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Steamtown

SPANG, CHALFANT & Co.

Locomotive No. 8

HISTORIC STRUCTURE REPORT

Part I

Prepared by
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August 1996

United States Department of the Interior
National Park Service
Steamtown National Historic Site

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Introduction

This report was prepared by Steamtown National Historic Site (NHS) on Spang, Chalfant & Co. 0-6-0 steam locomotive No. 8. The objective was thorough documentation of the locomotive's construction and operating history, in preparation for its acquisition by Steamtown National Historic Site as a museum display.

This study covers the history and physical configuration of the locomotive. Documentation includes locomotive and corporate histories, specifications, evaluation of the engine's current condition, component analyses, and paint analysis.

The Baldwin Locomotive Works (BLW) of Eddystone, PA, built No. 8 in April 1923 for Spang, Chalfant and Company of Etna, PA. Spang and a later owner, the Duquesne Slag Company, operated the locomotive in the vicinity of Pittsburgh for forty-one years. Duquesne Slag sold No. 8 to a private owner in 1964. It remained in private hands under a series of owners for an additional thirty-one years. The locomotive was eventually disassembled and placed in open storage in Clarks Summit, PA. At the time of storage the locomotive's original fabric was marginally intact, with serious deterioration of the firebox, boiler, smokebox and running gear.

Steam locomotive mechanic/restoration specialist J. David Conrad acquired No. 8 in early 1995, for the purpose of restoring the locomotive to non-operating condition, pursuant to its use as a static display.

The locomotive arrived at Steamtown National Historic Site on 25 July 1996. Following final preparation it will go on display in the park's Technology Museum.

Number 8's eligibility for the National Park Service List of Classified Structures and the National Register of Historic Places will be explored at a later date.

Administrative Data

Management Data

Spang, Chalfant and Company No. 8 is an 0-6-0 switcher-type steam locomotive, manufactured by the Baldwin Locomotive Works of Eddystone, Pennsylvania. Baldwin built the locomotive in April 1923 for Spang, Chalfant and Company of Etna, Pennsylvania. Number 8 was subsequently sold to the Duquesne Slag Company of Pittsburgh and a series of private owners. The locomotive became a component of the Steamtown NHS collection in January 1996.[1]

Proposed Use

The locomotive was stripped, painted, and reassembled by J. David Conrad for use as an interpretive exhibit in the Technology Museum at Steamtown NHS. The intact left side of the locomotive was repainted to its correct Spang, Chalfant and Company appearance. Portions of the right side smokebox, firebox, boiler, cylinders, cab and the tender were cut open for view by park visitors.

Planning Background

Steamtown National Historic Site was established by Public Law 99-591 on 30 October 1986. The final Steamtown National Historic Site Comprehensive Management Plan was released seventeen months later, in March 1988. The Railroad Yard Design Program/Interpretive Concept for Steamtown National Historic Site was approved in August 1989.

Proposed Treatment and Justification

Locomotive No. 8 is representative of steam-era industrial railroading in Pennsylvania. It was restored and modified into a static display to support the interpretive theme of Steamtown NHS.

Recommended Treatment for Materials Collected in Preparing This Report

All materials collected for this report, including photographs, drawings, field notes and other research materials will be turned over to the park's archives for placement in appropriate files.

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[1] Acquisition and ownership documentation is provided in Appendix 1.

Source Materials

Several individuals, institutions, and organizations were contacted for information, and generously made available documentary materials regarding Spang, Chalfant and Company and The Baldwin Locomotive Works. Steamtown NHS appreciates the assistance of:

J. David Conrad	- Chief Mechanical Officer, Valley Railroad, Essex, CT
Sloan Cornell	- President, Knox and Kane Railroad, Marienville, PA
George Deeming	- Curator, Pennsylvania State Railroad Museum, Strasburg, PA
Stanley Hall	- General Manager, East Broad Top Railroad, Mount Union, PA
Robert Patterson	- Former owner, Nicholson, PA
Willard Sturdevant	- Former owner, Dalton, PA
Albert Tannler	- Archivist, Pittsburgh Historical and Landmarks Foundation, Pittsburgh, PA
William Withuhn	- Curator for Transportation, Smithsonian Institution, Washington, D.C.

The Pittsburgh Historical and Landmarks Foundation and the Historical Society of Western Pennsylvania possess archival material on Spang, Chalfant & Co. and were visited by the author.

Archival material on the Baldwin Locomotive Works is held by the Pennsylvania State Railroad Museum in Strasburg, PA, the DeGolyer Library, Southern Methodist University, Dallas, TX, and the California State Railroad Museum, Sacramento, CA. The Pennsylvania State Railroad Museum holds the Baldwin Photograph Collection. In future endeavors, researchers should contact or perhaps visit these repositories.

Documentary History and Analysis

Spang, Chalfant & Company

In the late 1740s, trader George Croghan built a small fortified house at the base of Pine Creek on the Allegheny River in western Pennsylvania. The location, five miles above the Allegheny's confluence with the Monongahela River, was suitable for both agricultural and transportation uses and quickly drew other settlers. Within a few years the post was a bustling community described as having "several fields cleared and stockaded, together with log-houses, batteaux and canoes, and a Factor in residence." The residents chose Centerville for the name of their new town.[2]

The community continued to grow after Croghan's death in 1782. The first industry arrived in 1817, with the erection on Pine Creek of the factory of Belknap, Bean and Butler. The facility, reputedly the third rolling mill west of the Allegheny Mountains, produced iron scythes and sickles. In 1824, the partners enlarged the plant and installed steam power for the mill machinery. Two years later, financial problems forced Belknap, Bean and Butler to suspend operations. Henry S. Spang acquired the vacant factory in 1828.[3]

Henry Spang's family were pioneers in the early iron and steel industry of the United States. His grandfather, Rotterdam native Hans Georg Spang, emigrated to Berks County, Pennsylvania, in 1751. In 1772, Hans' son Frederick acquired the Oley Furnaces at Semple, Pennsylvania. The furnaces dated to 1744, and were among the first placed in operation in the American colonies. Henry S. Spang acquired the furnaces upon Frederick's death.[4]

Following the completion of the Pennsylvania Canal to Huntingdon in 1822, Henry Spang moved his operation west to Blair County. The lightly developed region had rich deposits of coal and iron ore;

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[2] Terry A. Necciai, "Allegheny County Survey Zone Form, Etna Borough," 1. File, Etna Borough. Pittsburgh History and Landmarks Foundation, Pittsburgh, PA. Bateaux were flat-bottomed river boats.

[3] Necciai, "Allegheny County," 1; Pittsburgh of To-Day. Pittsburgh: Consolidated Illustrating Co., 1896, not paginated. Museum collection, file "Spang-Chalfant." Historical Society of Western Pennsylvania, Pittsburgh, PA.

[4] John W. Jordan, Encyclopedia of Pennsylvania Biography, Vol. VI (New York: Lewis Historical Publishing Company, 1916), 1884; Charles C. Henderson, "Short History of Spang, Chalfant & Company." Sharpsburg Herald, 1908, n.p. Photocopy. File, Etna Borough, Pittsburgh History and Landmarks Foundation, Pittsburgh, PA; Arthur Cecil Bining, Pennsylvania Iron Manufacture in the Eighteenth Century (Harrisburg: Pennsylvania Historical and Museum Commission, 1973), 172.

the canal provided a means of transportation to eastern markets. Spang acquired the vacant Beekman and Company Iron Works south of Shaffersville with his oldest son, Charles F., and established H.S. Spang and Son. He renamed the mill the Etna Iron Works, reportedly for volcanic Mount Etna in Italy. Within a few years the Spangs were turning a profit at their new location.[5]

Charles' travels in search of materials and business opportunities pfor the family mill regularly took him throughout western Pennsylvania. It was he who discovered the available Belknap, Bean and Butler rolling mill on Pine Creek in 1828. Charles contacted his father and - after much discussion - convinced him to acquire the mill and relocate near the growing iron center of Pittsburgh. Henry Spang bought the vacant factory and moved his family to Centerville. His son became the General Manager of H.S. Spang and Son's new Etna Iron Works at age nineteen.[6]

The company flourished in its new location. Annual production of iron products at the Etna works exceeded 1,100 tons by the mid-1830s, with nails and angle iron providing the greatest sales. In 1850, Spang started manufacturing several sizes of wrought iron pipe. The discovery of oil near Titusville, PA, nine years later increased the demand for Spang's products. Iron pipe rapidly became the company's number principle product, totalling over one million pounds annually by 1856. That year's output also included 19,985 pounds of flue iron and boiler tubes for the Pennsylvania Railroad's Juniata Locomotive Shops.[7]

The town of Centerville prospered and grew along with the company, and eventually adopted the Etna name in recognition of its largest single employer. The plant occupied the area now between Etna's Butler and Bridge Streets, and was divided into the Pipe Mills (east of Butler) and the Upper Mills (west of Butler). A contemporary description of the plant stated:

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[5] Jordan, Pennsylvania Biography, 1884; Henderson, "Short History," not paginated.

[6] Henderson, "Short History," not paginated; "Charles Frederick Spang." Biographical sketch. Folder BA #3, Biographical/ Historical Sketches, Spang, Chalfant and Company. Museum Collection, Historical Society of Western Pennsylvania, Pittsburgh, PA.

[7] Necciai, "Allegheny County," 1; Spang, Chalfant and Company. Ledger F - Production Record, Etna Rolling Mill, 12 May 1832-29 March 1833; Ledger FB, 1856-1882; "Charles Frederick Spang." Folder BA #3, "Biographical/Historical Sketches, Spang, Chalfant and Company." Museum Collection, Historical Society of Western Pennsylvania, Pittsburgh, PA.

> The works occupy a desirable location on Pine Creek and the Allegheny River, and cover a large area of ground. The buildings are substantial and spacious structures, well arranged to secure the most economical handling of materials, and having a very costly and extensive equipment. Upwards of 1,000 hands are employed in the different departments, the works having an output of some 35,000 tons annually of finished product. It includes all standard sizes of merchant iron, flats, rounds, squares, etc., band iron, tank and sheet iron; the best grades of wrought iron welded tubes for boilers, gas, steam and water, oil well tubing and casing, line pipe, and drive pipe.[8]

Individual buildings included power plants, pipe storage warehouses, a machine shop, rolling mills, and several forges. The company also provided a swimming pool and meeting house for its employees, as well as a small clinic. Shipments of materials and finished products to and from the complex were handled by the Pennsylvania Railroad.[9]

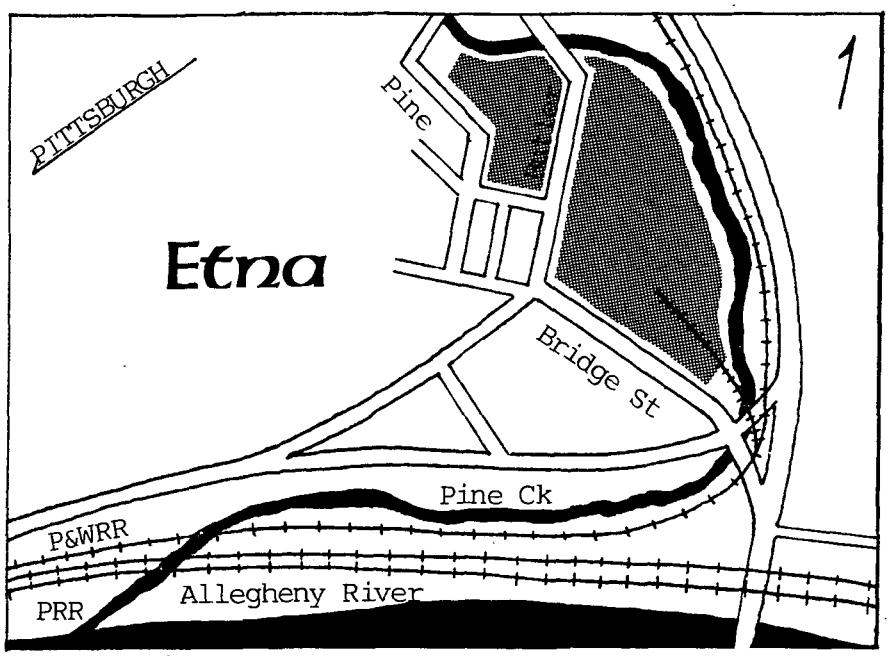

Fig. 1. Location of Spang, Chalfant and Company in Etna, PA. Not all streets are shown. Not to scale. Illustration by the author.

Henry Spang died in 1845, having placed his company in excellent position for growth in the 1850s and 1860s. Upon his death ownership passed to his son Charles and Charles' partners James

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[8] Pittsburg of To-Day, not paginated.

[9] Insurance Maps of Pittsburgh, Pennsylvania, Vol. 15. New York: Sanborn Map Company of New York, 1927, 1572.

McAuley and Joseph Long. The business was renamed Spang and Company in 1840 to reflect the partnership.[10]

Charles F. Spang continued to build on Spang and Company's reputation and profitability during his thirteen years at the head of the firm. He too followed tradition and involved his two sons in the management of the family business. One son, Norman, worked for the company for several years before leaving the family business and moving to France. The older son, Charles H., was groomed as the successor.[11]

Charles F. Spang retired in 1858, after thirty years total service, and relinquished control of the rolling mills to his son Charles H. At the time of his departure Spang and Company was recognized as one of the strongest and most profitable "small" steel producers and one of the nation's leaders in the production of pipe. After his retirement, Charles F. moved to Nice, France, where he died on 18 July 1904. A biographer noted that Spang was, "The last survivor of the famous Iron Masters of the former half of the nineteenth century. He is the most commanding figure in an industrial dynasty."[12]

The business was reorganized upon Charles H. Spang's ascension to the presidency. The corporation was renamed Spang, Chalfant and Company to reflect the addition of John W. Chalfant, Campbell B. Herron, A.M. Byers, and Alfred G. Lloyd as partners.[13] Chief among the new partners was John Weakley Chalfant, born on 13 December 1827, in Turtle Creek, Allegheny County. Chalfant's experience in the iron industry dated from 1850 and his employment by Zug and Painter in Pittsburgh. Six years later he purchased an interest in Spang and Company, and became a full partner with Charles H. Spang in 1858. John's brother, George A. Chalfant, joined the partnership in 1863.[14]

Charles H. Spang and John Chalfant extended their partnership to several other ancillary activities which promoted local business and philanthropic efforts. Chalfant was the founder and president of the People's National Bank of Pittsburgh, while Spang served as

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[10] Jordan, Pennsylvania Biography, 1885.

[11] Jordan, Pennsylvania Biography, 1884-1887; "Charles Frederick Spang," 1-4.

[12] "Charles Frederick Spang," 4; Jordan, Pennsylvania Biography, 1886.

[13] Ibid.

[14] John W. Jordan, Encyclopedia of Pennsylvania Biography, Vol. I (New York: Lewis Historical Publishing company, 1914), 123-124.

a director. The partners also served as directors of the Pittsburgh and Western (P&W) Railroad, the Pittsburgh Junction Railroad, and the Pittsburgh Locomotive Works. The three-foot gauge P&W connected Etna with the Baltimore and Ohio (B&O) Railroad at New Castle, PA. The B&O shipped iron ore from the Great Lakes port of Cleveland, OH, to New Castle. From there the P&W brought the ore directly to Etna.[15]

In 1871, Spang and Chalfant joined several other iron investors in the formation of the Isabella Furnace. The name was given in honor of Mrs. Isabella Herron, the wife of company partner Campbell Herron. The investors built the furnace using the latest techniques and materials and used it for the test and evaluation of new production methods. The Isabella Furnace proved to be highly successful and was later used to produce ferro-manganese steel.[16]

John Chalfant's greatest contribution to the company was the introduction of natural gas as a heating fuel for the mill's furnaces. Traditionally, iron and steel manufacturers used coal as the fuel for melting pig iron. In 1875, Chalfant installed a natural gas line between the plant in Etna and a natural gas field in Butler, PA. This pipe line was the first of its kind in the world and enabled the company to increase both production and efficiency.[17]

Charles H. Spang's retirement from the company after 1875 marked the end of over one hundred years of Spang family leadership in the American iron and steel industry. John Chalfant assumed the presidency of the corporation and, in 1878, organized the Spang Steel and Iron Company as the operating subsidiary of Spang, Chalfant and Company. Campbell Herron and George Chalfant were installed as president and general manager respectively.[18]

Spang, Chalfant and Company continued to grow under the capable leadership of the Chalfant brothers and Herron. In 1889, the prosperous Etna plant was one of the featured industries of the *Congreso Internacional Americano*. The conference's presentation on

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[15] Necciai, "Allegheny County," 1, 2; Jordan, Pennsylvania Biography, Vol. I, 125; Pittsburgh of To-Day, not paginated; Mike Walker, Comprehensive Railroad Atlas of North America - North East U.S.A. (Near Faversham, Kent, UK: Steam Powered Publishing, 1993), 55.

[16] Necciai, "Allegheny County," 1, 2; Jordan, Pennsylvania Biography, Vol. I, 125; Pittsburgh of To-Day, not paginated. The Isabella Furnace was sold to Carnegie Steel in 1909. Carnegie operated it until 1954.

[17] Jordan, Pennsylvania Biography, Vol. I, 124; Pittsburgh of To-Day, not paginated; "Charles Frederick Spang," 4.

[18] Jordan, Pennsylvania Biography, Vol. I, 124.

La Compañia de Hierro Y Acero Spang, Limitada commented that the company employed 400 persons and had a production capability of 50,000 tons per year.[19] Products included steel for boilers and fireboxes, steel plates for ships and bridges, steel ingots, steel bars, and steel railings. Spang's use of natural gas-fired open furnaces was highlighted.[20]

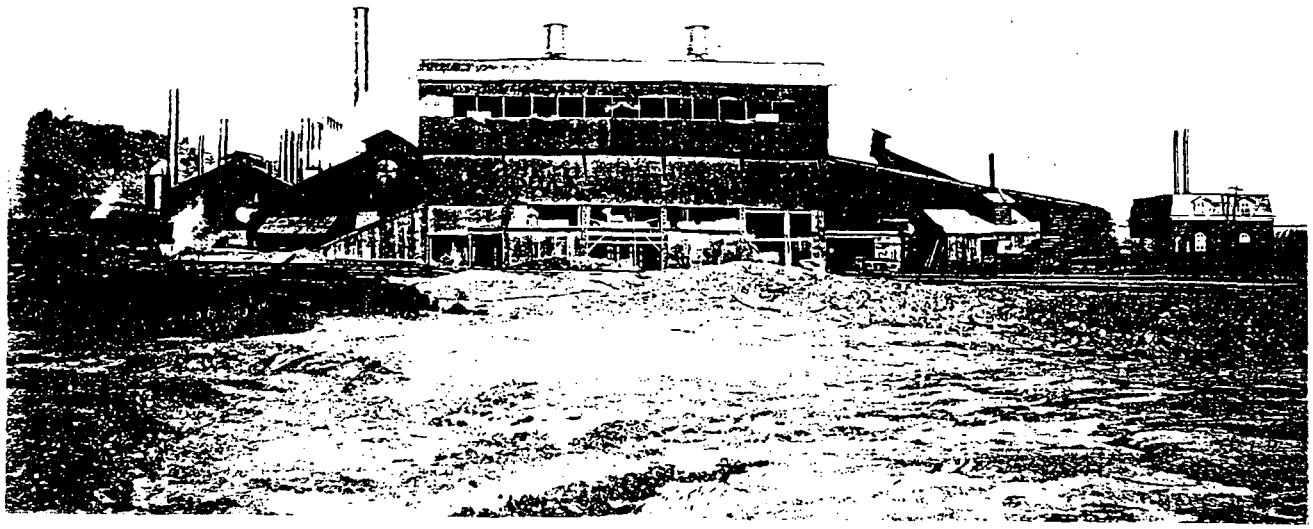

Fig. 2. Photograph of the Spang, Chalfant & Co. factory at Etna, PA, during the 1880s. From Notas Interesantes Acerca de Pittsburg (Pittsburgh: *La Camara de Comercio de Pittsburgh*, 1889), not paginated. File "Spang-Chalfant," Historical Society of Western Pennsylvania, Pittsburgh, PA.

John Chalfant died one decade after the international conference, on 28 December 1898. With his passing management of the company passed to his son, Henry P. Chalfant. Henry reorganized the corporation with himself as president and George Matheson, Jr., as vice president and general manager.[21]

Spang, Chalfant and Company continued to expand and modernize through the first three decades of the twentieth century. The last charcoal-fired forge at the factory was closed in 1913, leaving seven natural gas furnaces in service. By the end of World War I,

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[19] The Spang Steel and Iron Co., Limited.

[20] Notas Interesantes Acerca de Pittsburg. Pittsburgh: *La Camara de Comercio de Pittsburgh*, 1889, n.p. File "Spang-Chalfant," Historical Society of Western Pennsylvania, Pittsburgh, PA. Translation by author.

