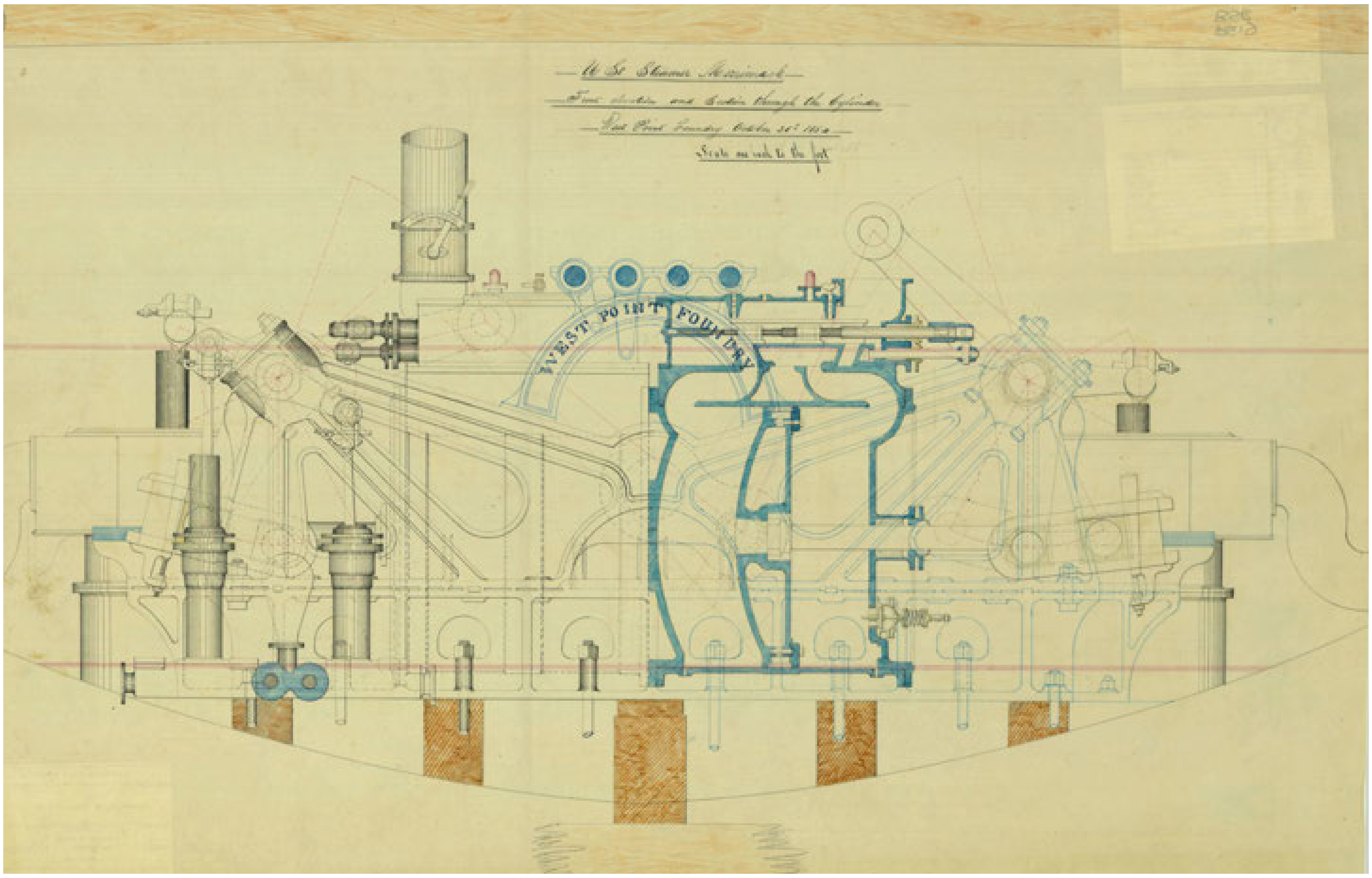
Although the WPF utilized vertical waterwheels for generating power, its skilled workers manufactured some of the earliest American-made horizontal water turbines. In the 1840s, the Foundry succeeded in making Scotch turbines (also called "Segner" turbines or wheels), the earliest feasible reaction turbine for industrial power generation. A notable use of this new prime mover was in improvements begun in the late 1840s to the inclined planes on the Morris Canal in northern New Jersey. The WPF manufactured at least the prototype turbine for this work, installed at Plane 7 West ca. 1847; a similar extant Scotch turbine remains in place at the nearby Plane 9 West (ASME Historic Mechanical Engineering Landmark #38). Another rare surviving example of a reaction turbine is found at the Hacienda Buena Vista near Ponce, Puerto Rico (ASME Historic Mechanical Engineering Landmark #177). Restored to working condition, this Barker-type reaction turbine was manufactured by the WPF in the early 1850s. Apart from Scotch turbines, in the 1850s the WPF supplied turbines designed by Emile C. Geyelin (1825-1900), a French hydraulic engineer who immigrated to the United States in 1849. The efficiency and durability of Geyelin's turbines helped persuade skeptical American mill owners of the advantages of the horizontal turbine, especially its higher power generation potential and decreased upkeep costs. Horizontal turbines extended the usefulness of direct-drive waterpower well into the twentieth century.

