Marketing Dynamics of the West Point Foundry, 1817-1911: A Value-Chain Analysis

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Background and Purpose

Operating from 1817 to 1911, the West Point Foundry was one of the most productive and historically-important American manufacturing operations of the period. Located in Cold Spring, New York (fifty miles north of New York City, and directly across the Hudson River from the West Point Military Academy), the foundry produced a wide variety of iron products, from ornamental latticework to the cannons and ordnance that were instrumental in the Union Army victory in the U.S. Civil War.

During the War of 1812, the United States had very limited capacity to manufacture heavy military ordnance—most of the weaponry used was imported. After the war, the West Point Foundry was initially funded by a federal subsidy authorized by President James Madison after the War of 1812. The purpose: to provide the United States with a means to produce heavy artillery. The presidential decree spurred the formation of the West Point Foundry Foundation, directed by former U.S. Member of Congress Governeur Kemble and U.S. Army General Joseph Swift. Three other foundries were built in Pittsburgh, Richmond, and Georgetown ((Rinaldi and Yasinsac, 2006).

In general, the West Point Foundry benefitted from supply-chain efficiencies because all of the essentials for producing and distributing iron products were proximal to the location. The purpose of this paper is to provide an examination of the basic value-chain dynamics of the West Point Foundry (hereafter, WPF). Porter's original (1985) value-chain typology offers insights into the general marketing dynamics of the foundry and the unique logistical factors that contributed to its success. We will examine both the primary activities (inbound logistics, operations, outbound logistics, and marketing, sales, and service) and the support activities (infrastructure, human resource management, and technology development) (Porter, 1985).

Value-Chain: Primary Activities

Inbound & Outbound Logistics

From a value-chain perspective, the core competitive advantage of the WPF lay in its extraordinarily fortuitous efficiencies in both inbound and outbound logistics. Raw material logistics were particularly efficient at the WPF location. Perhaps most importantly, iron ore was plentiful in mines in nearby Orange and Putnam counties. Forests surrounding the location provided wood for charcoal to fire the blast furnace. Sand for making molds was easily extracted from the Hudson River, whose shores lay a few hundred feet from the WPF site. Limestone (added to the initial iron ore and charcoal mixture as a liquefying agent) was also plentiful in the area. Local brick-making facilities in Haverstraw and Beacon provided brick to building and furnaces (Isleib and Chard, 2002).

The WPF also constructed a two-hundred-foot rail dock extending out into the Hudson River, effectively transforming Cold Spring into a deep water port for the offloading of raw materials and the loading of finished goods for shipping to New York City and other destinations. At the time the WPF was founded, the roads were not capable of transporting heavy materials or large finished goods. While rail transportation was increasingly available throughout the 19th century, shipping was the most efficient and important means of transportation for the WPF (Lewis, 2005).

Two other major events in American logistics and transportation history were paramount in facilitating the success of the WPF. First, the opening of the Erie Canal in 1825 provided access to the markets of the mid-west, via the ports of the Great Lakes. Goods produced by the WPF could now be transported north on the Hudson to Albany, and then west on the canal, eventually entering the Great Lakes waterways and the myriad ports thereof. Second, the Delaware and Hudson Canal, opened in 1828, connected (with the assistance of two gravity-railroads) the anthracite coal mines of Pennsylvania with the Hudson River at Kingston, forty miles north of the WPF. This new source of power was critical, because by the mid-1800s the area around the WPF was becoming increasingly

deforested, making the charcoal that had fueled its earliest days scarce. Most of the Pennsylvania coal was bound for New York City, but the barges also found the WPF to be a willing and important customer, and the WPF long dock became a regular off-loading stop.

Operations

In 1836, former U.S. Army officer Robert Parrott joined the WPF as a superintendent. Parrott purchased a one-third share in the operation in 1837, and married WPF founder Governeur Kemble's daughter in 1839. Parrott brought an innovative spirit to the foundry operations and continually developed new ideas in both foundry operations and product design.

In 1838, another foundry operation that was managed by the WPF Foundation, at Beach Street in New York City, closed and most of its assembly and machine shops, as well as much of its workforce, were moved to Cold Spring. This gave the WPF even greater range in manufacturing, allowing for the production of engines and boilers for steamships and other industrial uses; hydraulic cylinders and gigantic cast-iron pipes for the developing New York aqueduct system (which carried, as it still does, water from the Catskill Mountains to the reservoirs that serve New York City).

Other (pre-Civil War) products included: cotton presses sold to Southern States; textile mill machinery sold to operations in Nova Scotia, the Caribbean, and Austria; sugar mill machinery exported to the West Indies; 24-pound cannons; box stoves and ovens; wheels, engines, plummer blocks, gudgeons, shafts, cranks, flanges, and other specialized machinery castings; lighthouse structures; the locomotive *Dewitt Clinton* (first locomotive built in New York state , in1830); hat racks and umbrella stands; decorative cast iron benches given to Washington Irving for his Sunnyside estate near Tarrytown. In short, the WPF took the local raw materials and transformed them into a staggering variety of industrial and end-consumer products.

The peak of WPF operations came during the Civil War (1861-1865). In 1860, Robert Parrott invented the Parrot gun, considered decisive weapon in the Union victory. The guns ranged in size from 73 inches (capable of shooting a 10-lb. projectile) to 156 inches (300 lb. projectile). The production of the Parrot gun focused on speed rather than "quality"—most of the guns produced fell short of the highest ballistic standards, but the customer (the Union army) wanted them fast, and was willing to trade off "quality." (Nonetheless, the largest of the Parrot guns produced at the WPF were able to penetrate the masonry of Confederate forts, a distinct competitive advantage for the Union army.) In addition to the Parrot gun, the WPF also produced other cannons, ordnance, and gun-carriages. In all, the WPF produced more than 1,000 cannons and 1,000,000 projectiles for the Union army. Its importance in the Union army victory resulted in international recognition for the WPF as one of the most important industrial organizations in the United States (Isleib and Chard, 2002).