[21] Directory of the Iron and Steel Works of the United States and Canada, 19th ed. (New York: American Iron and Steel Institute, 1920), 323.

the Etna Iron and Tube Works boasted a total annual capacity of 200,000 tons black pipe, 24,000 tons galvanized pipe, and 7,000 tons of boiler tubes produced in sizes ranging from one-eighth inch to twenty-four inches diameter. To support production and sales, the corporation moved to offices in the Bank Building in downtown Pittsburgh and opened sales offices in Chicago and St. Louis.[22]

Henry's retirement in the mid-1920s ended Chalfant family ownership and operation of Spang, Chalfant and Company. New corporate management acquired a second rolling mill at Ambridge, PA, in the late 1920s. The second mill was called the "Standard Works," to differentiate from the older Etna Works. Efforts to further improve the corporation's market share came to a halt in 1929, when the Great Depression hit the country. The resulting financial collapse heavily impacted the coal and steel industries of Pittsburgh, including Spang, Chalfant and Company. The greatest single blow to Spang's fortunes came in 1933, in the form of a region-wide coal and steel strike.[23]

The industries of Pittsburgh had borne the brunt of strikes and labor violence several times since the riots of 1877 and the Homestead Steel strike of 1892.[24] In the early 1930s, several unions were attempting to organize the coal and steel industries of the Allegheny region. The main points of contention between labor and industry leaders were the "captive" coal mines - those directly owned by the big steel producers - and the unionization of the smaller steel companies.[25]

In 1933, during President Franklin D. Roosevelt's first term, the National Recovery Administration (NRA) and National Labor Board (NLB) established the right of labor to bargain collectively. The owners responded by refusing to recognize and negotiate with the unions. In late September 1933, the American Federation of Labor (AFL) and United Mine Workers (UMW) called a strike, which rapidly spread through western Pennsylvania, Ohio, Indiana, West Virginia, and northern Kentucky. Picketing quickly expanded to include steelworkers at Bethlehem Steel, Carnegie Steel, Weirton Steel and

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[22] Ibid.

[23] Directory of the Iron and Steel Works of the United States and Canada, 22d ed. (New York: American Iron and Steel Institute, 1935), 284.

[24] James Truslow Adams, The March of Democracy, Vol. 3 (New York: Charles Scribner's Sons, 1933), 276-277; Laurence Urdang, ed., The Timetables of American History (New York: Simon & Schuster, Inc., 1981), 254.

[25] Urdang, Timetables, 320; Samuel Eliot Morison, The Oxford History Of the American People (New York: Oxford University Press, 1965), 956.

the facilities of other "captive" mine owners. While these major corporations received the initial attention of the strikers, the strike also spread to the smaller independent operators, like Spang, Chalfant and Company. What started as an attempt to unionize the coal industry quickly became a steel strike, engulfing large and small alike.[26]

Several plants shut down after workers walked off the job. Strikers were bused and trucked throughout the region to participate in marches on the mines and steel plants that were attempting to operate. Two unions went after the manufacturers of the Beaver Valley, where Spang's Ambridge plant was located: The Steel and Metal Workers Industrial Union, which was not affiliated with the AFL, and The Amalgamated Association of Iron, Steel & Tin Workers.[27]

The confrontation came to a head in the first week of October. Despite the pleas of Pennsylvania Governor Gifford Pinchot and Federal officials, the strike spread to U.S. Steel and National Steel, raising the total number of strikers to 75,000. Striking miners and steelworkers refused to return to their jobs. The owners continued to refuse collective bargaining and recognition of the unions. Rioting broke out at National Steel's Steubenville, WV, plant on 1 October, resulting in several serious injuries and multiple arrests. Hundreds were arrested at several locations around Pittsburgh, primarily for inciting to riot.[28]

On Wednesday, 3 October, Spang, Chalfant and Company's Ambridge plant became the trouble spot. Rioting broke out shortly after 7:00 A.M. when over 300 pickets of both sexes blocked twenty Spang workmen from entering the facility. Deputy sheriffs moved in to protect the workers and were forced back by a hail of clubs, bricks and stones. The outnumbered deputies responded by throwing tear gas while Spang company policemen fired into the crowd from within the plant. The riot collapsed in the face of gunfire. One picket was shot and injured, three others were sent to the hospital, and scores of others left the scene with injuries.[29]

That evening Beaver County Sheriff Charles J. O'Loughlin swore in three hundred special deputies. The deputies were armed, given rudimentary training, and told to prepare for deployment to

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[26] Morison, American People, 956; "Weir Rejects Steel Union," The Pittsburgh Press, 3 October 1933, 2; "Ambridge Steel Picket Shot," The Pittsburgh Press, 4 October 1933, 2.

[27] "Weir Rejects Steel Union," 3 October 1933, 2; "Steel Picket Shot," 4 October 1933, 2.

[28] "Steel Picket Shot," 4 October 1933, 1.

[29] Ibid.

Aliquippa, Beaver Falls, Ambridge, Midland or wherever needed. That same night the Ambridge Borough Council met and authorized the use of the sheriff's special deputies to keep the streets clear of strikers.[30]

The picketers returned on 4 October without incident. On the morning of the 5th, pickets blocked traffic in and out of the plant in an attempt to prevent food and other supplies from getting to the employees that were still working:

> The shunting of three box cars into the plant was the signal for scores of pickets to clamber aboard the locomotive. Surrounding the engineer, they forced him to back the box cars out of the company property again. The pickets then spiked the switch, making it impossible to direct any more cars into the grounds.[31]

At 3:00 that afternoon five thousand striking steelworkers, coal miners, and supporters gathered in front of the plants of Spang, Chalfant and Company, Wycoff Steel Company, and Central Tube Company to hear James Egan speak. Egan, an organizer for the Steel and Metal Workers Industrial Union, pleaded for union solidarity and demanded that picketing continue until the union was recognized by the owners. After his speech, Egan was arrested and charged with inciting a riot and "inciting the unemployed." The crowd responded angrily. Sheriff O'Loughlin then arrived with his deputies, and announced that he had been ordered by the borough's leaders to clear all disorderly people from the street and entrances of the plants, stating, "We're here to open up the entrances and clear these streets, and we can do it. I hope you'll go peacefully."[32]

The crowd refused to disperse and the deputies waded in with tear gas, clubs, steel rods and shotguns. Individual picketers were approached and ordered to drop their weapons and depart. If they complied, they were allowed to leave; if they did not, the deputies started wielding their clubs. Within a few minutes the deputies were beating everyone and anyone who failed to move out of the way,

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[30] Donald E. Hirsch, "Reporter Who Ducked Bullets, Fled Tear Gas, Tells of Strike Battle." The Pittsburgh Press, 6 October 1933, 2.

[31] "More Hurt In Ambridge Riot." The Pittsburgh Press, 5 October 1933, 2. Conceivably, the locomotive may have been the company's 0-6-0, No. 8.

[32] "More Hurt," 5 October 1933, 2; Hirsch, "Reporter Who Ducked Bullets," 6 October 1933, 2. Egan was also the Communist Party of Pittsburgh's candidate for mayor. This fact was used by several steel owners and the press as proof that the strikes were motivated by communists.

including women, members of the press, and spectators. At least one deputy was clubbed by a striker.[33]

The fighting extended for blocks from the center of the town and the Spang, Chalfant main gate. The streets cleared quickly as the deputies left a trail of injured strikers and bystanders. An emergency aid station set up inside the plant's gate handled some of the wounded. Other injured protestors were removed by ambulances. The sole fatality was Adam Pietrszewski, 50, a candy dealer who had come to watch the disturbance. Pietrszewski was shot through the jugular vein.[34]

The central portion of Ambridge was cleared by 3:30 PM, only one half-hour after Egan began his solidarity speech. Police and deputies continued to move through town disarming people, including gangs of women armed with clubs and lead-weighted potato mashers. Several women protestors made the rounds of Spang employee's homes and threatened their families. The Ambridge police responded by placing guards around the houses. The women strikers booed the police, but took no steps toward renewing the violence. As a final step, Ambridge Police Chief John W. Flocker raided the headquarters of the Steel and Metal Workers Industrial Union and arrested nine union leaders as "suspicious persons." The day's violence and arrests broke the strike and a semblance of calm returned to Ambridge.[35]

As word of the Ambridge carnage spread, violence spilled over to other plants. At the Carnegie Steel Company's facility in Clairton, PA, strikers stoned cars and stabbed two local men who were attempting to enter the plant. One other man was run over by a car and suffered two broken legs. Strikers prevented an ambulance from retrieving the injured victim. A newspaper reported that agitators at Clairton openly announced, "We need action like they had in Ambridge."[36]

The extreme violence convinced some groups to reappraise their stands and the United Mine Workers began to reestablish its authority over its members. On 6 October, 20,000 striking mine workers returned to their jobs at the Cambria-Somerset mines in western Pennsylvania. Miners met at several other locations and

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[33] "More Hurt," 5 October 1933, 1; Hirsch, "Reporter Who Ducked Bullets," 6 October 1933, 2.

[34] "More Hurt," 5 October 1933, 1.

[35] "More Hurt," 5 October 1933, 2; "Ambridge Steel Siege Broken After Fatal Riot." Pittsburgh Press, 6 October 1933, 1-2.

[36] "More Hurt," 5 October 1933, 2.

announced they were willing to go back to work if President Roosevelt indicated they should do so.[37]

The President ordered the chairman of the largest steel companies to meet with him and NRA representatives on 6 October. Among those summoned were Myron C. Taylor of U.S. Steel; Charles M. Schwab and Eugene Grace of Bethlehem Steel; E.T. Weir, president of National Steel Corporation and Weirton Steel Company; and George Laughlin, Jr., of Jones and Laughlin Steel Corporation. National Recovery Administration chief General Hugh S. Johnson and Donald Richberg, general counsel for the NRA, also attended.[38]

The meetings continued for two days. President Roosevelt spoke out against both those who resorted to violence as well as the mine and steel owners who resisted change. He stressed that owners and labor had to work together to solve their industrial problems. Failure to do so would cripple the administration's efforts to end the Depression.[39]

On the evening of 7 October, Roosevelt delivered an ultimatum to the owners, ordering them to comply with the NRA codes for mine operations and negotiate immediately with the workers' unions. The codes included recognition of the unions, collective bargaining, minimum wages, maximum hours, and automatic deduction of union dues from employee's paychecks. Failure to work with the unions under these guidelines would result in the prompt licensing of the entire coal industry by the National Recovery Administration. The President also announced that he expected all 75,000 striking coal miners to return to work by the following Monday.[40]

Picketing dropped off substantially in the coal fields and workers throughout the affected region started returning to work. In towns such as Ambridge, deputies continued to walk the streets. With the exception of some minor disturbances, all was quiet.[41]

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[37] "Pickets Bar Mine Opening." Pittsburgh Press, 5 October 1933, 1; "Union Claims Strike Waning." Pittsburgh Press, 5 October 1933, 2.

[38] "Roosevelt Forces Showdown." Pittsburgh Press, 6 October 1933, 1.

[39] "'Stop Strikes' Plea Voiced by Roosevelt." The Pittsburgh Press, 7 October 1933, 1-2.

[40] "'Stop Strikes' Plea Voiced by Roosevelt." The Pittsburgh Press, 7 October 1933, 1-2; Morison, The Oxford History, 956.

[41] Fred H. Kury. "Captive Mines Told by U.S. To Accept Union." The Pittsburgh Press, 8 October 1933, 1, 6.

On 8 October, the steel and coal owners signed the NRA agreements that recognized the unions and changed work rules and pay. The following day the workers returned to their factories, including several hundred steelworkers in Ambridge. When the employees of Spang, Chalfant and Company, Wycoff Steel, and Central Tube Company returned to work, they found the following message posted at the entrance gates:

> The undersigned plants will operate as usual Monday morning at the regular hours. As operating schedules permit ALL employees will be given work.

The former strikers took this to mean there would be no retribution against those who worked or those who struck. [42]

Deputies in riot gear continued to patrol the streets of Ambridge for several days, but there were no reoccurrences of violence. Adam Pietrszewski, the only person killed in the rioting in front of Spang, Chalfant and Company, was laid to rest in a local cemetery on the afternoon of the 9th. Threats of additional marches to Ambridge for the funeral came to nothing. The strike was over.[43]

The end of the strike signified a major victory for President Roosevelt and organized labor, but at a substantial cost to the coal and steel industries and counties of Allegheny, Washington, Westmoreland and Fayette. Production losses were estimated at $7,485,000, with an additional $20 million in business losses. Total coal production during the strike period dropped from a pre-strike average of 11.2 million tons per year to less than 6 million tons.[44]

Spang, Chalfant and Company quickly resumed operations at its two facilities. Two years after the Ambridge riots the Spang Works in Etna operated with an annual capacity of 225,000 tons of butt-weld and lap-weld pipe and 35,000 tons of galvanized pipe. The Standard Works in Ambridge could produce 225,000 tons of butt and lap-welded pipe and 300,000 tons of seamless pipe. In 1938, the corporation reorganized as Spang Chalfant, Inc.[45]

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[42] "Steel, Coal Strikers Back At Work." The Pittsburgh Press, 9 October 1933, 4.

[43] Ibid.

[44] Vin Sweeney. "Strikes Rob District of $27,000,000." The Pittsburgh Press, 8 October 1933, 2.

[45] Directory of the Iron and Steel Works, 22d ed.,284.

Five years later, during World War II, the National Supply Company of Pittsburgh acquired Spang Chalfant. National Supply dated from October 1937, and operated several other subsidiary companies that produced oil field machinery and equipment, stationary and marine diesel engines, and gasoline engines.[46]

The war brought a period of increased business and worker stability to the steel industry of Pittsburgh, including National Supply Company. The end of the war found the Ambridge Works operating two Mannesmann seamless tube mills, capable of producing 312,000 tons per year of 1¼" to 14" seamless tubes. The older Etna Works operated four galvanizing pots, two butt-weld and three lap-weld furnaces, manufacturing butt-weld pipe from ½" to 4", and lap-weld pipe from 2" to 24". Total annual production capacity was 300,000 tons of pipe and tubes, including 93,000 tons of galvanized products. An third National Supply plant in Torrance, CA, contributed 45,900 tons of steel products annually.[47]

The wartime boom was tempered by a series of post-war steel strikes, all of which involved the former Spang Chalfant facilities in Etna and Ambridge. In January 1946, steelworkers in Pittsburgh went out for twenty-six days to win an 18½ cent per hour wage increase. In late 1949, the workers went on strike again over the question of company and worker contributions to pensions. The strike lasted forty-five days, despite appeals by President Harry S Truman.[48]

Late in 1951, the United Steel Workers of America (USW) presented management with a list of twenty-two new demands covering pay increases, the implementation of full union shops, and retroactive labor agreements. Negotiations quickly bogged down and a strike was called for 1 January 1952. President Truman once again intervened and asked the USW to forego a strike, for reasons of national defense. The United States was heavily involved in the Korean War and a steel strike would cripple rearmament efforts. The union agreed and postponed the strike date five times.[49]

The government's Wage Stabilization Board reported on 20 March 1952 that the union's demands for changes in wages and benefits were in keeping with government guidelines. The owners asserted that

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[46] Directory of the Iron and Steel Works of the United States and Canada, 24th ed. New York: American Iron and Steel Institute, 1945, 278-279; Necciai, "Allegheny County Survey," 2.

[47] Directory of the Iron and Steel Works, 24th ed., 279.

[48] "Steel's Postwar Years See Long Labor Disputes." Pittsburgh Press, 3 June 1952, not paginated. File, Pittsburgh Strikes-Steel, 1952. City history collection, Carnegie Library, Pittsburgh, PA.

[49] Ibid.

giving the unions everything would drive the price of steel up by more than $12.00 per ton while government guidelines only allowed an increase of $3.00 per ton. Negotiations in Washington, D.C., between the government, steel owners, and USW stalled.[50]

On 10 April 1952, the Federal government seized the factories of Pittsburgh's major steel producers. The President ordered the action to head off the threatened USW strike and cited the "inherent powers" of the Presidency for his authority. The owners immediately challenged the seizures and, on 30 April, Federal Judge David Pine ruled the seizure was unconstitutional.[51] On 2 June, United Steelworkers president Phillip Murray issued a nationwide appeal for 650,000 union members to walk off their jobs. Within a week, fifty-four steel manufacturing plants were closed, including National Supply Company's former Spang plants in Etna and Ambridge.[52]

The strike was settled on 24 July, following meetings between President Truman, USW president Murray, and U.S. Steel president Benjamin F. Fairless. The total national loss for the fifty-three day strike was estimated at $4 billion. Steel industry sales dropped by $2 billion. Many industries directly supported by the steel industry, including coal, railroads, fabrication, and automobile manufacturing, suffered similar losses and employee layoffs.[53]

The financial damage from the strike probably contributed to National Supply Company's decision to shut down the former Spang, Chalfant and Company plant in Etna. The company closed the facility in 1954 and began selling the equipment, including the

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[50] Ibid.

[51] Ibid.

[52] Ibid.; "Strike History Outlined," The Pittsburgh Press, 25 July 1952, not paginated; James F. Alexander, "Belligerent Pickets Mill About Steel Plant Gates," Pittsburgh Post-Gazette, 30 April 1952, not paginated; "Text of Murray's Call For New Steel Strike," The Pittsburgh Press, 3 June 1952, not paginated. File, Pittsburgh Strikes - Steel, 1952. City history collection, Carnegie Library, Pittsburgh, PA.

[53] "Steel Strike History," not paginated; "Four Billion Loss Estimated in 53-Day Strike," Pittsburgh Sun-Telegram, not paginated. File, Pittsburgh Strikes - Steel, 1952. City history collection, Carnegie Library, Pittsburgh, PA.

remaining locomotives. The final sale of mill equipment and property was completed in 1961.[54]

At the time of its closure, the Etna factory was known as the "oldest pipe mill still operating in America." What remained in 1995 was a large collection of industrial buildings, with a mix of older brick and newer corrugated steel structures. A variety of companies operated from the site, including the Tipping Machinery Company, manufacturers of rolling mills and steel mill equipment; the Bennett Paper Company; and Pantone's Auto Parts. The Duquesne Electric Company occupied what appeared to be the oldest building in the complex, on the north side of Pine Street. With the exception of the old Spang and Chalfant family home on Locust Street, there was little other remaining evidence of either the Spang or Chalfant names in Etna.[55]

The Baldwin Locomotive Works

The Baldwin Locomotive Works (BLW) of Philadelphia and Eddystone, PA, was the most successful and storied builder of steam locomotives in the history of American railroading. Between 1832 and the 1930s, Baldwin became the largest of the "big three" steam locomotive manufacturers, easily outdistancing rivals Lima and the American Locomotive Company (Alco). Yet, this industrial giant was unable to successfully transition from steam to diesel production after World War II, and ceased locomotive production in the mid-1950s.[56]

Matthias Baldwin's entry into the early American locomotive market was unplanned. He started a jewelry company in a Philadelphia alley in 1819. In 1825, Baldwin formed a partnership with machinist David Mason to manufacture printing machinery and tools. A few years later the partners bought a steam engine to power their equipment. Unhappy with the engine's poor design, Baldwin successfully built a replacement. This success lead to the construction of a miniature steam locomotive capable of running on a small

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[54] "Chalfant House Evening Club Celebrates On Historic Site," North Hills News-Record (Etna, PA), 21 November 1967, 28; Necciai, "Allegheny County Survey," 2.

[55] "Chalfant House Evening Club," 28.

[56] John H. White, Jr., A Short History of American Locomotive Builders in the Steam Era (Washington, D.C.: Bass, Inc., 1982) 27-28; Eugene L. Huddleston. "The War Production Board and Diesels," Railfan and Railroad, January 1986, 36.

track. Baldwin completed the locomotive in April 1831, and gave it to the Philadelphia Museum.[57]

Local entrepreneurs took notice of the model and convinced Baldwin to build a full size operating steam locomotive. Baldwin completed the engine, a 2-2-0 known as "Old Ironsides," in November 1832. A newspaper account of the locomotives debut, quoted in The Locomotives That Baldwin Built, stated:

> A most gratifying experiment was made yesterday afternoon on the Philadelphia, Germantown and Norristown Railroad. The beautiful locomotive engine and tender, built by Mr. Baldwin, of this city, whose reputation as an ingenious machinist is well known, were for the first time placed on the road. The engine traveled about six miles, working with perfect accuracy and ease in all its parts, and with great velocity.[58]

In reality, the five-ton engine leaked steam, had difficulty going into reverse, and suffered from wheel slip. Its top speed before it derailed was about thirty miles per hour. The railroad was unhappy with the product and paid Baldwin only $3,500 for the locomotive, instead of the agreed $4,000. In response, Matthias Baldwin declared, "This is our last steam locomotive."[59]

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[57] Fred Westing, The Locomotives That Baldwin Built (Seattle: Superior Publishing Company, 1966), 13-14.

[58] Ibid., 15.