Building in Iron

Apart from advancing the use of heavy machinery and motive power, the WPF helped introduce cast iron as an architectural building material when it made key components for the four-story Edgar Laing Stores in lower Manhattan, completed in 1849. The first American building to feature self-supporting, multi-storied, cast iron load-bearing elements, the Edgar Laing Stores building was designed by James Bogardus (1800-1874), an early proponent of the use of cast iron in American commercial architecture. Although soon eclipsed by other iron firms specializing in structural members, the WPF continued to supply commercial cast iron work, largely in Manhattan, through the nineteenth century. The WPF also fabricated ironwork for lighthouses before and after the Civil War, like those erected at Whitefish Bay and Manitou Island in 1861 along the Upper Peninsula shore of Lake Superior and the second lighthouse at Cape Canaveral in Florida in 1868. All three lighthouses remain in service.

Top left: Detail of hand-drawn sketch from description of centrifugal pump built by the WPF for the Union Canal in Pennsylvania. Image from microfilm held by the Pennsylvania State Archives, Harrisburg, PA. Bottom left: Service schedule for the steam packet *Cleveland* from the Hawkeye newspaper of Burlington, Iowa, August 6, 1840.

Above: Detail from WPF letterhead dated to 1848 depicting a vertical beam engine for marine service. Original held in private collection.