However, the end of the Civil War was the beginning of the decline of the WPF. Government contracts dried up, and the WPF was finding it difficult to make payments on debt incurred during their expansion. The WPF workforce fell from peak of 2000 during the Civil War to 150 in 1886. Exacerbating the decrease in demand for iron products was the increase in the demand for steel, most notably produced in the mills of Pittsburgh. But the WPF continued to operate, at a reduced level of output, through the 1890s, satisfying a combination of military and private contracts.

In 1897, the WPF was purchased by the Cornell Iron Company of New York; the foundry continued to produce, on a relatively small scale, a range of products from heavy ordnance to decorative cast iron. The company produced 8000 tons of structural steel for the construction of the Park Row Building in New York, completed in 1899 and the tallest building in the world at the time. That was the last of the big contracts for the WPF; business continued to slow after that and WPF operations ceased in 1911.

Marketing, Sales & Service

Most of the pure marketing activity for the WPF was indirect. From 1820 to 1838, the WPF auxiliary location at Beach Street in Manhattan handled most of the final machining, finishing, assembling and storage of wrought and cast iron products. From this location, the products were then shipped to final customers. After 1838, these functions were moved to the Cold Spring location.

The efforts to supply the Union army with guns and ordnance required little marketing, as the customer orders were direct and unsolicited. However, product testing and demonstration was undertaken, by using Crow's Nest Mountain across the Hudson River for target practice. On June 24, 1861, this testing took on the characteristics of both a "customer sample" and a public relations effort, as President Abraham Lincoln arrived in Cold Spring to observe the range and accuracy of the guns.

The WPF also found its way into popular culture. Jules Verne uses the WPF as the manufacturer of a rocket in his novel *From Earth to the Moon*. John Ferguson Weir featured the WPF in two of the era's most famous American paintings: *The Gun Foundry* (1867) and *Forging the Shaft* (1868). The two paintings highlighted the military and non-military products of the WPF, respectively.

In an interesting convergence of divergent realms, the by the mid-1800s WPF executives often hosted social gatherings that included the artist Asher Durand, the writers Washington Irving and William Cullen Bryant, and Sylvanus Thayer, the founding superintendent of the West Point Military Academy. From a public relations perspective, these cultural affiliations added to the gravitas that the WPF had established as an important factor in the nation's industrial development.

Value-Chain: Support Activities

Infrastructure

Several infrastructure factors contributed to the value-chain advantages enjoyed by the WPF. The actual site in Cold Spring was a flat 90-acre parcel for the actual ironworks (part of land that had been forfeited by Frederick Philipse III, and prominent landowner who had been a Loyalist during the Revolution). An internal rail system running end-to-end through the center of the WPF moved materials and finished goods through the process, and then ran out to the long dock that had been extended into the Hudson for deep water off- and on-loading. Also running through the site was Foundry Brook, which provided water power for several aspects of the process, including lathes to machine large cannons and a water-wheel-powered bellows to fire the 30-foot blast furnace (Isleib and Chard, 2002). In addition, security and protection for the WPF during the Civil War was provided by the military presence at West Point (Lewis, 2005).

*Human Resource Managemen*t

As the WPF grew, the village of Cold Spring grew also to provide the workforce, mostly immigrants from the British Isles who were experienced foundry workers. (As this was a violation of British law, the ships carrying the workers sometimes had to outrun British galleons.) An apprenticeship program was established to help grow workforce locally. WPF provided housing, education, clothing, and health care at an infirmary adjacent to the foundry site. In 1828 the Chapel of Our Lady church was built to service the predominantly Irish Catholic workforce.

Technology Development

Applying the most up-to-date metallurgical technologies, the WPF was capable of producing a wide range of iron products. Small products were made directly from the pig iron that emerged from the blast furnace; larger products required a remelting of the pig iron in three smaller cupola furnaces that provided better temperature control and allowed for the manufacturing of cast iron products and even smaller "puddling" furnaces for producing wrought iron products.

Other technological dynamics were aided by the logistical efficiencies of the WPF location. In 1842, Parrott discovered that the pig iron produced at a small foundry 20 miles from Cold Spring in Greenwood, New York, was much stronger than that produced by the blast furnace at WPF. The WPF began buying this pig iron from the Greenwood foundry, and soon ceased operating the blast furnace in Cold Spring. The extra strength (due to less limestone required, a function of the nature of the iron ore used) was worth the extra transportation costs (20 miles of poor roads and a ferry across the Hudson).

Data Sources:

Putnam County Historical Society & Foundry School Museum, Cold Spring, NY:

1. Permanent collection
2. Special exhibition, "Making a Living: Businesses in Philipstown and Beyond, 1850-1970.

Research Notes and Reports: Michigan Technological University Industrial Archaeology Program, West Point Foundry Field Project

References:

Isleib, C. R., and Chard, J. (2002), *The West Point Foundry & the Parrot Gun*, Purple Mountain Press, Fleischmanns, New York.

Lewis, T. (2005), *The Hudson: A History*, Yale University Press, New Haven, Connecticut.

Porter, M. E. (1985), *Competitive Advantage*, Free Press, New York.

Rinaldi, T. E. and Yasinsac, R. J. (2006), *Hudson Valley Ruins*, University Press of New England, Hanover, New Hampshire.