[59] Westing, Locomotives, 17; Freeman Hubbard, "The Editor's Waybill," Railroad, December 1972, 20; "From the Halls of Baldwin," Trains, May 1962, 42.

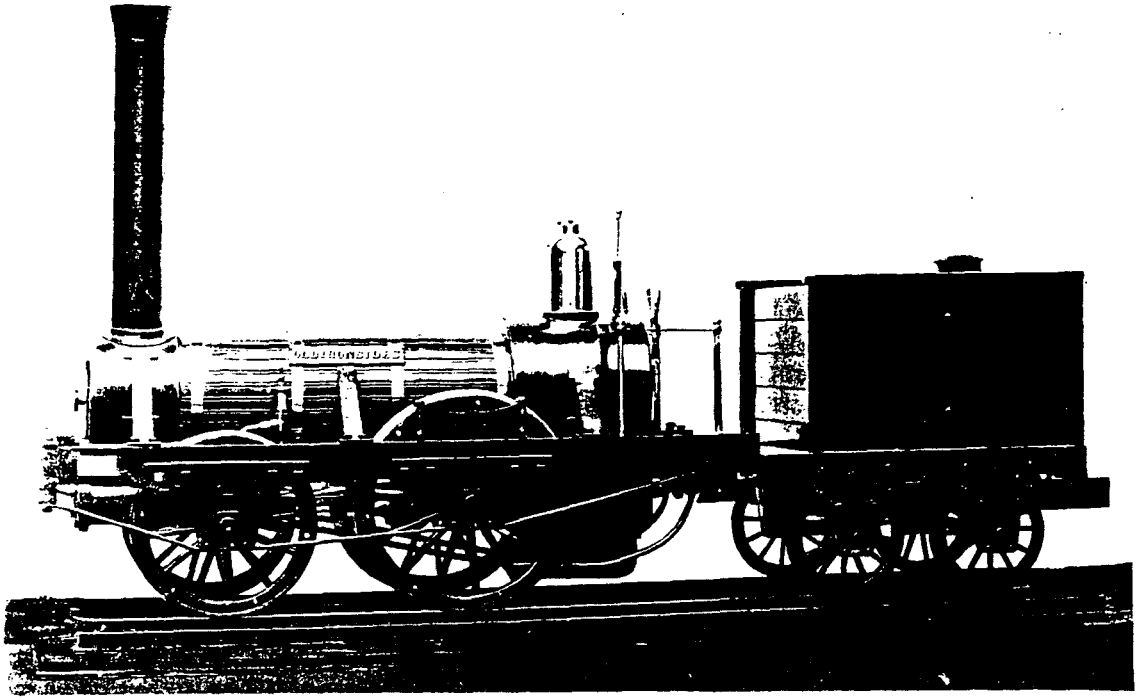

Fig. 3. "Old Ironsides." From James W. Kerr, Illustrated Treasury of Baldwin Locomotives, 1831-1856 (Alburg, VT: DPA-LTA Enterprises, Inc., 1983), 5.

Baldwin changed his mind when other railroads approached him with requests for steam locomotives. The second Baldwin steam engine was a 4-2-0 built for the Charleston & Hamburg Railroad Company of South Carolina. The locomotive was completed on 18 February 1834, and named "E.L. Miller," for the man who placed the order. This engine proved to be more successful than "Old Ironsides" and led to additional orders.[60]

Subsequent years brought continual expansion. In short order Baldwin employed 240 men and was producing two locomotives a month. The company built a new factory in 1835, at Broad and Spring Streets in Philadelphia. Four years later George Vail and George Huffy replaced Mason as Baldwin's partners. In 1852, the company completed its 500th locomotive and began to outsell and outproduce its larger rivals, notably the Norris (Philadelphia), Rogers (Patterson, NJ) and Schenectady (NY) Locomotive Works. Nine years later Baldwin sold its 1,000th locomotive.[61]

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[60] Westing, Locomotives, 19, 21.

[61] Ibid., 10.

Matthias Baldwin died in 1866, and control of his company passed to the partnership of Charles T. Parry, Edward H. Williams, and George Burnham. M.W. Baldwin and Company reorganized as Burnham, Parry and Williams in 1873, the same year the company turned out its 2,000th locomotive. Parry subsequently left the partnership, which then reorganized as Burnham and Williams.[62]

At the opening of the twentieth century a work force of almost 1,700 men was crowded into the old Baldwin factory on Broad Street. The company produced about 500 locomotives annually and had a total market share of thirty to forty percent, but saw room for further expansion. In 1903, Burnham and Williams started construction of a second plant in a Eddystone, south of Philadelphia. Work shifted from Broad Street as portions of the new facility opened. The move to Eddystone was accomplished under the auspices Burnham and Williams general superintendent Samuel M. Vauclain. The full transfer of locomotive production to Eddystone was completed in 1928, during Vauclain's last year as company president. In 1909, the company reorganized and incorporated as the Baldwin Locomotive Works. This name remained in use for the next forty-one years.[63]

During World War I, Baldwin employed over 22,000 men and turned out an average of ten locomotives a day from the Broad Street and Eddystone plants. In 1918, Baldwin turned out a staggering 3,580 locomotives, many of which were shipped overseas for service on French and English railroads. Baldwin also built armaments for the war effort, including railroad carriages for fourteen-inch naval guns and tractor-mounted seven-inch guns. The company manufactured rifles and ammunition for the British Army at its Eddystone Munitions Company.[64]

Baldwin conducted its first diesel locomotive design studies during the mid-1920s, albeit as a minor adjunct to steam production. The company's first diesel locomotive, demonstrator No. 58401, rolled out of Eddystone in 1925. The engine was briefly tested on The Reading Company lines but proved unsuccessful. Further Baldwin

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[62] Ibid. Parry later left the partnership, which reorganized as Burnham and Williams.

[63] George H. Drury, Guide to North American Steam Locomotives (Waukesha, WI: Kalmbach Publishing Co., 1993), 38; White, American Locomotive Builders, 27; Hubbard, "Waybill," 20; "Halls of Baldwin," 42; Westing, Locomotives, 10. "The" was added to the corporate title in 1911.

[64] Westing, Locomotives, 79-80; Hubbard, "Waybill," 20; "Halls of Baldwin," 42.

diesel development and sales came to an abrupt halt in 1929, with the onset of the Great Depression.[65]

Baldwin struggled with the financial complications of the Depression until 1935, when it declared bankruptcy. The company attempted to work out of its financial duress by pushing the proven attributes of the steam locomotive and resuming development of diesel switchers. Larger and more powerful engines were built and sold to the traditional Baldwin customers, such as the 0-10-2 "Union" type for U.S. Steel's Union Railroad; 2-10-4 "Texas" types for the Bessemer and Lake Erie Railroad; and 2-8-8-4 "Yellowstones" for the Duluth, Missabe and Iron Range and Northern Pacific Railroads. In 1939, Baldwin introduced a line of switching locomotives powered by the De La Vergne inline six- and eight-cylinder marine diesel engines. Railroads with Baldwin steam experience bought the locomotives and diesel production finally became a valued part of the corporation's business.[66]

World War II brought the financial respite that Baldwin needed to survive. During the course of the conflict the company sold several hundred steam locomotives and over five hundred VO660 and VO1000 diesel switchers. Many of the sales were due to the efforts of the government's War Production Board (WPB).[67] The board limited steam production to designs already in service and selected specific manufacturers to build steam and diesel locomotives. Baldwin was assigned production of 4-8-4 and articulated steam locomotives and diesel switchers.[68]

In 1943, the WPB authorized Baldwin and the other steam manufacturers to design, build and test road diesels. Baldwin scrambled to prepare road freight and passenger locomotives for the anticipated postwar boom. At the end of the war BLW offered a full line of steam and diesel locomotives, including 2400 horsepower transfer diesels and 3000 horsepower multi-engine freight locomotives, nicknamed "centipedes" for their multiple wheels. Baldwin's intended to continue production of steam locomotives as its primary product, with diesels as a backup.[69]

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[65] Jerry E. Pinkepank, "On Behalf of Baldwin," Trains, December 1967, 23-24.

[66] Pinkepank, "On Behalf of Baldwin," 24; Gary Dolzall, "Born Of Smokestack America," Trains, November 1989, 38.

[67] Charles A. Brown, "Eddystone Contrasts," Trains, June 1985, 30-31.

[68] Drury, North American Steam Locomotives, 422-425.

[69] Pinkepank, "On Behalf of Baldwin," 25, 26.

The postwar boom that Baldwin eagerly anticipated passed the company by. The market for steam locomotives evaporated and its diesels were found wanting in comparison to the products of General Motors' Electro-Motive Division (EMD) and Alco. The corporation continued its traditional practice of custom building locomotives to any specification to meet the needs of the customers. The resulting engines were large, complex, with limited versatility, and required excessive maintenance. In comparison, EMD offered several standard designs that were easy to maintain. EMD quickly became the preeminent diesel locomotive manufacturer, with Alco assuming the number two position.[70]

Orders for steam disappeared. The final domestic Baldwin steam locomotives were ten Chesapeake and Ohio (C&O) 2-6-6-2's delivered in 1949. The C&O numbered the locomotives 1300-1309 and assigned them to coal service in West Virginia. The last of these engines retired in 1957, only eight years after their introduction.[71]

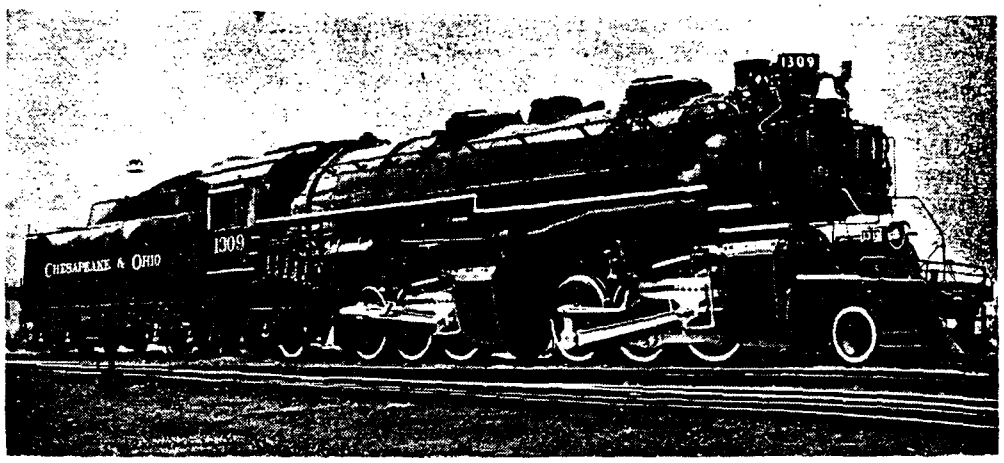

Fig. 4. Chesapeake and Ohio Railroad 2-6-6-2 No. 1309, the last domestic steam locomotive built by Baldwin. From Alfred Comstock, ed., "Information Booth," Railroad, March 1953, 58.

Baldwin's financial position once again became precarious. The company's mainstay product was dead and it's diesels were outclassed by the products of its competitors. Attempts at prolonging steam production, such as four coal-fired steam turbine locomotives built for the Chesapeake and Ohio and the Norfolk and Western Railroads, failed. The locomotives were unsuccessful due to mechanical problems and expense. Despite its best efforts, Baldwin was doomed. In 1948, Westinghouse acquired control of the Baldwin

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[70] Drury, North American Steam Locomotives, 38.

[71] Ibid., 38, 88. Number 1308 is preserved at a public park in Huntington, WV. Number 1309 is on display at the B&O Railroad Museum in Baltimore, MD.

Locomotive Works, ending the company's 116 years of corporate independence. In August 1950, Westinghouse arranged the merger of Baldwin and Lima-Hamilton.[72]

Long-time steam competitor Lima had also faced an uncertain postwar market. Perhaps even more than Baldwin, the Ohio corporation held on to steam too long and shifted to diesel production late. Lima merged with the General Machinery Company of Hamilton, OH, in 1947, to form Lima-Hamilton Corporation. Hamilton's six cylinder turbo-charged diesel powered the first Lima diesel switcher in November 1949. Lima-Hamilton production to the time of the merger with Baldwin totalled 198 switchers and freight locomotives.[73]

The initial effects of Westinghouse management and the formation of Baldwin-Lima-Hamilton (BLH) were positive. The newly merged company became the third largest producer of diesel locomotives, behind Alco and EMD. Baldwin suspended production of Lima diesels and used Lima expertise to standardize its own locomotive designs. The company worked to improve its customer support and commercial image. The merger also brought the corporation Lima's extensive construction equipment business, providing a broad non-locomotive industrial base.[74]

In the long run, the addition of Lima-Hamilton's technical and marketing expertise proved inadequate. BLH products were saddled with a reputation for high maintenance costs and poor reliability. Diesel locomotive sales continued to plummet. In 1956, Baldwin's last major customer, the Pennsylvania Railroad, declined to buy any new Baldwin locomotives for the first time in either corporation's history. The management of Baldwin asked the Pennsylvania to reconsider, but the railroad said it was financially unable to subsidize BLH through continued orders. A few weeks later Baldwin-Lima-Hamilton quit the locomotive business. A small industrial diesel switcher was the last of the nearly 71,000 locomotives produced by the once great Baldwin Locomotive Works.[75]

Forty years later, the remnants of the largest steam locomotive manufacturer are few and scattered. Baldwin-Lima-Hamilton merged with Armour and Company in 1965. The Lima, OH, manufacturing plant was sold to the Clark Equipment Company in the early 1970s. In

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[72] Ibid., 87, 307, 328; "Two Major Locomotive Builders Announce Plans To Merge," Trains, October 1950, 6.

[73] Jerry E. Pinkepank. Diesel Spotters Guide (Milwaukee: Kalmbach Publishing Co., 1967), Lima 3-7.

[74] "Two Major Locomotive Builders," 6; Pinkepank, "On Behalf of Baldwin," 30.

[75] Pinkepank, "On Behalf of Baldwin," 30; White, American Locomotive Builders, 28.

April 1971, Armour closed its Baldwin-Lima-Hamilton subsidiary and disposed of the massive Eddystone plant. At the time of its closure the once great company employed only 1,200 workers. In August 1971, the remaining industrial equipment and heavy machinery was sold at auction.[76]

The last Baldwin erecting shop building at Eddystone was torn down in early 1995.[77] All that remains at the site is the old cruciform office building, which is now used for condominiums. Over 600 Baldwin steam locomotives survive in parks and museums scattered across the continent.

Building Techniques

Baldwin's massive industrial complex at Eddystone incorporated ninety buildings, including four foundries; a pattern shop; a fifteen-acre boiler shop; blacksmith shop; cylinder machine shop; locomotive frame shop; wheel and axle shop; power plant; a seventeen and one-half acre machine shop; tender shop; paint shops; and the focal point of production, the erecting shop. Other buildings housed the supporting departments, including corporate offices; engineering offices; physical laboratories; and chemical laboratories. Twenty-six miles of track serviced the 591 acre plant.[78]

Baldwin built each locomotive by assembling components manufactured at the individual shops. The cylinders, locomotive and tender frames and smaller parts were cast in the foundry. Machinery in the boiler shop cut, pressed and riveted the boilers and steam domes. Finishing machinery in the cylinder, frame, blacksmith, and wheel shops took the rough components and prepared them for final assembly. Locomotive tenders were built on a production line in their own specialized building.[79]

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[76] Hubbard, "Waybill," 21.

[77] William Withuhn, conversation with author, 2 September 1995.

[78] The Story of Eddystone. 1928. Reprint, with forward by D.S. Richter (Felton, CA: Glenwood Publishers, 1974), 12, 25, 17, 21, 24, 27, 30, 33, 35, 40, 44, 48, 55, 75.

[79] Ibid., 12-13, 17-20, 24, 27, 30.

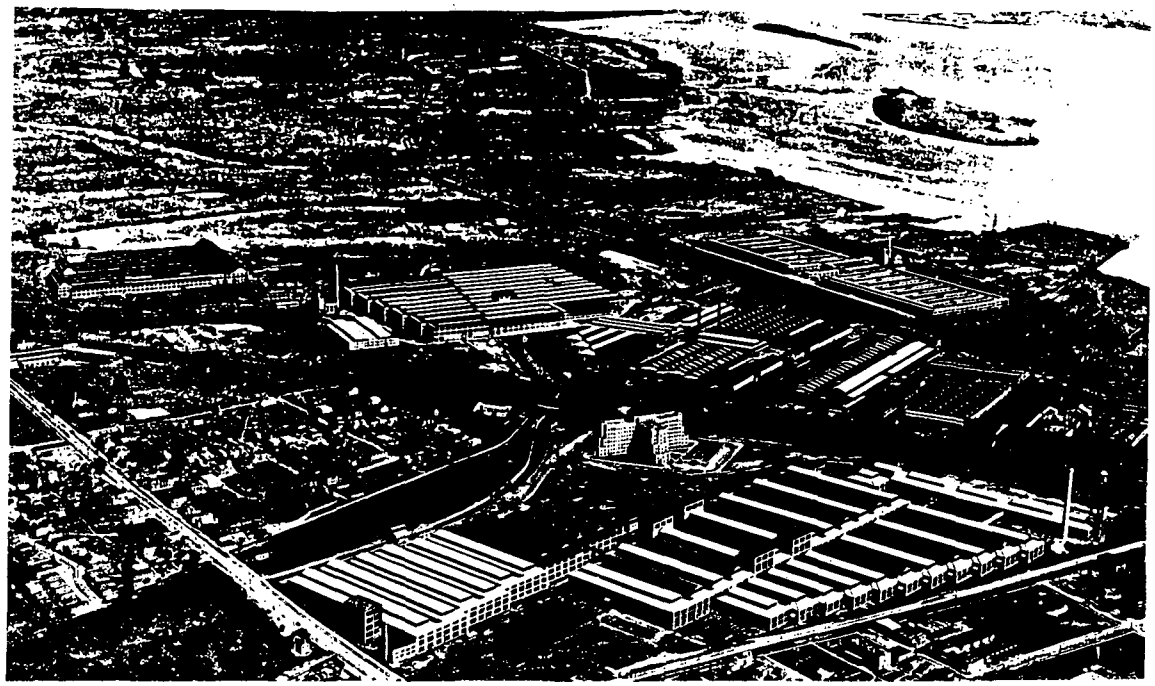

Fig. 5. Aerial view of Baldwin's Eddystone facility. The famous cruciform-shape office building is in the center of the photograph. From The Story of Eddystone. 1928. Reprint, with forward by D.S. Richter (Felton, CA: Glenwood Publishers, 1974), 8.

The assembly process started in the erecting shop, as described in a 1928 Baldwin publication on its Eddystone facility:

> Every component, however small and insignificant, must come there for final assembly. The high-roofed building with its massive cranes spanning the wide bays has much of interest to the layman. The lurid glare of the oil burners outlines a huge locomotive moving twenty feet in the air; another locomotive grows magically as it rolls toward the finishing bay; the end doors open and a finished machine steams to the testing track.[80]
>
> The boilers enter the west end of the shop where the fittings and tubes are applied and the boiler tested. From here they are taken to the erecting bay and fastened to the foundation. Foundation and boiler are then taken from the forms, wheeled and trucked, and the beginning of the locomotive starts its march toward the finishing bay. The principle of progressive erection is carried out. Each bay furnishes its particular components, each night the locomotive moves ahead one bay. A steady stream of material flows into its appropriate bay and is applied before the next move.

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[80] Ibid., 48.

Steadily the locomotive progresses and in the next to the last bay the tender is attached. Steam is raised, an inspection is made and then the engine backs out to the mile long testing or running track. Here it is given a workout at full steam pressure and road conditions are duplicated as nearly as possible. Another inspection, a few finishing touches and the locomotive is ready for delivery.[81]

Locomotive Type

The earliest 0-6-0 type locomotives were an outgrowth of the 0-4-0 design and were developed as a means of increasing locomotive tractive effort and pulling power. The type gained some popularity in the mid-nineteenth century as a main line freight locomotive but is probably best known for its many years of service as a switching engine.[82]

The Baltimore and Ohio Railroad ordered the first American 0-6-0 from Robert Stephenson and Company of Newcastle-upon-Tyne, England, in 1829. Unfortunately, the ship carrying the locomotive from England to the United States sank in the Atlantic Ocean. Nine years later, the Beaver Meadow Railroad of Perryville, PA, built an 0-6-0 in its shops. This engine is considered to the first of the type constructed in this country.[83]

In 1842, Matthias Baldwin built several flexible-beam truck locomotives in an 0-6-0 configuration. Through the mid-1850s, these locomotives and similar engines built by the Norris Locomotive Works of Philadelphia were the most numerous 0-6-0s in the nation. Baldwin's "John C. Calhoun," built in 1843, was representative of the type. The "Calhoun" weighed twelve tons, had 12½" X 16½" cylinders, and 36" driving wheels.[84]

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[81] Ibid., 50-51.