High Profile Work

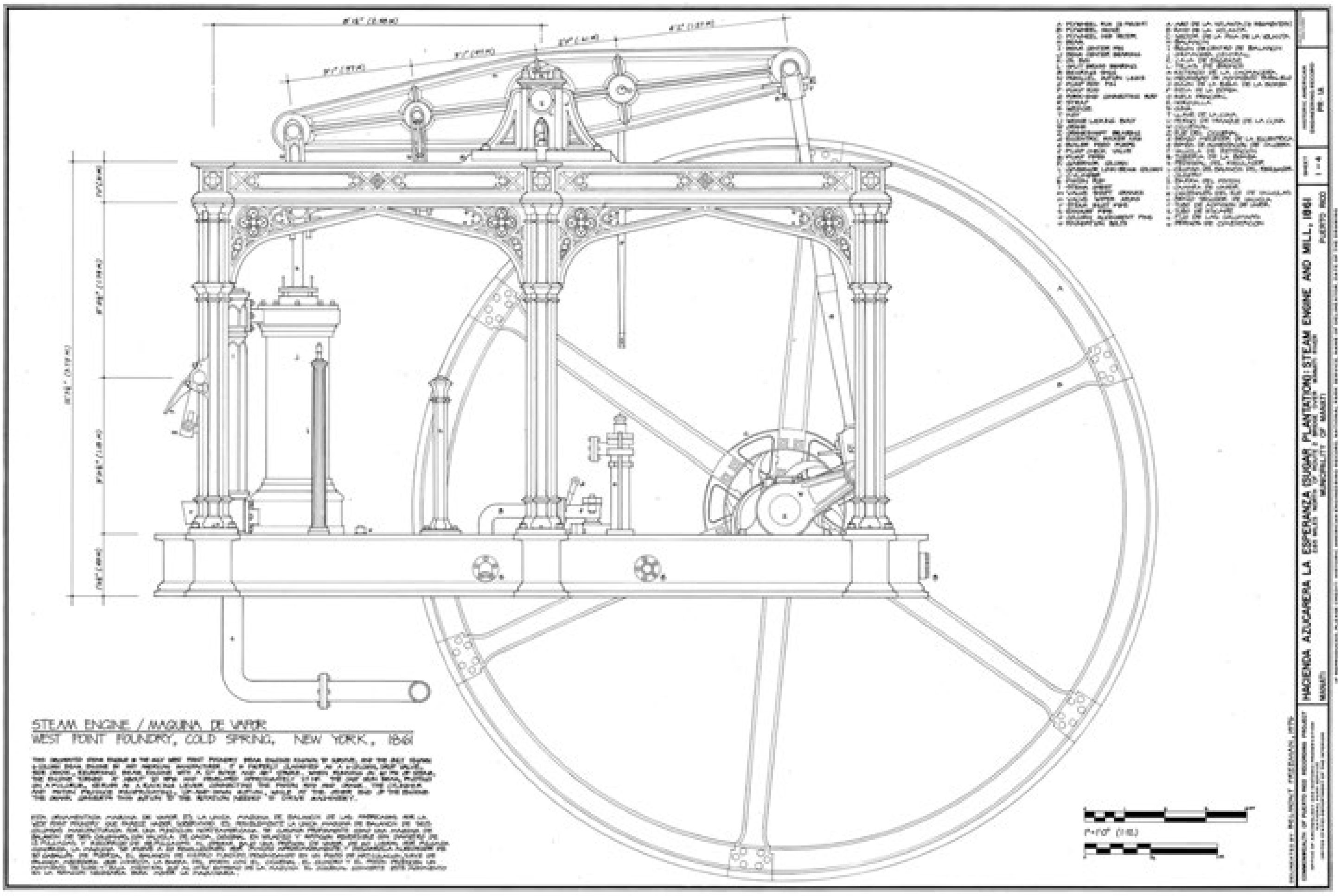
With an improving economy in the 1850s, the WPF maintained a leading presence in national markets for industrial machinery. In 1851, the WPF completed a beam engine and water pumping machinery for the newly built Dry Dock No. 1 of the New York Navy Yard in Brooklyn. Set in a 75-foot-tall Gothic cast iron frame, the striking, multi-story, 300-ton, 200-horsepower pumping engine was the largest engine of its kind in the nation at the time. Three years later, the much-heralded screw-driven steam frigate USS *Merrimack* was fitted out at the Boston Navy Yard with a back-acting engine made by the WPF. The novel power plant with its two opposing six-foot diameter steam cylinders proved troublesome in service yet would later drive the CSS *Virginia* during the Civil War. (Coincidentally, the WPF also made the XI-inch Dahlgren guns of the USS *Monitor,* which fought the *Virginia* to a draw in March 1862.)

Also helping expand the commercial iron trade as well as the navy in these years, the WPF furnished a pair of beam engines with 56-inch diameter steam cylinders and seven-foot diameter blowing cylinders for the Thomas Iron Company's first two anthracite blast furnaces completed in Hokendauqua, Pennsylvania, in 1855. Judged by many as the most productive blast furnaces in the United States at the time, together they set a standard for anthracite ironmaking into the 1860s. Regrettably, little remains of this site.

Surviving Works

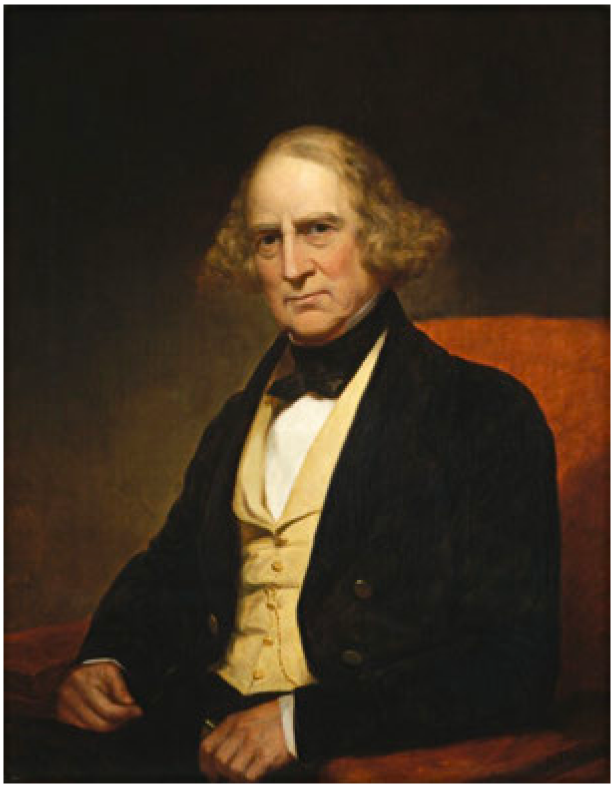
In 1856, the WPF supplied a 20-horsepower horizontal steam engine and boilers for the rebuilt Cornwall Furnace in southeastern Pennsylvania. The assembly is preserved in situ at the Cornwall Iron Furnace site, a state historic site (ASME Historic Mechanical Engineering Landmark #106). A second example is a restored and operational beam engine and sugar cane mill at the Hacienda La Esperanza Nature Reserve (Hacienda La Esperanza Para la Naturaleza) in Manatí, Puerto Rico (ASME Historic Mechanical Engineering Landmark #35). Completed in 1861 for José Ramon Fernández y Martinez, a leading sugar magnate, the frame of the steam engine incorporated Tudor Gothic accents resembling that of the beam engine built for the New York Navy Yard a decade earlier.

Although cast, forged, and finished as one piece with no moving parts, rifled Parrott guns count by far as the most numerous surviving objects that illustrate the cutting-edge engineering and ironworking capabilities of the WPF. They were extensively employed by Union artillery and naval forces during the Civil War, and examples still stand today on numerous battlefield parks and courthouse squares and in cemeteries across the country where Civil War dead are honored. Robert Parrott's eponymous cannon will likely remain the most recognizable symbol of the WPF for generations to come.



Left: Front elevation and cross-section of a back-acting engine built by the WPF in 1854 for the frigate USS *Merrimack*. Original drawing held in the National Archives and Record Administration, Washington, DC (Record Group 19, Bureau of Steam Engineering) and image courtesy of author Stephen C. Kinnaman.

Above: Elevation of a beam engine completed by the WPF in 1861 for a sugar plantation in Manatí, Puerto Rico. Drawing by the Historic American Engineering Record (HAER # PR-1A, delineated by Belmont Freeman, 1976).



Above: Gouverneur Kemble, chief organizer of the WPF (1786-1875). Portrait by Asher B. Durand, oil on canvas (1853). Image courtesy of the National Gallery of Art, Andrew W. Mellon Collection.

Opposite: Excavation of a machine pad in the boring mill (2012) and the restored West Point Foundry Office Building.

Engineering Careers

To make a range of instruments for peace and war, the WPF attracted multiple generations of tradesmen and engineers to Cold Spring. Many came from overseas, accelerating the transfer of technology and knowledge to an industrializing United States. William Young emigrated from Ireland at the urging of Gouverneur Kemble and served as the first superintendent of the WPF; he would later help establish the Ulster Iron Works rolling mill in Saugerties, New York, followed by the Mount Savage Iron Works in Maryland. English-born James Renwick, Sr. (1790-1863) was an original member of the West Point Foundry Association as well as a leading expert in steam engine design and mechanical and civil engineering, professor at Columbia College, and the author of influential technical treatises. He also served as consulting engineer on the design and machinery of the Morris Canal in New Jersey. Of unknown origins, David Matthew and Adam Hall together supervised the construction of the first railroad locomotives produced by the WPF as well as several marine engines in the 1830s.