[82] John H. White, Jr., A History of the American Locomotive (New York: Dover Publications, Inc., 1979), 66.

[83] Ibid. The Beaver Meadow later became part of the Lehigh Valley Railroad.

[84] Ibid., 66, 396, 400. The flexible beam locomotive's front axle was designed to slide laterally on curves. This allowed improved operation on rough and poorly laid track.

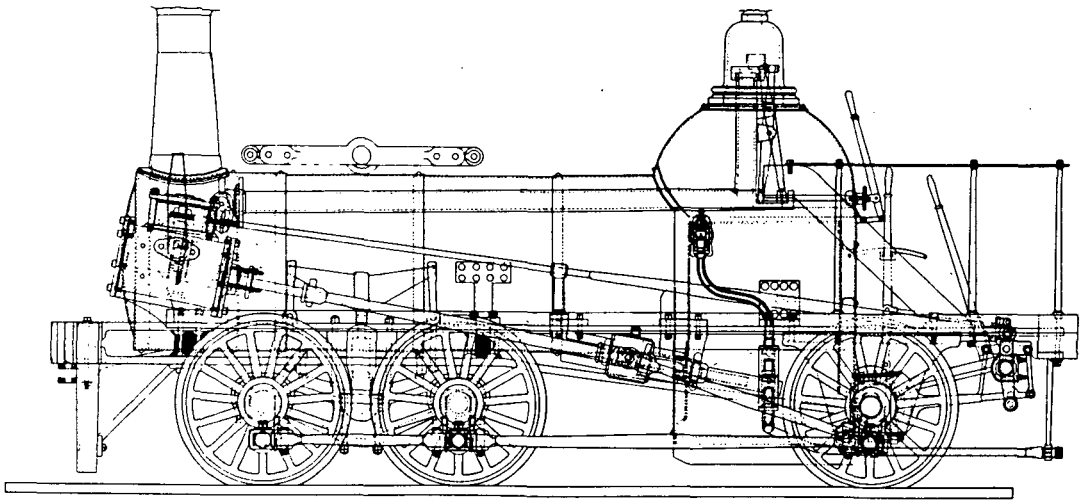

Fig. 6. Baldwin flexible-beam locomotive John C. Calhoun, built for the Wilmington and Raleigh Railroad. From John H. White, Jr., A History of the American Locomotive (New York: Dover Publications, Inc., 1979), 400.

After 1854, the Rogers Locomotive Company, the New Jersey Locomotive and Machine Works, and the Danforth, Cooke and Company built a series of powerful six-wheel freight locomotives for the Buffalo and Erie, Buffalo and State Line, and Lackawanna and Western Railroads. These engines were substantially larger than the earlier Baldwin and Norris 0-6-0s. Rogers' "Vulcan," typical of the period's designs, weighed twenty-three tons and had 16" X 22" cylinders and 54" drivers.[85]

These early freight 0-6-0's were quickly superseded by other types. In comparison to 2-4-0 and 4-4-0 designs, the 0-6-0s of the period suffered from limited power and poor tracking ability. Apparently, the total number of 0-6-0 freight locomotives that were built was less than three hundred. By the late 1870s, the 0-6-0 was superseded in road service by 2-6-0's and 2-8-0's and found better use as yard switchers.[86]

Steam locomotive manufacturers offered switchers through the end of the steam era. Switching engines worked on all major railroads, moving freight and passenger cars around yard facilities and putting trains together. They also operated extensively in industrial service. To enhance their utility in that role, switchers were usually fitted with equipment not normally found on main line steam locomotives, such step boards at both ends for use by brakemen. Most switchers operated with one of three types of tenders: a

[85] Ibid, 66.

[86] Ibid., 66-67.

standard rectangular tender, a cylindrical Vanderbilt tender, or a slope-back tender. The latter type was particularly useful as it increased visibility to the rear of the locomotive, an importance consideration when shifting cars around the yard.[87]

Production of 0-6-0's slowed during the 1920s. Several railroads, such as the Atchison, Topeka and Santa Fe and the Louisville and Nashville, stopped buying new switchers and instead modified older road locomotives to the 0-6-0 configuration. Others bought 0-8-0 switchers or concentrated on maintaining their existing units. Baldwin's last large order for new 0-6-0's was in 1928 when the company delivered fifty F-7 class locomotives to the Seaboard Air Line Railroad. The company continued to offer steam-powered switching locomotives to industrial customers at a reduced level through the end of steam production in 1949.[88]

Over 110 0-6-0 switchers survive in the United States in museums and displays. Former Spang, Chalfant and Company No. 8 joins Baldwin-built 0-6-0 No. 26 as the second 0-6-0 in the Steamtown NHS collection.[89]

Locomotive History/Period of Construction

The Baldwin Locomotive Works of Eddystone, PA, built 0-6-0 switcher No. 8 for Spang, Chalfant and Company in April 1923. The construction number for the locomotive was 56402. The manufacturer's class number was 6-32D.[90]

Class 6-32D specified an 0-6-0 steam locomotive with 19" x 24" cylinders; 50" driving wheels; 10' 6" wheelbase; 3500 gal. capacity water tank; 180 p.s.i. boiler operating pressure; 26,500 lbs. of

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[87] Gordon Chappell, Steam Over Scranton: The Locomotives of Steamtown. Special Historical Study (Denver: National Park Service, 1991), 19.

[88] Drury, North American Steam Locomotives, 26, 230.

[89] Ibid., 19.

[90] J. David Conrad, The Steam Locomotive Directory of North America, Vol. 1 (Polo, IL: Transportation Trails, 1988) 115; Catalogue of Locomotives: Code Word-Mazieren. Photocopy (Philadelphia: The Baldwin Locomotive Works, n.d.), 65. Pennsylvania State Railroad Museum, Strasburg, PA. Baldwin identified design variations by alliterative names. Class 6-32D was given the name "Mattaccino." Other names in the series included Matronly, Matrose, and Matshamers.

tractive effort; and a working weight of 112,000 lbs. The locomotive was designed to pull 3500 tons on level track (Fig. 7).[91]

THE BALDWIN LOCOMOTIVE WORKS 65

Six Coupled Locomotives

Gauge 4 Feet 8½ Inches

With Separate Tenders

Class 6-D Type 0-6-0

CODE WORD	Class	Cylinders Diameter Stroke Inches	Diameter Driving Wheels Inches	Boiler Pressure Pounds per Square Inch	Rated Tractive Force Pounds	Weight in Working Order Pounds	Wheel Base	Capacity Tender for Water 8½-lb. gallons	Load in Tons (2000 Pounds) of Cars and Lading: On a Level	On a Grade per Mile of: 26.4 ft. or ½ %	52.8 ft. or 1 %	79.2 ft. or 1½ %	105.6 ft. or 2 %	158.4 ft. or 3 %	211.2 ft. or 4 %	264.0 ft. or 5 %
Matronly	6-12 D	9 x 16	33	160	5,340	30,000	6′ 9″	1000	575	270	165	115	85	55	35	25
Matrose	6-14 D	10 x 16	33	160	6,590	35,000	7′ 7″	1200	710	335	205	145	105	65	45	30
Matrozen	6-16 D	11 x 16	33	160	7,970	40,000	8′ 0″	1300	860	410	250	175	130	85	55	40
Matruelis	6-18 D	12 x 18	37	160	9,520	47,000	8′ 1″	1500	1030	490	300	210	160	100	65	50
Matserving	6-20 D	13 x 20	42	160	10,930	52,000	8′ 6″	1800	1190	565	345	240	185	115	80	55
Matshamers	6-20 D	13 x 22	44	160	11,480	55,000	8′ 9″	2000	1240	590	360	255	190	120	85	60
Matsuri	6-22 D	14 x 24	44	160	14,530	64,000	9′ 6″	2200	1580	750	475	325	245	155	110	80
Matsvot	6-24 D	15 x 24	44	160	16,690	72,000	9′ 9″	2400	1810	865	535	375	285	185	125	90
Matsvotten	6-26 D	16 x 24	50	180	18,800	82,000	9′ 9″	2600	2055	975	605	425	325	210	145	105
Matsya	6-28 D	17 x 24	50	180	21,210	92,000	10′ 6″	2800	2320	1105	685	485	365	235	165	120
Mattabas	6-30 D	18 x 24	50	180	23,790	102,000	10′ 6″	3000	2600	1235	765	545	410	265	185	135
Mattaccino	6-32 D	19 x 24	50	180	26,500	112,000	10′ 6″	3500	2900	1375	855	605	560	295	210	155
Mattaeugig	6-34 D	20 x 24	50	180	29,380	124,000	11′ 2″	4000	3060	1490	925	650	495	320	225	160
Mattamore	6-34 D	20 x 26	50	180	31,810	133,000	10′ 10″	4000	3390	1615	1000	710	540	350	245	180
Mattanah	6-36 D	21 x 26	50	180	35,080	141,000	11′ 0″	4000	3620	1730	1070	760	580	375	265	195
Mattarios	6-38 D	22 x 26	50	180	38,500	155,000	11′ 6″	4000	3960	1895	1175	835	635	415	290	215

Fig. 7. Excerpt from the Baldwin Catalogue of Locomotives, Code Word Mazieren, Class 6-D. Photocopy. Philadelphia: The Baldwin Locomotive Works, n.d., 65. Pennsylvania State Railroad Museum, Strasburg, PA.

Using these basic specifications, Baldwin modified the locomotive to fit a customer's specific needs. Number 8 was delivered to Spang with 19" x 24" cylinders, 46" drivers, and weighed 117,970 lbs. The locomotive received its final testing in Eddystone on 19 April 1923 and was subsequently delivered to its new owner.[92]

Information on the locomotive's specific use with Spang, Chalfant and Company is limited. Both the Pennsylvania Railroad (PRR) and the Baltimore and Ohio Railroad (B&O) served the Spang facility in Etna, PA. Spang's second plant in Ambridge was also served by the Pennsylvania. Locomotive No. 8 was initially delivered to Etna and was probably used to switch incoming loads of iron ore to the blast furnaces. The engine would then haul carloads of finished tubing and steel plate to either the plant's entrance tracks or the PRR's

[91] Catalogue of Locomotives, 65.

[92] Ibid.; George Deeming, telephone conversations with author, 1 and 9 August 1995.

and B&O's Etna Yards. From there the products were shipped to other locations around the country.[93]

No information has been found to indicate if Spang, Chalfant and Company operated other steam locomotives. Number 8 may have been rotated between the factories in Etna and Ambridge and conceivably could have been involved in the riots at the latter location, as described on page 17. No evidence or documentation has been found to confirm this possibility.

Locomotive No. 8 was later sold to Duquesne Slag Products Company of Pittsburgh. The date of sale is unknown but may have occurred in 1954, when National Supply Company closed the Etna factory. Duquesne Slag dated to the turn of the century and offered "crushed and screened slag for concrete and road building, ballast, roofing, cinders and granulated slag," according to an advertisement in the city directory.[94] The largest facility, with 110 employees in 1931, was located in the Glenwood section of Pittsburgh, alongside the Monongahela River and the tracks of the Baltimore & Ohio Railroad. The company operated additional plants at Birdsboro, Topton, Coatesville, Catasaqua, Pottstown, and Glendon, PA.[95]

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[93] *Notas Interesantes Acerca de Pittsburg*, not paginated; Walker, Railroad Atlas of North America, 53, 55, 73. The B&O line through Etna was the former Pittsburgh and Western Railroad (P&W). The PRR serviced Ambridge from its Conway Yard.

[94] Polk's Pittsburgh (Allegheny County) City Directory, 1936 (Pittsburgh: R.L. Polk & Co., Publishers, 1936), 25.

[95] Industrial Directory of Pennsylvania, 1st ed (Harrisburg: Pennsylvania Bureau of Statistics, 1914), 98; 7th ed., 1931, 99; 9th ed., 1938, 65.

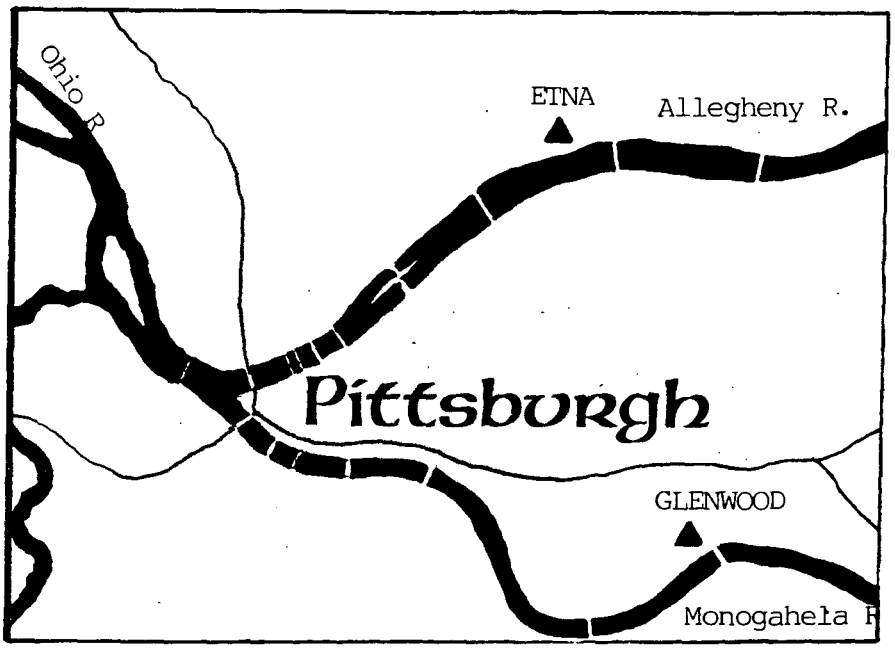

Fig. 8. Illustration of the location of the Spang, Chalfant & Company plant in Etna and the Duquesne Slag Products plant in the Glenwood section of Pittsburgh. No scale. Illustration by the author.

Duquesne Slag retired its steam locomotives in the early 1960s and replaced them with diesels. In June 1964, steam enthusiast Sloan Cornell bought No. 8 and Baldwin 0-4-0T No. 65 from the company for excursion service on his Penn View Mountain Railroad. Cornell moved the locomotives by rail to Blairsville, PA, and then trucked them to the excursion site.[96]

Cornell had built the 4½ mile long Penn View Mountain Railroad in 1959, on the side of a ridge three miles northeast of Blairsville. With acquisition of the two locomotives, revenue operations commenced in 1964. He ran the railroad as a family business, employing his uncle Hal Cornell as a brakeman; his brother-in-law Bob Libengood as a conductor; his son Jim Cornell as fireman/engineer; and his daughter Terri as clerical help.[97]

Number 8 was in very poor condition when Cornell bought it. He made minor repairs, painted the locomotive and operated it in

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[96] Sloan Cornell, conversation with author, 27 October 1995; Conrad, Steam Locomotive Directory, 115. Locomotive No. 65 is now marked for the Huntington and Broad Top Mountain Railroad and is on display in Dudley, PA. A third former Duquesne Slag Products locomotive, Baldwin 0-6-0T No. 69, is on display in Washington, PA.

[97] Joseph A. Mannix. "Railroad Magazine Visits Penn View Mountain Railroad," Railroad. September 1972, 44-45; Cornell, 27 October 1995.

regular service until 1966, when one of the driving wheels cracked. Several attempts to repair the wheel failed and Cornell retired the engine. Operations on the Penn View continued with former a Mississippian Railroad Baldwin 2-8-0, No. 76.[98]

Fig. 9. Spang, Chalfant & Co. No. 8 in excursion service on the Penn View Mountain Railroad. From Steam Passenger Service Directory - 1966 (New York: Empire State Railroad Museum, 1966), 52.

In 1973, Cornell closed the Penn View Mountain Railroad and made arrangements to operate on the Pennsylvania Railroad's former Indiana, PA, branch. He named his new line the Blairsville and Indiana Railroad and prepared to operate steam-powered excursions and freight service. However, in 1976, the quasi-government Consolidated Rail Corporation (Conrail) acquired the line from the bankrupt Penn Central Railroad. Cornell instead bought the Gettysburg Railroad and moved his operation to south-central Pennsylvania. All vestiges of the Penn View Mountain were removed.[99]

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[98] Cornell, 27 October 1995.

[99] Ibid. Cornell later acquired the Knox & Kane Railroad in north central Pennsylvania.

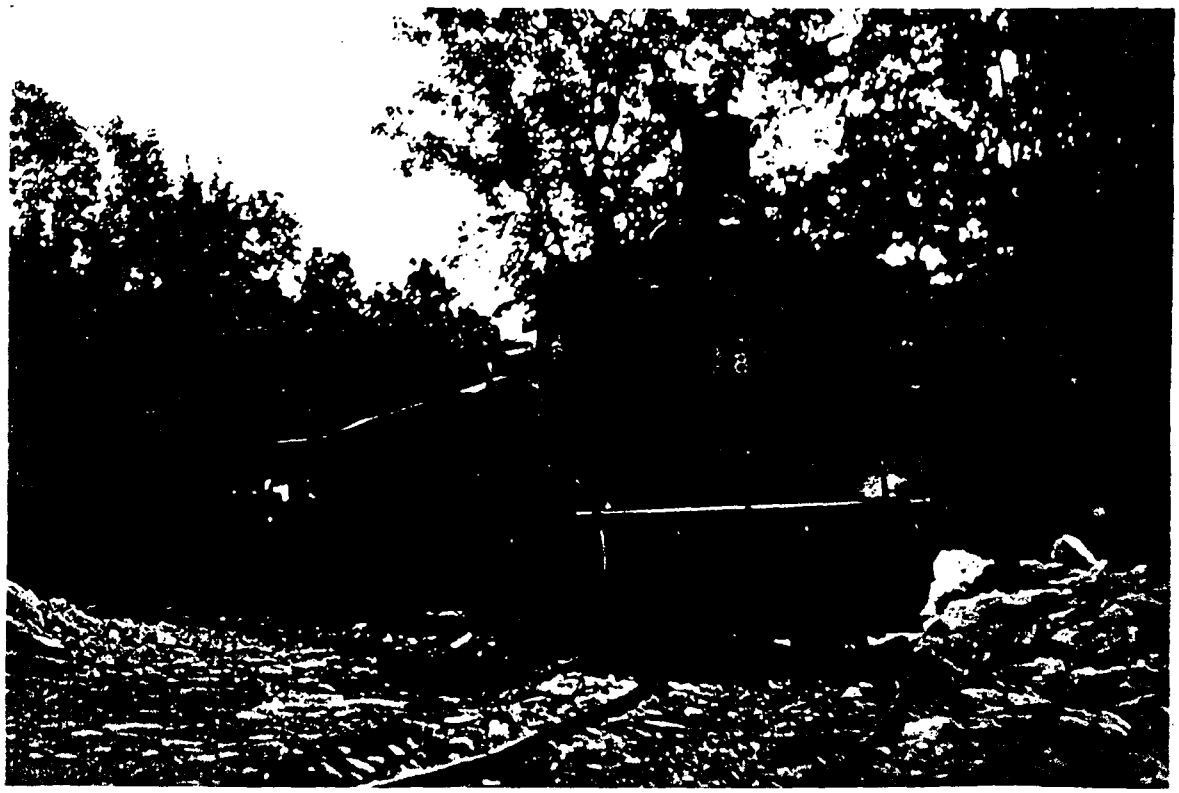

Fig. 10. Penn View Mountain Railroad excursion train, with No. 8 in the lead. From Ron Ziel and George H. Foster, Steam In the Sixties (New York: Meredith Press, 1967), 196.

During this period No. 8 was moved to Blairsville and partially disassembled in preparation for operations on the Blairsville and Indiana. In 1975, Cornell decided the locomotive was excess to his needs and offered it for sale.[100]

A group of steam enthusiasts in Scranton acquired No. 8 and trucked it to Clarks Summit, PA. The engine was stored on a section of the old Delaware, Lackawanna and Western Railroad main line while the group discussed its future. The new owners intended to restore the locomotive and use it to power excursions in the Scranton vicinity. They studied several options, including operations on the old Lackawanna Railroad main line from Nicholson to Hop Bottom; on the former Lehigh Valley Railroad's Montrose Branch running from Tunkannock to Montrose or State Line and Sullivan Branch between Towanda and Monroeton; and on the former Delaware and Hudson Railroad's Penn Division main line from Scranton to Carbondale.[101]

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[100] Ibid.

[101] Willard Sturdevant, conversation with author, 17 November 1995; Conrad, 18 May 1995.