Between 1836 and 1839, Charles W. Copeland (1815-1885) continued Adam Hall's work at the WPF on marine engines. Most noteworthy during his time in Cold Spring, Copeland built the *Siamese*, an iron-hulled catamaran paddle-wheel steamer for service on Lake Pontchartrain in Louisiana, and allegedly one of the earliest American-built iron-hulled vessels. After leaving the WPF, Copeland took on a naval constructor position with the U.S. Navy, where in 1840 at the New York Navy Yard he oversaw the fitting of a 600-horse-power WPF-made engine into the ill-fated sidewheel frigate USS *Missouri*. Copeland went on to have a distinguished career in engineering and would be a founding member of the American Society of Mechanical Engineers in 1880.

Charles H. Haswell (1809-1907) also worked as a high-level engineer at the WPF in the mid-1830s before going on to serve two stints as Engineer-in-Chief of the U.S. Navy in the 1840s and early 1850s. Like Copeland, he became one of the more influential naval engineers of the period. During and after the Civil War, Frederick Rumpf served as the lead engineer for machinery manufacture at the WPF (while Robert Parrott oversaw ordnance production) and exerted broad influence on mechanical engineering at the time.
The WPF also cultivated talent by taking on apprentices who learned skilled trades in working at the Foundry while completing classroom study at the nearby Foundry School. Many prominent American machinists and engineers in the mid-nineteenth century began their careers in apprenticeship at the West Point Foundry.

Of Lasting Importance in American History and Mechanical Engineering Heritage

Between 1820 and 1870, the WPF was a site of extraordinary American engineering work and talent. The locomotives, steam engines, and other capital goods it supplied made a critical contribution to early American industrialization—a role on par with the armaments manufacture for which it is widely known. The WPF nurtured many proofs-of-concept that advanced American mechanical engineering, but it was not the only place of heavy ironworking in the nation before the Civil War; it competed against firms in Boston, New York City, Philadelphia, Baltimore, Richmond, and Pittsburgh that also profited in emerging markets for capital goods. Unlike those of its competitors, however, the WPF site was not extensively razed or repurposed. Due to fortunate neglect, the West Point Foundry Archaeological Site is the most intact example of a manufacturing site of its kind dating from the early decades of American industrialization.

Though woodlands have reclaimed the site, the shops of the WPF are easily traced by building foundations and collapsed ruins, artifacts, and archaeological deposits. An Italianate-style, two-story brick office building, completed in 1865, stands as the site's most complete edifice. Listed on the National Register of Historic Places in 2010, the West Point Foundry Archaeological Site is the focus of the West Point Foundry Preserve, a public park owned and maintained by Scenic Hudson of Poughkeepsie, New York. The organization protected the 90-acre site in 1996 to prevent its development, then went on to advance an understanding of the Foundry by sponsoring industrial archaeological studies undertaken by Michigan Technological University between 2002 and 2008. Based on that research, Scenic Hudson made a $6-million investment in the creation of an "outdoor museum" that tells the story of the Foundry, its contributions to America's Industrial Revolution and the Civil War, and the land's subsequent ecological renewal. (The preserve's interpretive features include a mobile-friendly audiovisual tour, available at foundrytour.org.) Scenic Hudson also owns nearby Foundry Dock Park, a small park on the Hudson River that preserves the landside remains of the WPF's Long Dock and provides access for non-motorized boats.

Housed in the former Foundry School on Chestnut Street, the Putnam History Museum is within walking distance of the preserve and offers a permanent exhibit dedicated to the West Point Foundry along with collections of books, photographs, artifacts, and manuscripts that aid in telling the history of this one-of-a-kind place of engineering achievement. A Roman Catholic chapel, built in 1835 by Gouverneur Kemble for the WPF's workers, also survives nearby on the Hudson River. (Today, it is known as the Chapel Restoration.) In addition, many examples of workers' housing and commercial architecture from the WPF period can be found along the streets of Cold Spring.