A lack of adequate funding and other problems prevented any of the options from becoming viable. The single largest obstacle to their plans was the poor condition of the locomotive. A member of the owners group, Dave Gruner, recommended that the engine be further disassembled in order to perform a mechanical inspection. The locomotive was found to have leaky tubes and a cracked L3 - left side third - wheel. The tubes and cracked wheel required replacement.[102]

The group hired Valley Railroad chief mechanical officer J. David Conrad to undertake a more extensive survey of the locomotive. Conrad pulled several staybolts, removed the steam dome cover, and found massive deterioration of the forward firebox tube sheet. His estimate for repairs totalled approximately $20,000-40,000. According to group member Robert Patterson, "That pretty much condemned restoring the locomotive to operating condition." Conrad indicated that the engine could be reassembled and run for brief periods at a greatly reduced pressure. The owners decided not to put any more money into the project and offered the locomotive for sale as a museum piece.[103]

At the time of the group's decision, Conrad was looking for a locomotive for Steamtown National Historic Site. He first contacted Steamtown NHS superintendent Dr. John A. Latschar in March 1994 concerning an exchange of locomotives. Conrad would acquire an 0-6-0 or 0-8-0 steam locomotive and modify it into an interpretive display similar to one at the National Railway Museum of York, England. He would partially section portions of the locomotive to reveal the inner surfaces of the boiler, firebox, cylinders, and other parts. In return for delivering this display to Steamtown, Conrad would receive a locomotive from the park's collection for restoration and operation elsewhere.[104]

Conrad felt that this type of display was the best means of demonstrating the design and function of steam locomotive components. Park management agreed and, on 3 August 1994, concluded a verbal agreement with Conrad. The formal agreement, encompassing the scope of work, proposed delivery date for the sectioned locomotive,

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[102] Robert Patterson, conversation with author, 26 October 1995. Gruner was employed by Hartford Boiler Corporation and had experience with boiler inspections.

[103] Ibid.

[104] J. David Conrad to Dr. John A. Latschar, 5 March 1994. Building files, folder "Spang, Chalfant & Company No. 8," Steamtown National Historic Site, Scranton, PA. Correspondence concerning the proposal and selection of No. 8 is provided in Appendix 2, pages 69 to 83.

and the park locomotive to be traded, was signed by new park superintendent Terry R. Gess on 21 November 1994.[105]

Conrad initially considered purchasing an 0-8-0 switcher in Illinois for the project. When No. 8 became available he bought it instead, for $20,000. He started work on the former Spang, Chalfant and Company switcher at its storage site in Clarks Summit, PA in the spring of 1995. Conrad did all of the work in the open and in his spare time, commuting from his home in Ivoryton, CT. On several occasions he was forced to suspend the project due to a lack of time or inclement weather. Conrad also provided his own tools and portable cutting and painting equipment. He primed portions of the locomotive and tender as they were completed and then covered them with protective tarpaulins.

Conrad also painted the exposed interior sections based on their functions: the boiler and boiler tubes were painted light blue, corresponding to the proper water level over the crown sheet. Above the crown sheet the boiler wall was painted white. The interiors of the firebox, smokebox, and tubes were painted bright yellow; gray paint was used to represent steam in the throttle, dry pipe, admission pipe, and cylinder valve interiors. The interior of the water tank was painted dark blue. These colors match those proposed by Conrad in his original and revised scopes of work (see pages 81 and 86), with the exception of the substitution of yellow for red in the firebox, tubes and smokebox.

All repairs and modifications were completed in the fall of 1995 in preparation for the move to Steamtown NHS. Steamtown NHS contracted to move the locomotive to the park by tractor-low boy trailer in late 1995.

On 16 January 1996, Steamtown National Historic Site accepted ownership of Spang, Chalfant and Company No. 8 in exchange for Canadian Pacific Railway 4-6-2 locomotive No. 1293. Extended negotiations with the Pennsylvania Department of Transportation finally resulted in the delivery of the locomotive to the park on 25 July 1996.[106]

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[105] Dr. John A. Latschar to J. David Conrad, 16 March 1994; Calvin F. Hite to J. David Conrad, 8 August 1994; J. David Conrad to Calvin Hite, 10 September 1995; Calvin F. Hite to J. David Conrad, 21 September 1995; Terry R. Gess to J. David Conrad, 20 November 1994. Building files, folder "Spang, Chalfant & Company No. 8," Steamtown National Historic Site, Scranton, PA.

[106] Terry R. Gess to J. David Conrad, 16 January 1996. Building files, folder "Spang, Chalfant & Company No. 8," Steamtown National Historic Site, Scranton, PA.

Architectural and Restoration Data

As-Built Specifications - Locomotive No. 8

Reporting Marks: none	AAR Class: 0-6-0
Type: Six-wheel switcher	Number of Locomotives: 1
Builder: Baldwin	Date Built: April 1923
Tractive effort:	22,800 lbs
Weight on drivers:	117,970 lbs
Length over couplers:	28' 4"
Width over cab:	9' 9¼"
over cylinders:	10'
Height at steam dome:	13'
at stack:	14' 11½"
Wheelbase:	8' 6"
Driver diameter:	46"
Cylinder diameter:	19"
Tender length:	27'
Tender width:	9' 2"
Tender height at rails:	11' 6½"

Underframe

Construction:	steel
Sills:	steel
Buffer:	unknown
Draft gear:	unknown
Draw Bar:	steel

Firebox

Construction:	riveted steel with staybolts

Boiler

Construction:	riveted steel
Operating pressure:	180 lbs

Cab

Construction:	steel with wood
Windows:	wood sashes

Roof:	wood
Flooring:	wood
Drivers	steel; Baldwin steel tires
Valve Gear	Walschaerts
Accessories	
Lighting:	electric
Tender	
Construction	welded steel
Truck type:	four-wheel arch bar
Wheelbase:	128"
Springs:	elliptical
Pedestals:	cast
Wheels:	36" cast
Brakes	
Type:	steam
Driver brake:	clasp
Tender brake:	clasp
Finish	
Boiler cladding:	painted steel
Firebox:	steel
Cab:	painted steel and wood
Frame and running gear:	painted steel
Tender:	painted steel

Maintenance and Repairs

Information on maintenance activities by either Spang, Chalfant and Company or the Duquesne Slag Company has not been identified. None of Sloan Cornell's maintenance records remain. Efforts by subsequent owners were limited to the following actions by the Endless Mountain Steam Association, the group formed by Will Sturdevant, Robert Patterson and others:

- right side tender sill replaced
- tender angle iron braces replaced
- tank floor replaced
- new coal bunker walls installed
- L3 driver replaced
- right side wheel driving box liners replaced

- cab sides replaced below window line
- new dry pipe fabricated, not installed[107]

Summary of Condition and Modifications

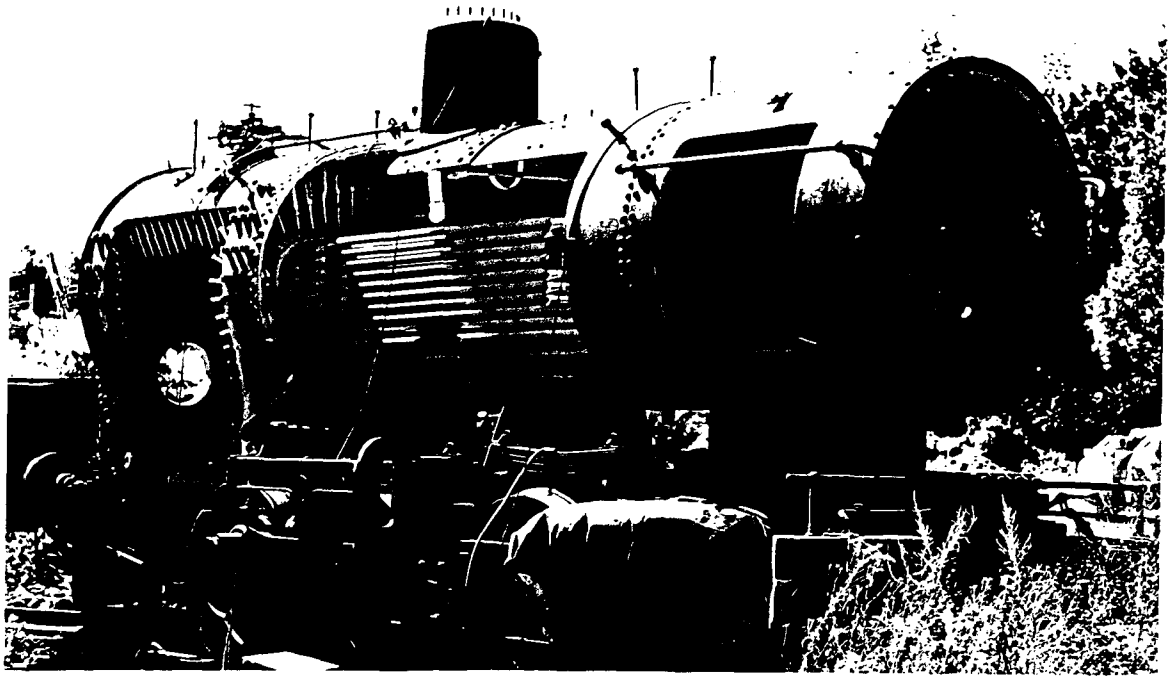

Fig. 11. Modification of Spang, Chalfant & Co. No. 8 in progress at Clarks Summit, PA, 11 October 1995. Photograph by author.

J. David Conrad commenced work on Spang, Chalfant and Company No. 8 in the spring of 1995. At that time the locomotive was stored in Clarks Summit on a section of track. The cab was removed from the frame and stored on the ground near the locomotive. The majority of the locomotive's valve gear, appliances, and cab fittings were removed and stored in an adjacent Delaware and Hudson steel boxcar (also acquired by Steamtown NHS).

The following information summarizes the condition of the locomotive components at the time of its acquisition by Conrad, and lists his repairs, modifications and restoration work.[108]

GENERAL - All metallic surfaces on the locomotive were needle-chipped to remove rust, then primed and finish coated.

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[107] Cornell, 27 October 1995; Sturdevant, 30 November 1995; Patterson, 26 October 1995.

[108] J. David Conrad, interview with author, 13 March 1996.

PILOT BEAM/RUNNING BOARDS - The running board brackets were straightened and the wood footboards replaced in kind with white oak. The boards were treated with Woodlife Wood Preserver and left in a natural state, matching the original treatment.

The cut levers and handholds were straightened. The end of the left side hand hold was rusted off. A replacement hand piece was fabricated and installed.

SMOKEBOX - The smokebox front and door were off the locomotive and stored in the boxcar. They were needle-chipped, primed, painted and reinstalled. Patches were welded into place where required. Conrad fabricated and installed replacement smokebox dogs where required.

A section measuring approximately four feet by four feet was cut in the smokebox, exposing the front tube sheet, the exhaust nozzle, front end netting, and the steam admission pipes. Both admission pipes were sectioned so that visitors could see the exhaust nozzle and front tube sheet. Most of the front end netting was "rusted to nothingness," and was completely replaced. Half of the baffle plates were reinstalled to enable visitors to see the smokebox interior more clearly.

SMOKESTACK - The smokestack was patched by the locomotive's previous owners. The patch was cut and repositioned to align the sectioned portion with the side of the locomotive.

CYLINDERS - The cylinder saddle was needle-chipped, primed and painted.

The right side cylinder was the first portion of the locomotive to be sectioned. The cylinder was quartered, with approximately one fourth of the cylinder and the valve cut longitudinally and laterally. The initial cuts were made with a cutoff saw, which was limited to a depth of about four inches. An attempt to deepen the cuts using the air arc process was unsuccessful; portions were instead removed using the cutting rod method, which successfully burned through the cast iron. The cuts opened up the valve passages and the bore of the cylinder for view.

The cylinder head was cut using the same process, as were the body of the valve and the valve cover.

RUNNING GEAR - The driving wheels were needle-chipped, primed and painted. The driving axles were polished and repacked with fresh journal pads prior to being reassembled.

Originally the locomotive used cotton waste wiper media. Long cotton waste of the type historically used on the locomotive was difficult to obtain and the materials that were available were of poor quality. In addition, Conrad was unable to determine a method of mounting cotton waste properly to prevent snagging. He substituted journal pads as they were readily available.

The locomotive is equipped with Walschaerts valve gear. The side rods and valve gear were degreased, polished and clear-coated with polyurethane.

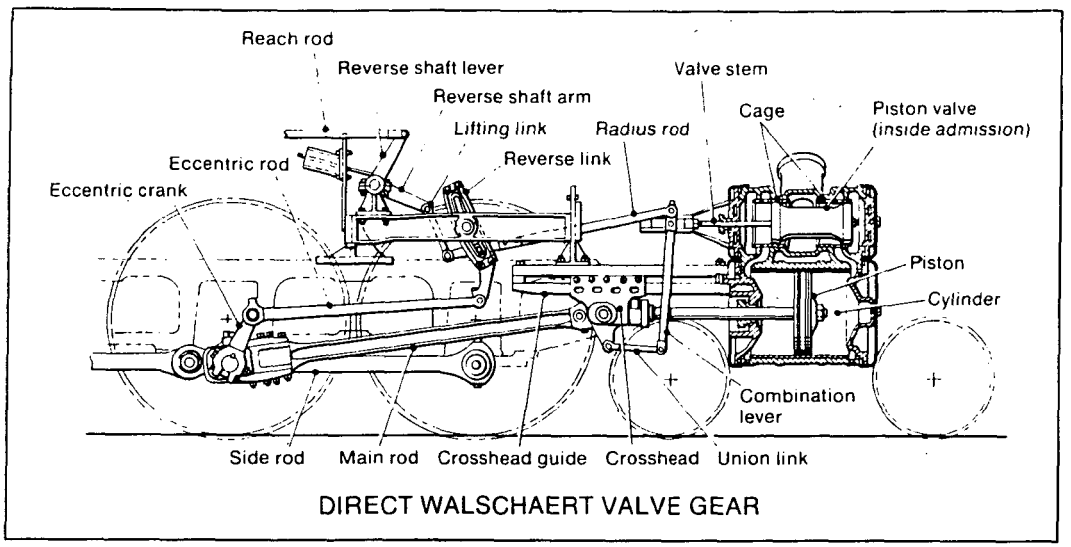

Fig. 12. Diagram of Walschaert valve gear. From George H. Drury, Guide To North American Steam Locomotives (Waukesha, WI: Kalmbach Publishing Co., 1993), 411.

FRAME/SPRINGS - Conrad described the condition of the locomotive frame as "fairly good." The condition of the springs and spring rigging was "rather poor." Other than cleaning, priming and painting, no other work was done on the frame and springs.

BRAKES - Most of the brake components were found in the boxcar, cleaned and reinstalled. A few replacement components were required. One blind brake shoe remains to be installed. Conrad rated the overall condition of the brake gear as "fairly poor."

The locomotive had an air compressor mounted on the left side of the smokebox, apparently installed by Duquesne Slag Company as a means of providing air pressure for the brake system. Because the locomotive was to be returned to its Spang Chalfant appearance, Conrad removed the compressor and its associated air reservoirs and air brake piping. In their place he installed the proper steam brake system components, including a replacement steam brake line from another steam locomotive.

The first locomotive steam brakes were installed in England in 1833, by Robert Stephenson. The engineer operated a two-position valve, which allowed steam from the boiler into a cylinder with piston and rod. As steam entered the piston the piston rod was forced out, actuating the brake gear and slowing the engine. Once the locomotive was stopped, the engineer rotated the valve in the opposite direction, venting steam to the atmosphere and releasing the brakes. The steam brake proved effective for locomotives but was not suitable for use with freight and passenger cars. By the end of the 1870s, the air brake system developed by George Westinghouse was standard equipment among all manufacturers and railroads, almost totally replacing the steam brake and other braking systems in mainline passenger and freight operations.[109]

Steam brakes were retained for use with industrial locomotives, particularly in instances where the operator was not concerned with providing air pressure for car braking, such as in steel mills. The lack of a locomotive air compressor saved maintenance costs and therefore reduced expenses for the operator. Manufacturers offered steam braking systems for industrial and export locomotives right up until the demise of the steam locomotive industry. Two other locomotives in the Steamtown NHS collection have intact steam brake equipment: Bullard Company 0-4-0T No. 2, and Public Service Electric & Gas Company 0-6-0 fireless No. 6816.[110]

BOILER - The entire right side of the boiler was opened from about two feet back from the smokebox to the circumferential joint between the boiler and the fire box, extending from above the driving wheels to nearly the top of the boiler drum. The steam dome was sectioned, L-shaped to the top, to reveal the boiler tubes, throttle valves, the dry pipe, boiler braces, and other components.

The throttle valves were sectioned using the abrasive cutoff saw. The dry pipe and boiler were sectioned with torch. All rough edges were ground smooth. All of the boiler tubes were reinstalled; several were sectioned.

Inspection of the boiler following sectioning confirmed its very poor condition. All interior surfaces were covered with scale; chipping of the scale revealed extensive deterioration and pitting. The extent of this deterioration reinforced the decision to permanently remove the locomotive from service.

A contractor sandblasted the interior of the boiler to the greatest extent possible. The interior surfaces and parts were then primed and painted. The steam dome and dome casing were cut and the dome

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[109] David Marshall, "Brakes," Railroad Magazine, May 1946, 14.

[110] J. David Conrad, conversation with Mark Morgan, 10 June 1996.

cap was reinstalled with intact safety valves. The valves were stripped of paint, polished and clear coated.

The previous owners removed and discarded the locomotive's boiler jacket and asbestos boiler insulation. With the exception of a couple of pieces at the backhead, all of the jacketing currently on No. 8 is new reproduction. Photographs and referrals to typical Baldwin practice were used to determine the correct location of the seams and the size and spacing of rivets.

Conrad installed the replacement boiler jacket over two by two wood spacers wired to the boiler shell. Styrofoam was placed between the boiler and jacket at the open portions of the boiler, simulating the original insulation. Conrad initially considered using calcium silicate as a replacement material but felt it was too close in appearance to asbestos.

SAND DOMES - Conrad cut a window in the forward sand dome. The window will be closed with a plexiglass liner with a pocket, which will contain sand, to illustrate the function of the sand dome. The rear sand dome was not modified.

FIREBOX - The firebox exhibited gross deterioration in the thickness and condition of the sheets. The inside was sandblasted, primed and painted. The tube sheet and grates were left intact.

The right side of the firebox was cut using an oxy-acetylene torch from a point two staybolt rows back from the circumferential joint to a point two staybolt rows forward of the backhead. The opening measures approximately five feet by six feet. The inner sheet opening was cut slightly smaller to display the double-wall construction of the firebox. The staybolts were also cut and their ends ground to present a smooth appearance for the visitor.

The turret valve and its associated piping are attached to the top of the firebox. These were needle-chipped, primed and painted. Copper components were stripped, polished and clear coated.

CAB - The right front quarter of the cab was removed to allow viewing of the interior. The cab sides are new; according to Conrad the previous owners replaced the sides "pretty much in kind" with sheet steel. The sides were attached to the framework with carriage bolts. The bolt heads were filled, giving them the appearance of rivets.

The cab floor on the left side was intact and reinstalled. A replacement was fabricated for the missing right side floor. The original T-iron edging on the left and right sides of the cab was rusted beyond salvaging and was replaced.

The inside lining of the cab - all of the wainscotting, ceiling and back walls - was badly rotted and suffered from fire damage due to vandals. All of the wood was removed and replaced in kind with Douglas fir porch siding. Wherever possible, the original roof bows were retained. Two of bows were rotted and/or burned and were replaced. The wainscotting was treated with Woodlife Wood Preserver, primed with an oil-based wood primer, and painted with an oil-based finish coat.

The cab windows and doors are mostly original and in good condition. Most were stripped, sanded, primed and repainted. Where necessary, an epoxy wood filler was used to make repairs. The cab windows were reglazed as necessary; some of the glass is original. Conrad fabricated and installed a reproduction left front window.

BACKHEAD - The majority of the backhead fittings were held in storage at Steamtown NHS. Brass and bronze pieces were cleaned with muriatic acid to get the tarnish off, then polished and clear coated. The iron and steel parts were either sandblasted or needle-chipped, primed and painted.

TENDER - Conrad cutaway portions of the tender's water and coal compartments on the right side. The water tank opening measures approximately three feet square and the coal compartment section is about two feet square. The interior of the tender was sandblasted in areas adjacent to the cutaways. The tender body had been previously needle-chipped, primed and painted. During the process Conrad discovered that someone had painted graffiti on the side of the tender. Initial attempts at removing the graffiti were unsuccessful so he sanded, primed and painted the entire tender.

The coal bunker floor was renewed by the previous owners, except for the steel sheeting. New steel sheeting was fitted where required as a replacement. Badly rusted portions of the coal bunker top collar were cut away and repaired with welded patches. The patches were installed flush with the original material so that the seams would become indistinguishable after the welds were ground.

Little other corrective work was required with the tender. The previous owners needle-chipped, primed and painted the trucks and wheels. Conrad cleaned, sanded, reprimed and repainted both trucks and all eight wheels. The edging at the top of the tender and tender safety railings are original. They were sanded, primed and painted. The footboards, brackets and grab irons at the rear of the tender received the same treatment as those at the front of the locomotive. Finally, the steam fittings for the brake system were replaced with Barco joints.

Paint Schemes

Railroads are as conscious of their public image as any other major industry. To that end, the paint and markings applied to locomotives and rolling stock during any period are designed to appeal to the passenger and freight customer, and to give the image (if not always the reality) of a solid, profitable, progressive company. As the corporate image and prospects change, the markings are usually modified.

In contrast, most industrial locomotive operators painted their equipment in simple, subdued markings. These markings rarely, if ever, changed during the course of the locomotive's operations.

First Scheme - Spang, Chalfant & Co.

The builder's photograph for No. 8 indicates that the engine was painted black, with white detail lines, lettering, and numbers. "Spang, Chalfant & Co., Inc." was centered on the sides of the tender in approximately ten-inch modified Gothic style lettering. A ten-inch tall Railroad Roman number eight was centered on the lower cab sides. Additional four-inch tall locomotive numbers were centered on the sides of the forward sand dome and locomotive headlight (Fig. 13).

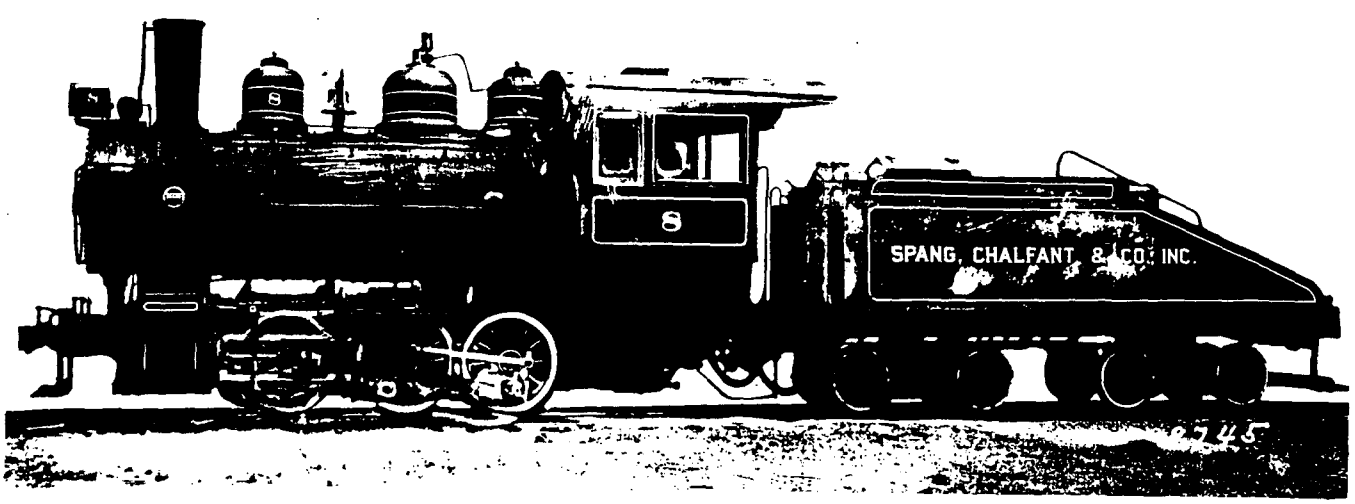

Fig. 13. Builder's photo of Spang, Chalfant and Company No. 8. Baldwin negative No. 8745. Baldwin Locomotive Works photograph collection, Railroad Museum of Pennsylvania, Strasburg, PA.

One-inch detail lines were painted on the tender and upper tender side panels; the lower cab sides; surrounding the two cab side

windows; encircling the steam dome and two sand domes; on the sides of the slide valve chests; and on the lower portions of the cylinder housings. The locomotive was delivered with white "sidewalls" on the drivers and tender wheels. The spokes were highlighted with one-half-inch stripes radiating from the hubs to the wheel rims.

This paint scheme and lettering style have been documented for Steamtown NHS's Baldwin 0-6-0 No. 26. This may indicate that the striping and lettering style was a standard design applied by Baldwin if another scheme was not specified by the customer.

This is the correct, 1923 as-delivered paint scheme for No. 8.

Second Scheme - Duquesne Slag Products Co.

No photographic or documentary evidence has been found to indicate Duquesne Slag locomotive markings, if any. According to prior owner Willard Sturdevant, sanding of the tender by his group revealed Spang lettering, but no evidence of markings for Duquesne Slag Products. Sloan Cornell commented that the engine was in poor shape when he acquired it, including the paint. It is probable that Duquesne Slag never painted the locomotive or only painted over the Spang, Chalfant and Company markings.[111]

Third Scheme - Penn View Mountain

No suitable photographs have been found that indicate the correct Penn View Mountain scheme for No. 8. Cornell stated that he painted the locomotive blue with yellow trim and painted the tender black with yellow trim. Sturdevant stated that both engine and tender were painted blue with red trim at the time of his group's acquisition.[112]

Existing paint on the locomotive was sanded off by Sturdevant and the other owners in 1979. The boiler was then primed.

Current Status

Restoration and modification of No. 8 is complete. Steamtown NHS acquired the locomotive on 16 January 1996; it was delivered to the park on 25 July 1996 and placed on temporary display in the park's roundhouse. Once final preparations, cleaning and touch up are completed, the park will place the locomotive on exhibit in the Technology Museum.

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[111] Sturdevant, 9 November 1995; Cornell, 27 October 1995.

[112] Cornell, 27 October 1995; Sturdevant, 9 November 1995.

Evaluation of the Proposed Use On the Integrity of the Locomotive

Locomotive No. 8 was employed in industrial service for several decades. Disassembly, exposure to the elements and neglect have further affected the integrity of the engine. Damage to No. 8 was mitigated by contractor J. David Conrad during the restoration process, as detailed on pages forty-seven to fifty-two.

Future display of the locomotive as a static exhibit at Steamtown National Historic Site should have minimal impact on the integrity of the car. Any further degradation of the structure will be documented and corrected as required.

PHOTOGRAPHIC DETAILS

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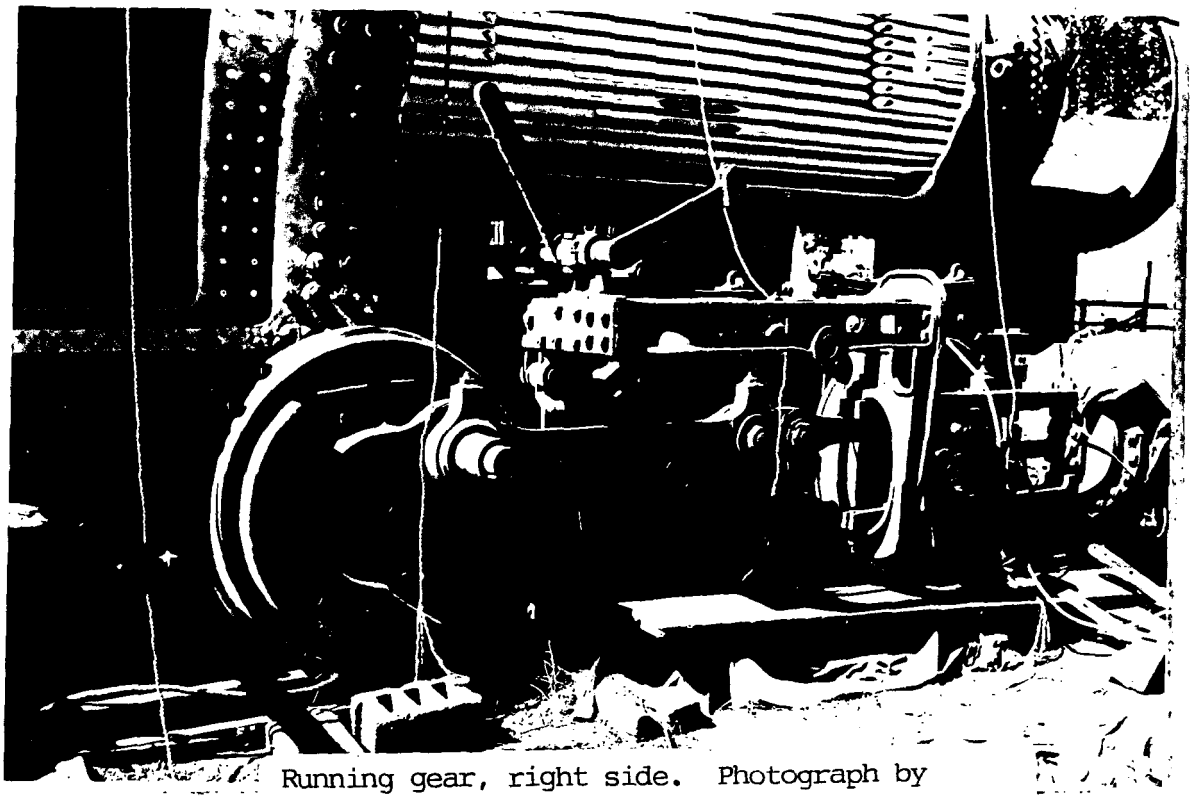
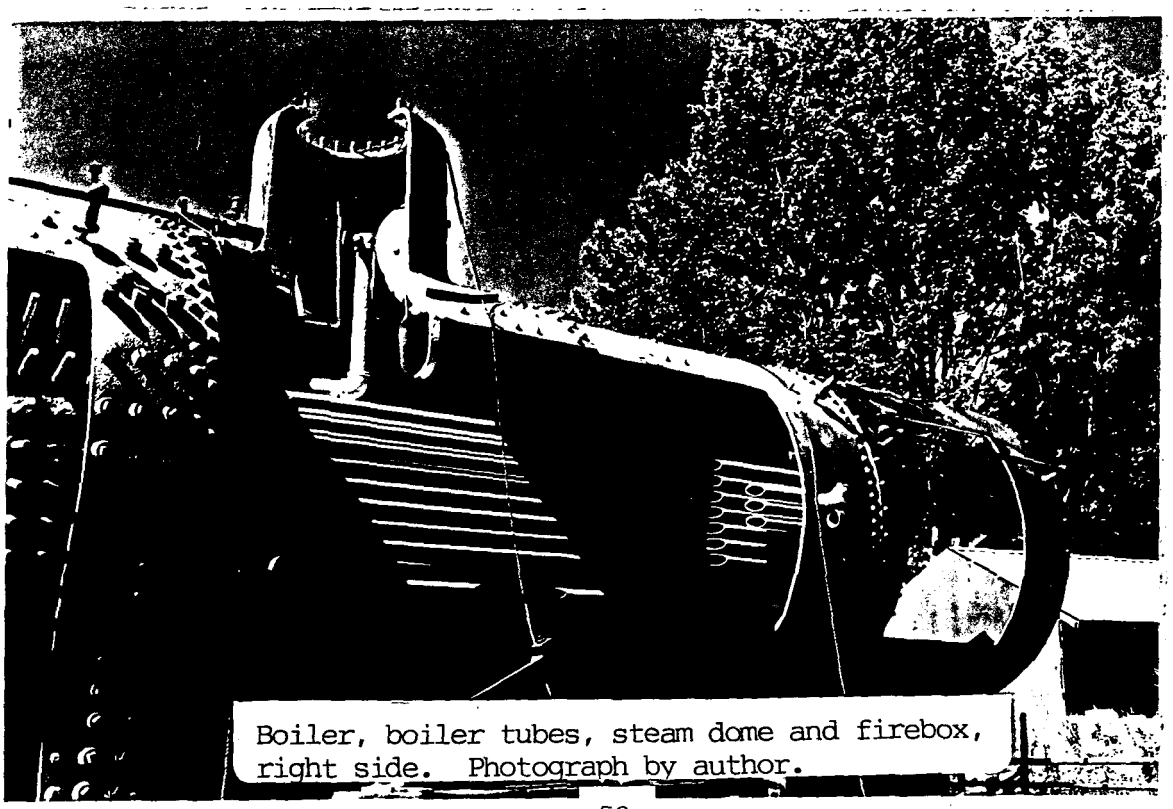
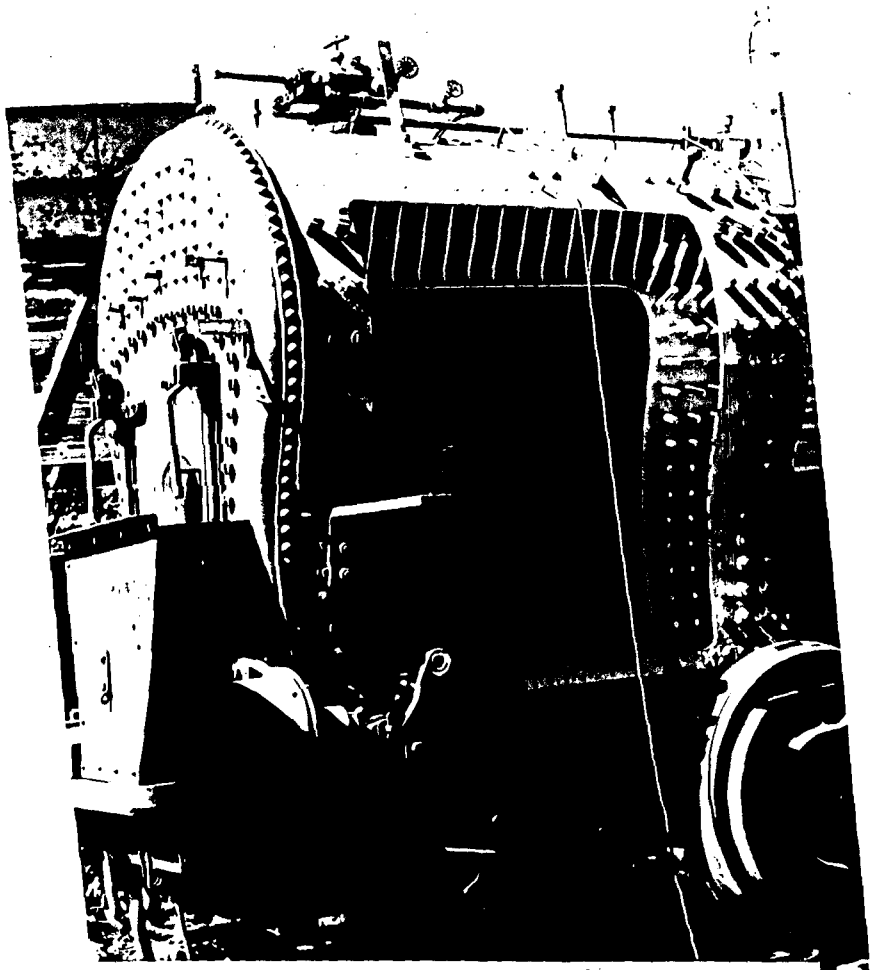


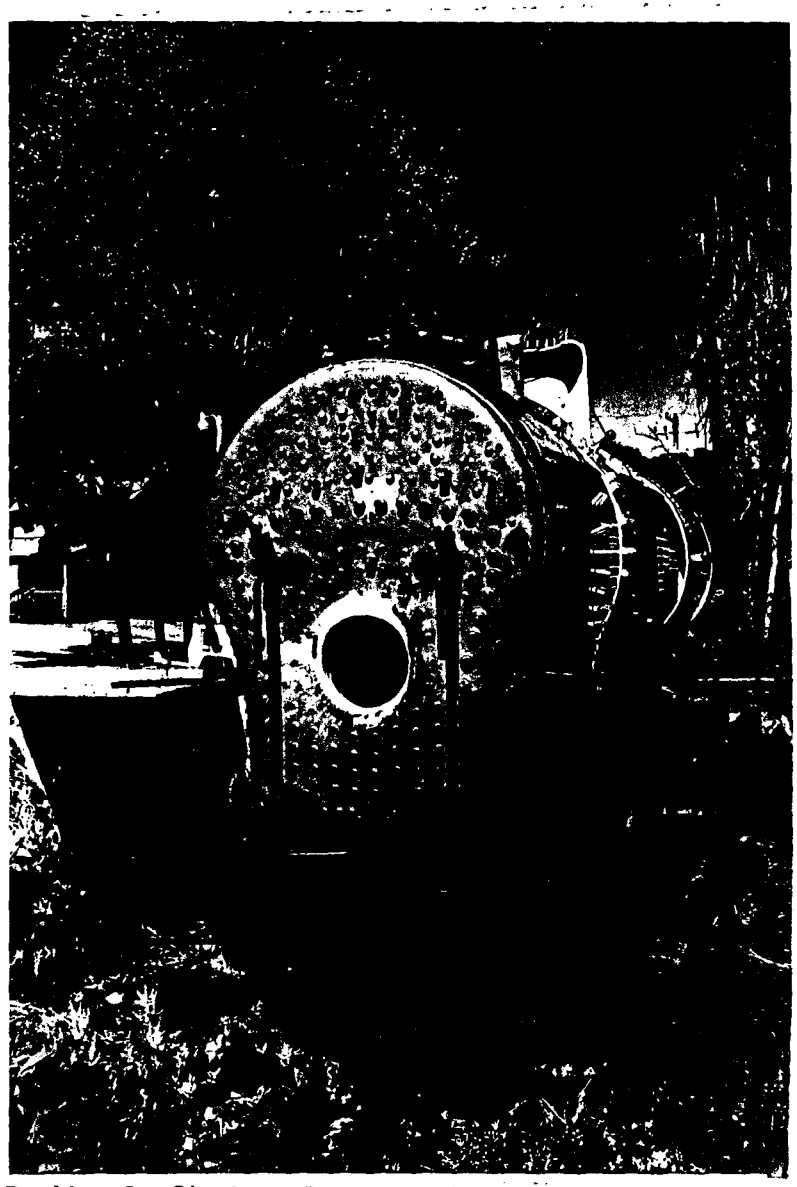
Running gear, right side. Photograph by author.



Boiler, boiler tubes, steam dome and firebox, right side. Photograph by author.



Firebox, backhead, right side. Photograph by author.



Backhead, firebox door opening. Photograph by author.

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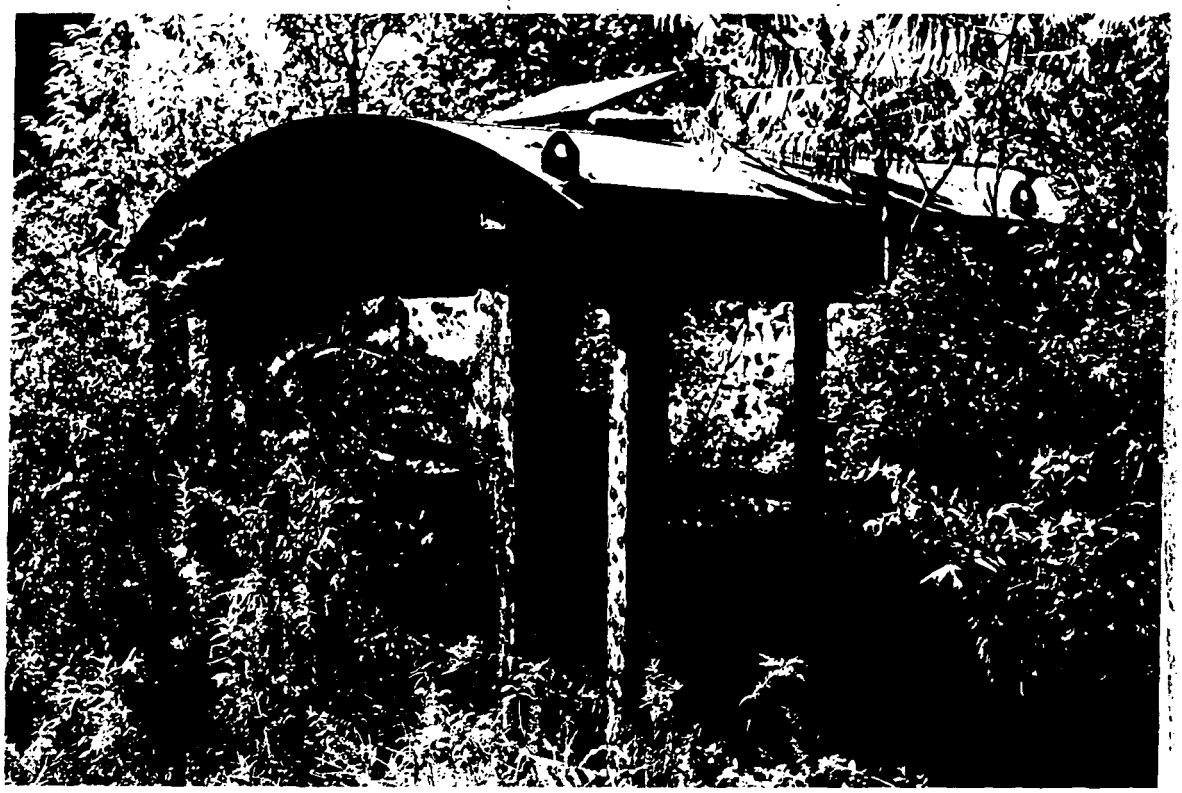
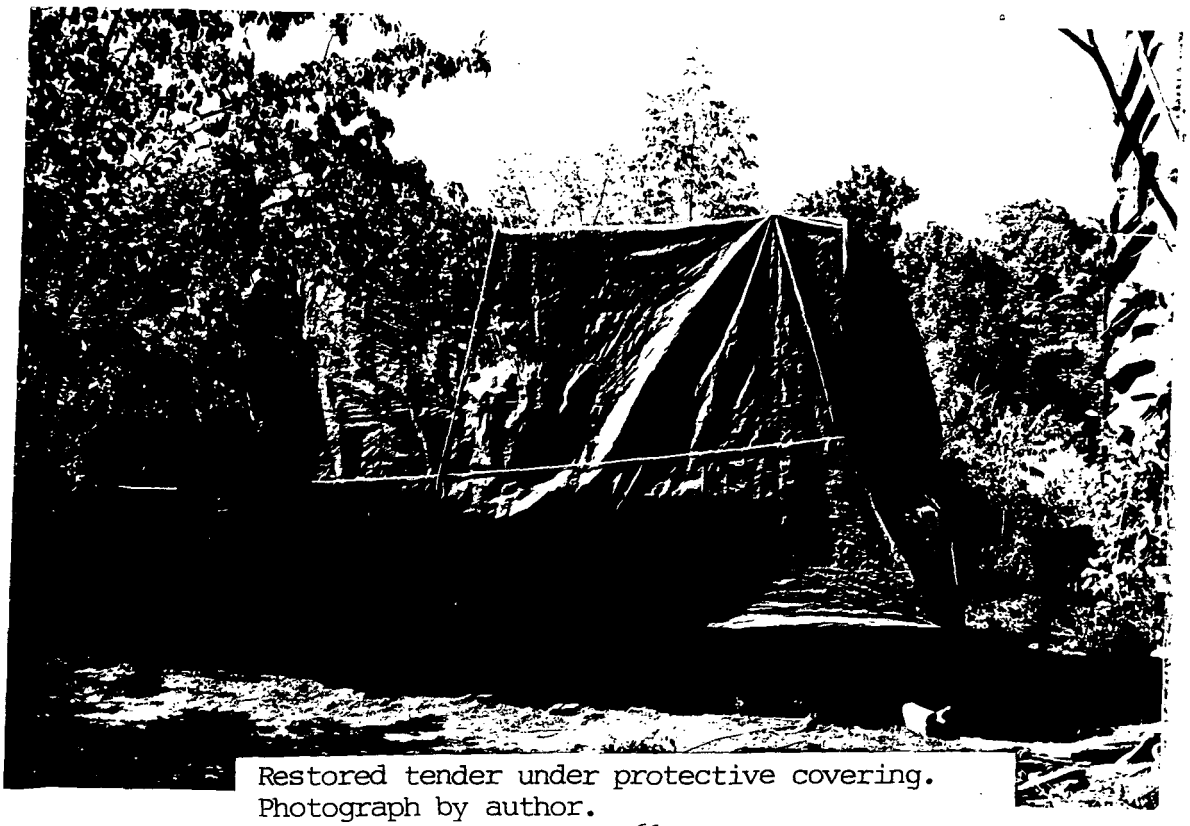


Cab prior to restoration. Photograph by author.