Daytime parking at the West Point Foundry Preserve is available at the foot of Kemble Avenue, while a short pathway connects the preserve with the Cold Spring station of Metro-North Railroad (it follows the former railroad spur that served the WPF). Admission is free. Please be respectful of archaeological ruins, artifacts, and plant and wildlife communities. Interpreters and researchers lead occasional guided tours of the preserve, while the Putnam History Museum is open spring through fall, with a fee for admission. Information about upcoming tours and events can be found online and on social media for Scenic Hudson and the Putnam History Museum.

Places to Visit

West Point Foundry Preserve | 68 Kemble Avenue, Cold Spring, NY 10516 | ScenicHudson.org
Foundry Dock Park | 46 Market Street, Cold Spring, NY 10516 | ScenicHudson.org
Putnam History Museum | 63 Chestnut Street, Cold Spring, NY 10516 | putnamhistorymuseum.org
Chapel Restoration | 45 Market Street, Cold Spring, NY 10516 | chapelrestoration.org

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THE HISTORY AND HERITAGE PROGRAM OF ASME

Since the invention of the wheel, mechanical innovation has critically influenced the development of civilization and industry as well as public welfare, safety and comfort. Through its History and Heritage program, the American Society of Mechanical Engineers (ASME) encourages public understanding of mechanical engineering, fosters the preservation of this heritage and helps engineers become more involved in all aspects of history.

In 1971 ASME formed a History and Heritage Committee composed of mechanical engineers and historians of technology. This Committee is charged with examining, recording and acknowledging mechanical engineering achievements of particular significance. For further information, please visit www.asme.org.

LANDMARK DESIGNATIONS

There are many aspects of ASME's History and Heritage activities, one of which is the landmarks program. Since the History and Heritage Program began, 271 artifacts have been designated throughout the world as historic mechanical engineering landmarks, heritage collections or heritage sites. Each represents a progressive step in the evolution of mechanical engineering and its significance to society in general.

The Landmarks Program illuminates our technological heritage and encourages the preservation of historically important works. It provides an annotated roster for engineers, students, educators, historians and travelers. It also provides reminders of where we have been and where we are going along the divergent paths of discovery.

ASME helps the global engineering community develop solutions to real world challenges. ASME, founded in 1880, is a not-for-profit professional organization that enables collaboration, knowledge sharing and skill development across all engineering disciplines, while promoting the vital role of the engineer in society. ASME codes and standards, publications, conferences, continuing education and professional development programs provide a foundation for advancing technical knowledge and a safer world.

Opposite and back cover: West Point Foundry Preserve
photos: Robert Rodriguez, Jr.

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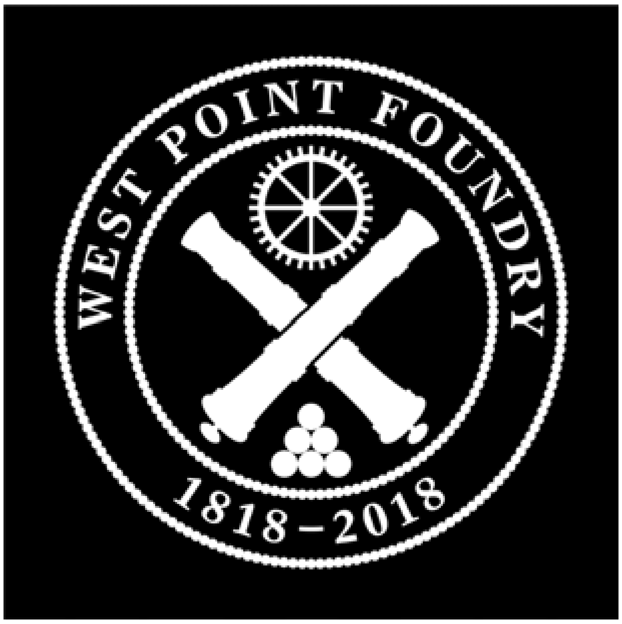

SCENIC HUDSON

Scenic Hudson preserves land and farms and creates parks that connect people with the inspirational power of the Hudson River, while fighting threats to the river and natural resources that are the foundation of the valley's prosperity.

ScenicHudson.org