Restored tender under protective covering. Photograph by author.

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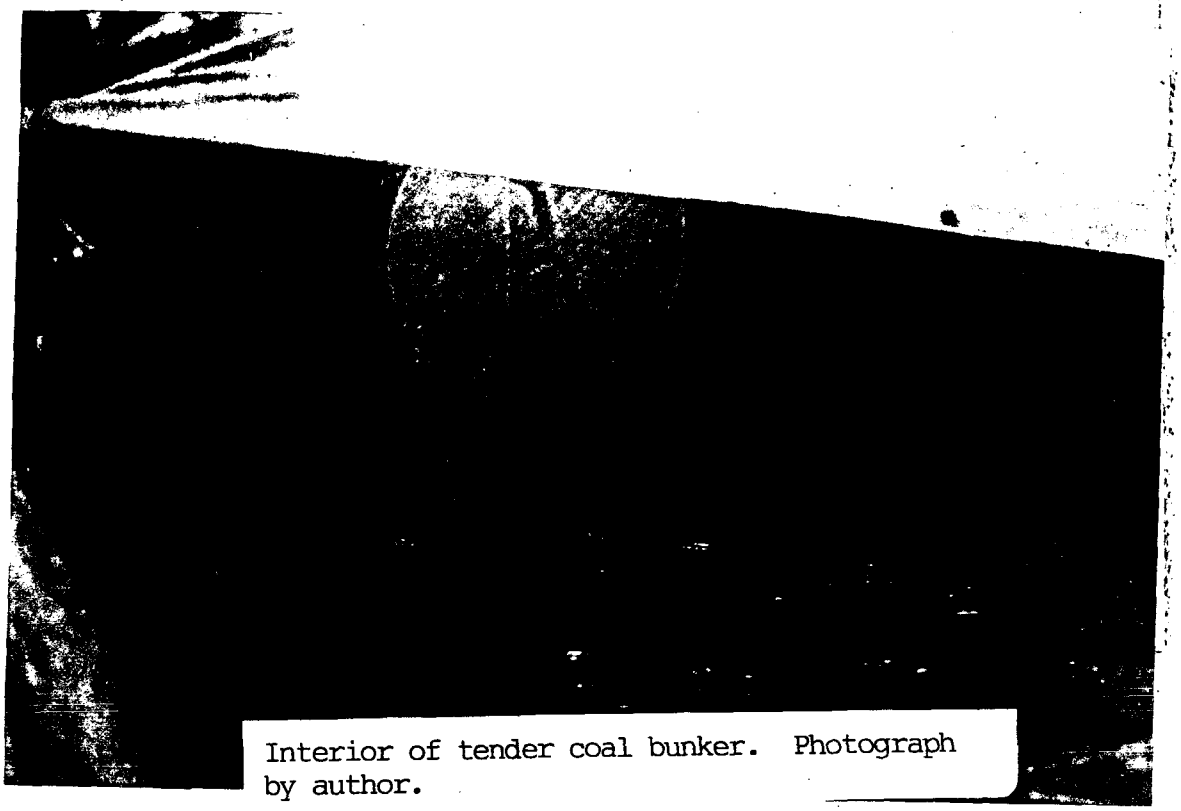
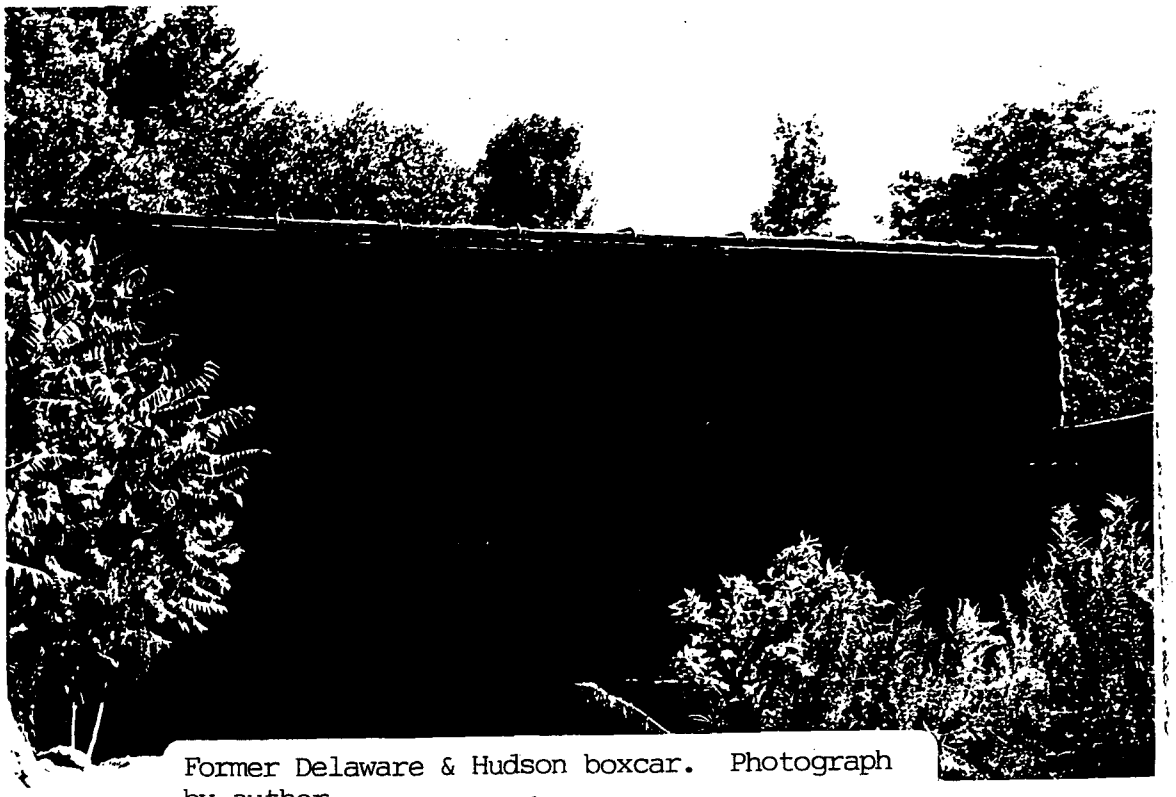


Interior of tender coal bunker. Photograph by author.



Former Delaware & Hudson boxcar. Photograph by author.

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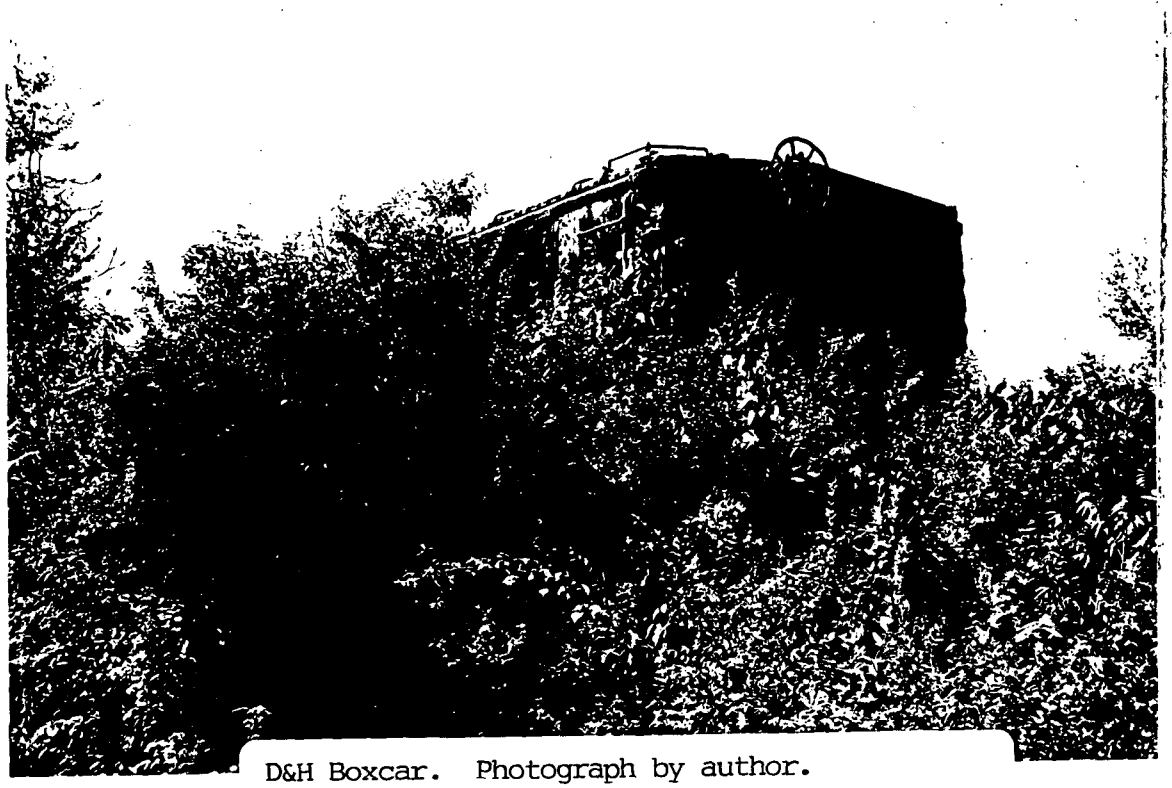
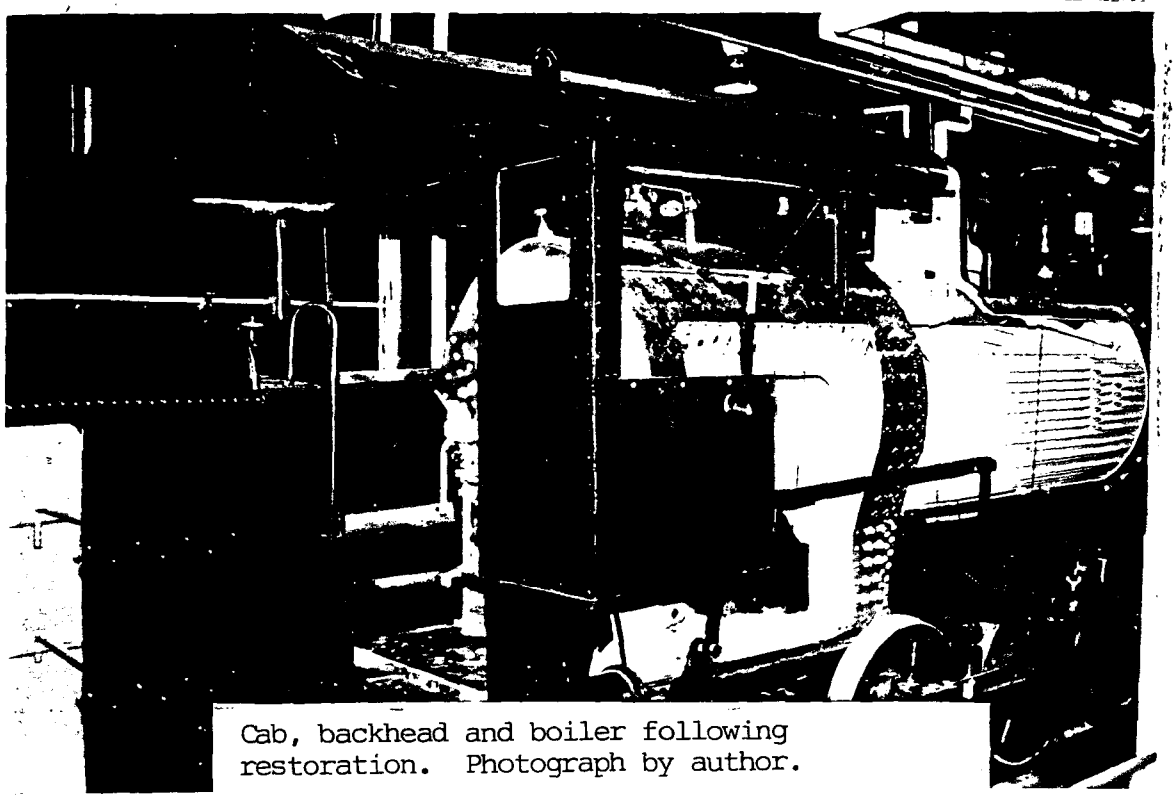


D&H Boxcar. Photograph by author.



Cab, backhead and boiler following restoration. Photograph by author.

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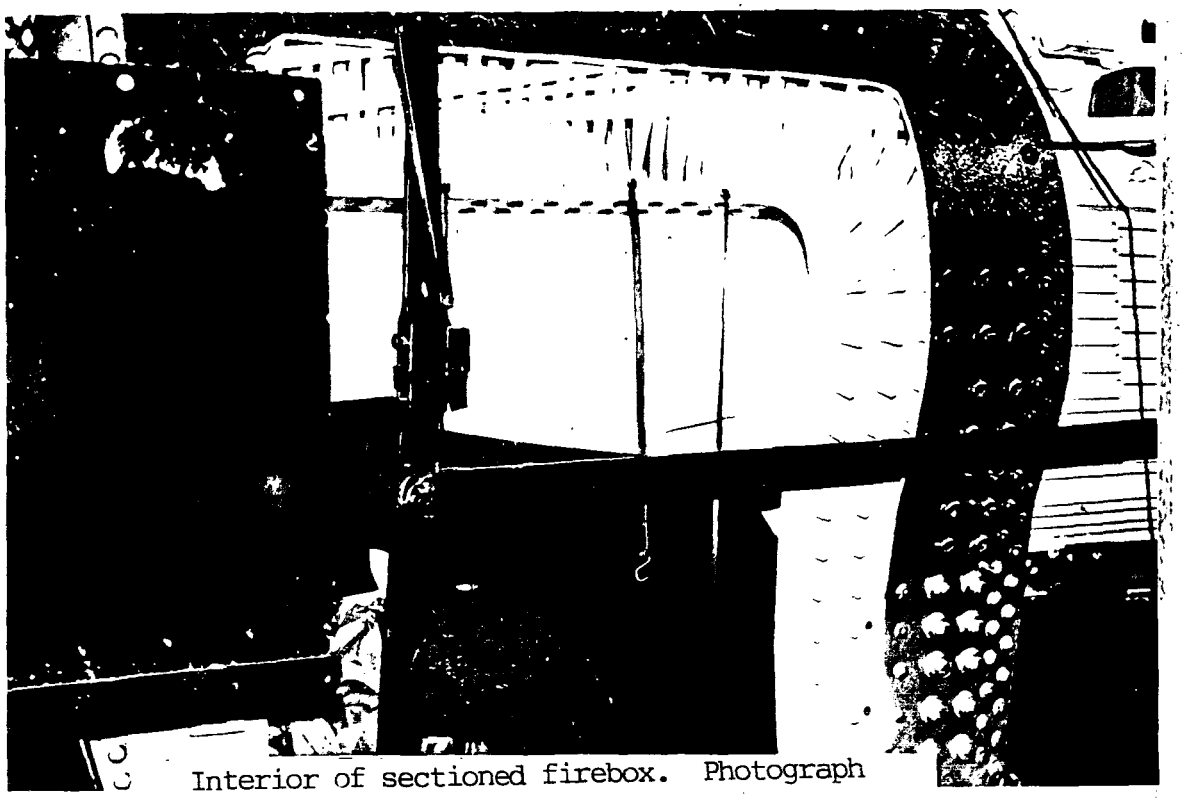
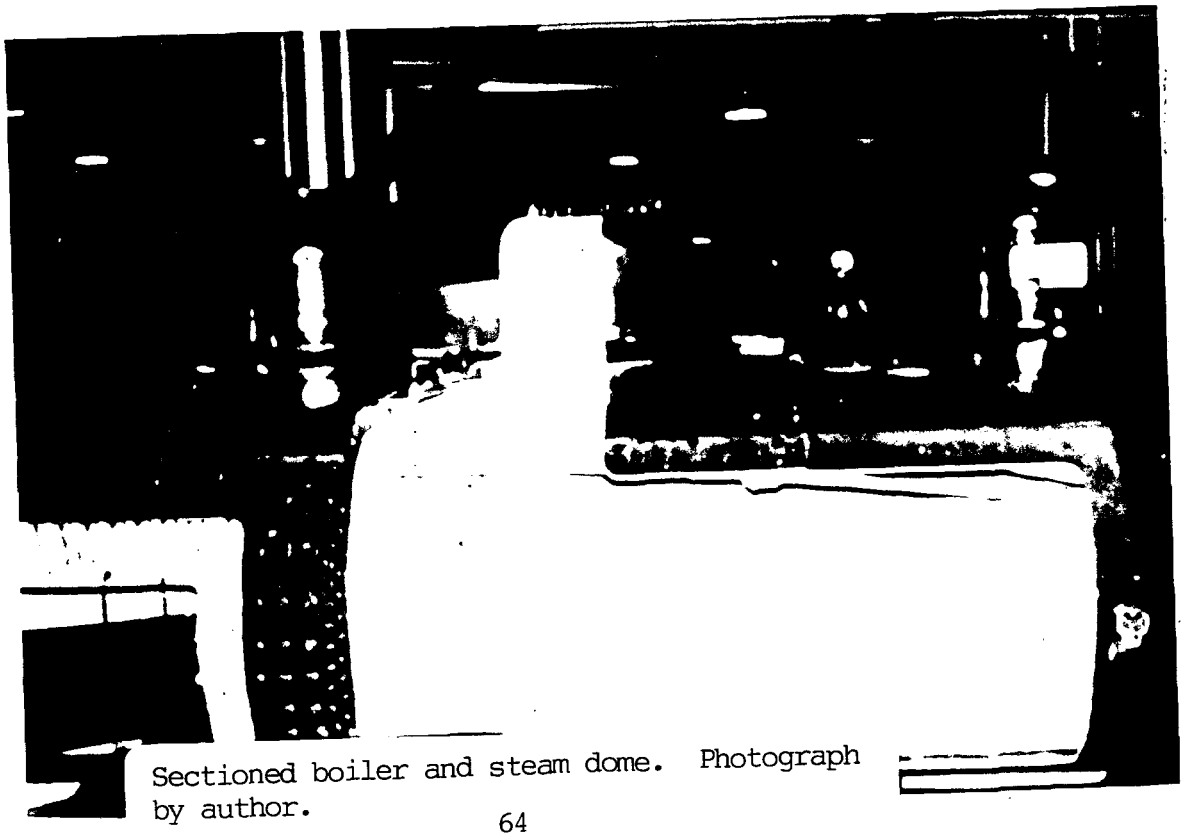


Interior of sectioned firebox. Photograph by author.



Sectioned boiler and steam dome. Photograph by author.

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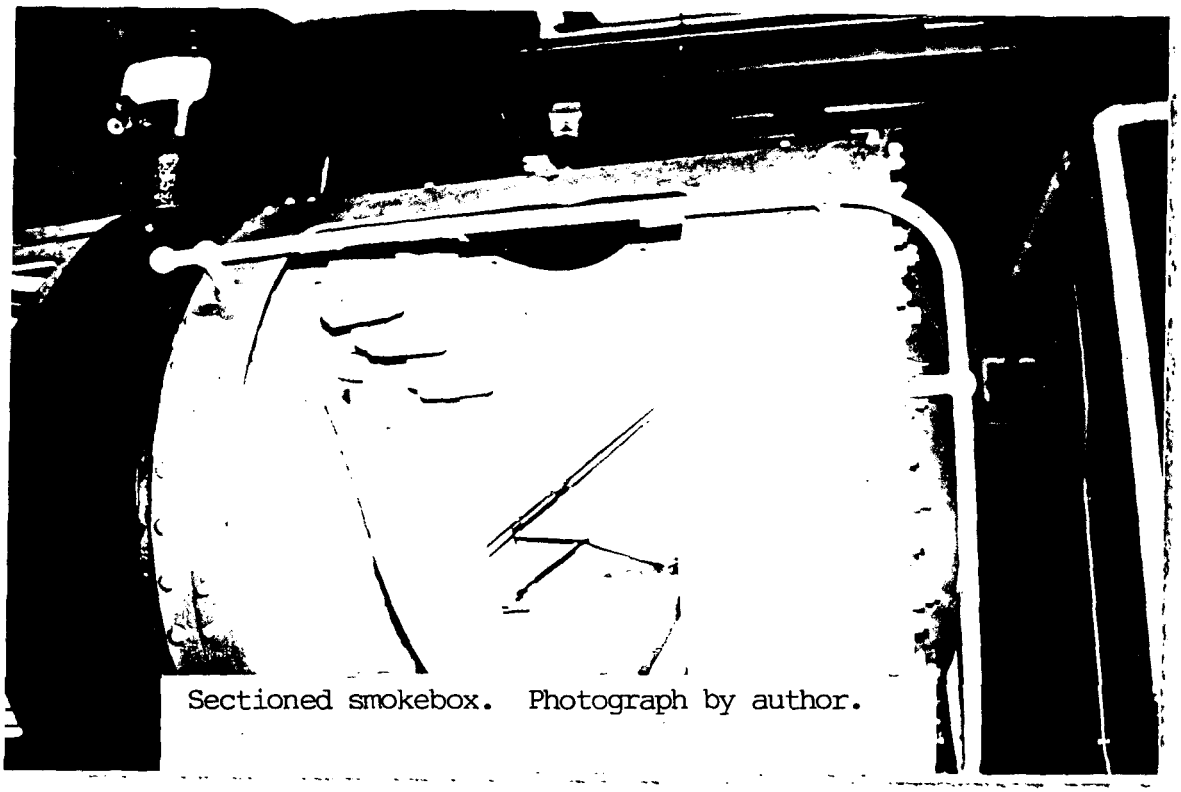
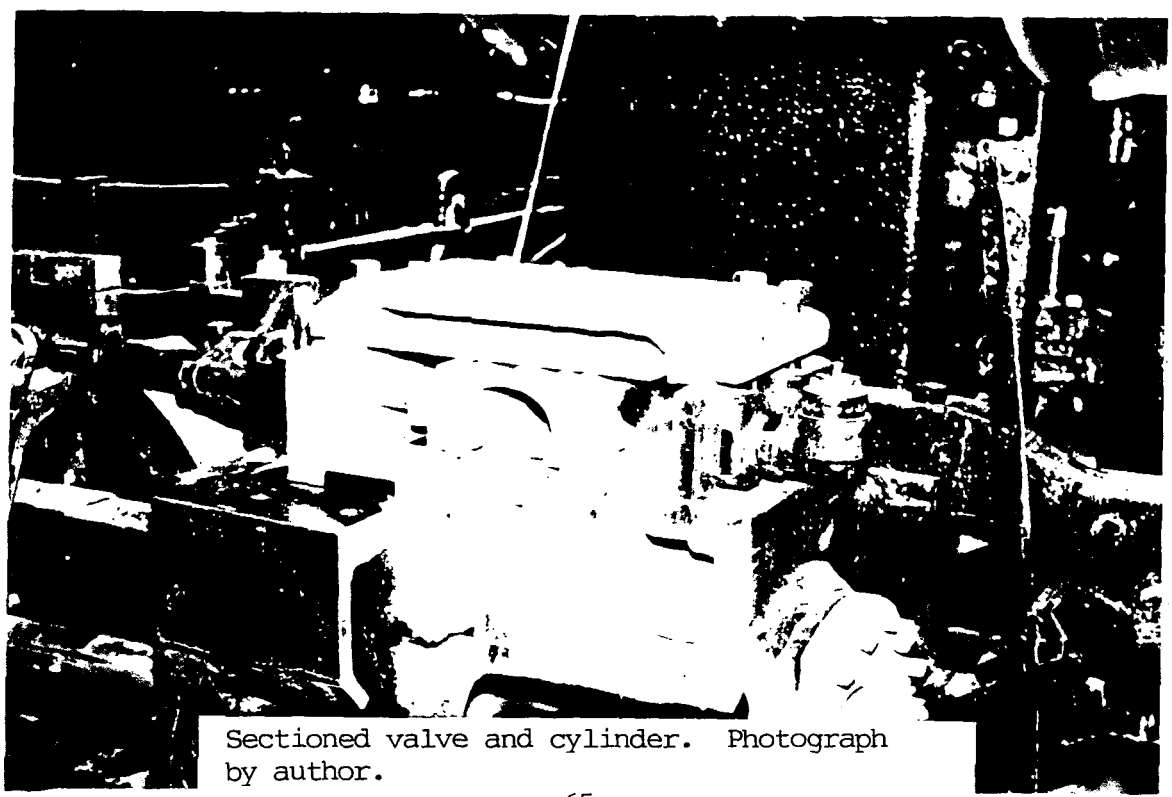


Sectioned smokebox. Photograph by author.



Sectioned valve and cylinder. Photograph by author.

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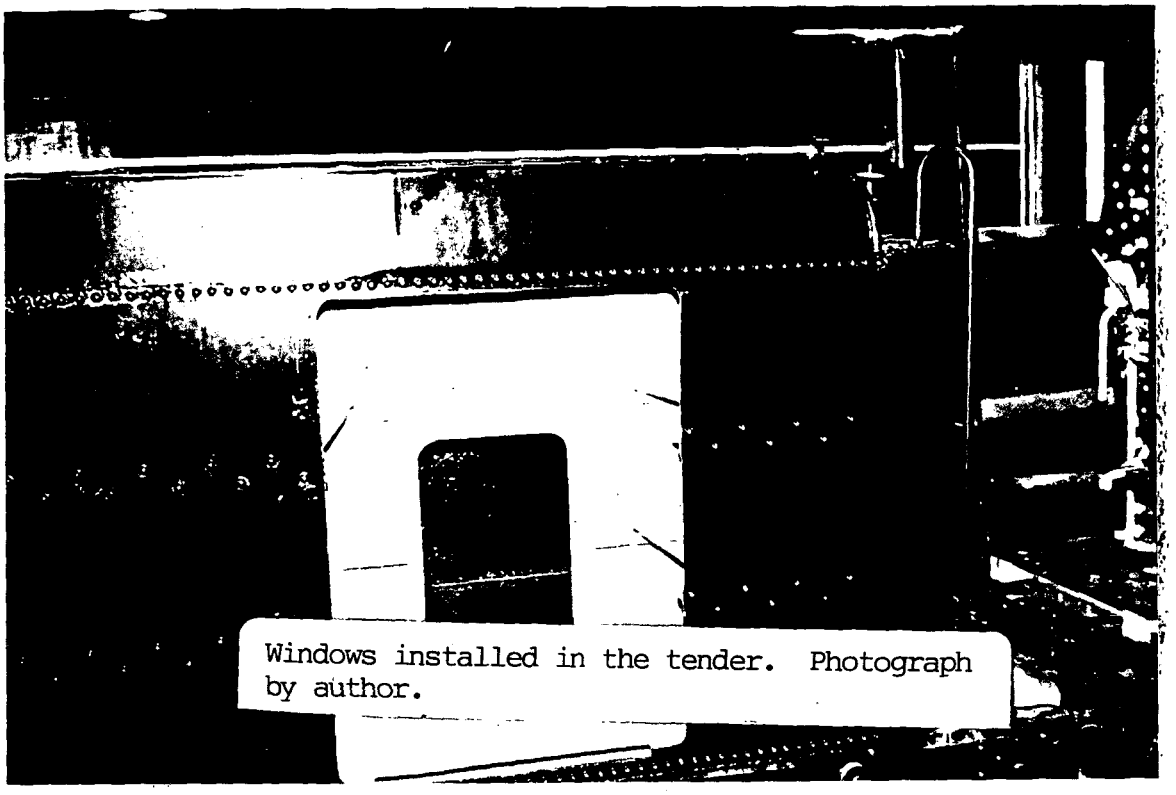
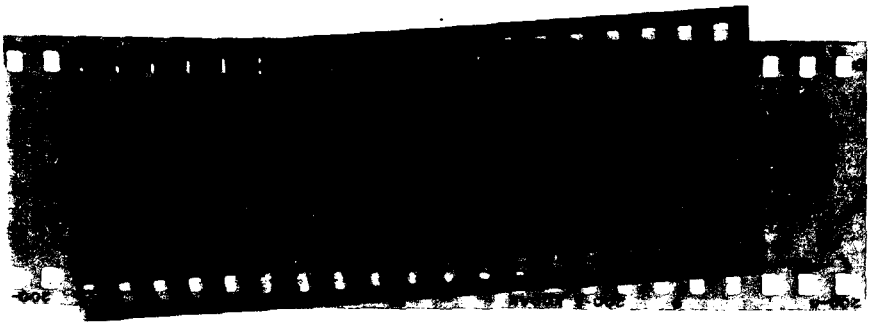


Windows installed in the tender. Photograph by author.



Appendix 1 - Legal Documentation

One document has been located concerning ownership of Spang, Chalfant and Company No. 8. It is the Bill of Sale from Sloan Cornell to Willard Sturdevant, representing the Endless Mountain Steam Association.

At the time of this report's completion Sturdevant had been unable to locate any additional documentation, including the bill of sale from the association to J. David Conrad.

AGREEMENT OF SALE

MADE this 25 day of June 1975

between B. Sloan Cornell, hereinafter called seller and Willard Sturdevant hereinafter called buyer. Witnesseth, that the seller for and in consideration of the sum of Ten Thousand Dollars, agrees to sell to the buyer at Blairsville, Pennsylvania, one 1923 Baldwin Locomotive, Class 6, 32 D 1156, where is and as is.

Buyer agrees to pay the sum of Fifteen Hundred Dollars upon the signing of this agreement and the balance of Eighty Five Hundred Dollars within 90 days or upon the delivery of the locomotive, whichever comes first. Delivery is to be the date the locomotive is to be loaded for delivery.

IN WITNESS WHEREOF, the parties to this agreement have hereunto set their hand and seals, the day and year first above written.

Willard Sturdevant (Seal)

B Sloan Cornell (Seal)

Signed, Sealed and Delivered in the Presence of

Louis Hoff

Clara J. Cornell

The above agreement is extended to December 18, 1975, with the acknowledgement of the receipt of an additional sum of Eleven Hundred ($1,100.00) Dollars. The balance due in the amount of Seventy-four Hundred (7,400.00) dollars is due and payable on December 18,1975 at which time the seller will deliver the above described equipment FOB Blairsville, Pa.

is and as is.

Buyer agrees to pay the sum of Fifteen Hundred Dollars upon the signing of this agreement and the balance of Eighty Five Hundred Dollars within 90 days or upon the delivery of the locomotive, whichever comes first. Delivery is to be the date the locomotive is to be loaded for delivery.

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Willard Sturdevan (Seal)

B Sloan Cornell (Seal)

Signed, Sealed and Delivered

in the Presence of

Louis Hoff

Clara J. Cornell

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Willard Sturdevan Seal

B Sloan Cornell Seal

Witnessed:

O. P. Anderson

October 18, 1975.

Appendix 2 - Project Correspondence and Proposal

J. DAVID CONRAD
23 BLAKE STREET
IVORYTON, CONNECTICUT 06442

March 5, 1994

Dr. John A. Latschar, Superintendent
Steamtown National Historic Site
150 S. Washington Ave.
Scranton, PA 18503

Dear John:

I was recently contacted by Mr. J.M.Hebda, president of the Green Mountain Railroad, a regional carrier which operates from Bellows Falls to Rutland, Vermont. Steamtown operated over their trackage until moving to Scranton, and since then, the Green Mountain has continued to operate seasonal passenger trains in addition to handling freight, their primary source of revenue.

As part of a planned expansion of the their passenger operations, The Green Mountain asked if I would be interested in bringing a steam locomotive (capable of hauling their train) to Vermont, and operating it for them on a contract basis. Therefore I am seeking a suitable locomotive for that purpose. I realize that Steamtown probably wouldn't be in a position to sell anything, but would you consider a trade?

I am sure that during your recent visit to the National Railway Museum at York, you couldn't help but notice the steam locomotive there which has been partially sectionalized to show the inner surfaces of the boiler, firebox, etc. In my opinion, it is the best single display there, demonstrating the design and function of the various components far better than any drawing or verbal description. It is a centerpiece of the museum which enhances the balance of the locomotive collection because it makes them understandable as machines, not merely finely restored objects to be admired on their aesthetic merits. I would propose to trade an 0-6-0 or possibly an 0-8-0 steam locomotive, sectionalized, painted and ready for display in exchange for former Canadian National Railways No. 5288 with such parts as are needed to make it complete.

Please contact me at your earliest convenience so we can discuss my proposal in more detail. Thank you for your consideration.

Very truly yours,

J. David Conrad

cc: Mr. J.M.Hebda
encl.

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

D62

March 16, 1994

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear David:

Your letter of last week, concerning the potential trade of our Canadian National #5288 for a sectionalized display locomotive, has generated a great deal of interest. At one time in the development of our interpretive and museum exhibit plans, we had considered the benefits of such a display, but the idea fell victim to the budget axe.

We are intrigued enough by your idea, that I would like to ask you to take the time to develop your letter of inquiry into a full-fledged proposal. Among the obvious questions we have are the proposed schedule for this project, the exact costs (if any) to the park (including transportation of the #5288), what parts "are needed to make it complete," what locomotive you have in mind to sectionalize, and whether you could provide the appropriate interpretive text to illustrate the exposed workings of the locomotive. I'm sure there will be further questions, as the proposal is developed and discussed.

If you can guarantee that the sectionalized locomotive could be ready in time for the grand opening of our museum complex in July of 1995, and if you can guarantee that the quality of the resulting display will be comparable to the one at the National Railway Museum in York, I think we've got the makings of a deal.

I have been told, by the way, that last weekend's seminar was excellent. Our folks certainly appreciated the chance to attend.

I look forward to hearing from you.

Sincerely,

Dr. John A. Latschar
Superintendent

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO

D18

August 8, 1994

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear Mr. Conrad:

It was a pleasure meeting with you last Wednesday. I have outlined the verbal agreements made at that meeting between yourself and officials at Steamtown National Historic Site, regarding your proposal to provide a sectionalized steam locomotive, in exchange for a Canadian steam locomotive in the park's collection.

It was agreed that you would provide a Baldwin locomotive 0-6-0 and tender, sectionalized on the right (engineer's) side. The locomotive will be prepared in final display condition, similar to the example currently in the National Railway Museum in York, England. Approximately one-fourth to one-third of the interior of the locomotive would be cut away, in the form of "windows" visible to the public.

The National Park Service will provide Canadian Pacific #1293, including tender, complete with all parts necessary for your eventual restoration to operation.

Both parties agreed to assume transportation costs for the locomotives which they are receiving.

Supervisory Exhibit Specialists Wayne Dobson and Chris Ahrens will serve as points of contact from Steamtown National Historic Site throughout the duration of the project.

It is anticipated that the exchange of the two locomotives would take place sometime during the grand opening season in 1995.

I hope this accurately reflects the agreements made during your visit. If there are any discrepancies, omissions or questions, please feel free to call. We are looking forward to reviewing your scope of work, which will then enable us to develop a formal agreement in order to officially begin the project.

Sincerely,

Calvin F. Hite
Acting Superintendent

bcc:
Division Chiefs, STEA

ug of a final acceptance

J. DAVID CONRAD
23 BLAKE STREET
IVORYTON, CONNECTICUT 06442

September 10, 1995

Mr. Calvin Hite
Acting Superintendent
Steamtown National Historic Site
150 South Washington Avenue
Scranton, PA 18503

Dear Calvin:

Thank you very much for your letter of August 8, 1994 reference #D18. Your letter accurately reflects agreements made during our visit regarding the trade of a Baldwin 0-6-0 locomotive and tender sectionalized on the right side, in exchange for Canadian Pacific #1293 Locomotive and tender complete with all parts necessary for restoration to operation.

It is my intent that the Baldwin 0-6-0 steam locomotive be ready during your grand opening season 1995. I would like the option of leaving #1293 at Steamtown until the following winter.

The proposed scope of work and a sketch covering the Baldwin 0-6-0 locomotive is enclosed. I hope that these are sufficient for us to develop a formal agreement and begin the project.

Very truly yours,

J. David Conrad

JDC/pac

Encl.

Proposed Scope of Work

Sectionalized Baldwin 0-6-0 Locomotive and Tender

The goal of the project is to restore a Baldwin 0-6-0 steam locomotive and tender to its appearance when the property of Spang, Chalfant & Company #8. The right side of the locomotive will be cut-away to show inner surfaces of:

Cylinder and slide valve
Smoke box, exhaust nozzle, and stack;
Steam admission pipe
Boiler and steam dome
Dry pipe
Throttle valve
Firebox wrapper sheet
Firebox side sheet
Several boiler tubes
Cab side
Front sand dome
Injector and boiler check valve
Piping
Tender water compartment
Tender coal pocket

The left side of the locomotive will be restored to its appearance as a freshly repaired locomotive. The locomotive and tender will be mobile so that they can be moved without any dis-assembly.

Sections of the locomotive will be cut away using an abrasive cut-off saw, oxy-acetelene torch, or air arc as appropriate. All edges will be ground smooth or filled as necessary leaving no sharp corners. Areas to be cut away will be as per attached drawing or as agreed upon by National Park Service representatives.

Included in the areas to be cut away are:

Cylinder and valve, to show internal steam passages and piston
Boiler, to show interior bracing, front and rear tube sheets, throttle valve and dry pipe, etc. Some boiler tubes will be complete removed, others will be sectionalized to show inner surfaces.
Firebox wrapper sheet to show water side surface and staybolts as well as both inner and outer sheets cut away to show the firebox interior with grates, etc.
A section of tender side to show the interior of the cistern with baffles, and a section of the coal pocket side to show the coal space. A quantity of coal in a transparent plastic container will be attached to the coal pocket side.

Piping on the cut away side of the locomotive will be left in place wherever possible. Pipes will be cut away as well to illustrate their functions (water, steam, sand, etc.). The diagram included shows all straight cuts. The actual cuts could be made as curves, "wavy", or on angles. Also, the cut aways could be "stepped", that is boiler jacket cut away to show insulation, insulation cut

away to show outer wrapper sheet, outer wrapper sheet cut away to show inner firebox side sheet, inner firebox side sheet cut away to show firebox interior.

The diagram shows a large portion of the wrapper sheet left intact. This area could be "stepped" to expose more of the inner firebox.

Entire locomotive and tender will be thoroughly cleaned, chipped and/or sandblasted as appropriate, and primed with Dupont Corolar Epoxy Primer.

Boiler jacketing will be installed on the left side of the locomotive over wolmanized pine spacers (to replace insulating material). Jacketing will be primed on both sides and finished coated on the outside. Jacketing on the right side will be cut away to expose the boiler shell and a small portion of insulating material (calcium silicate).

Cab will be restored with all gauges, valves, etc., and woodwork repaired or replaced. A portion of the right cab wall will be cut away to expose the side sheet and door sheet of the outer and inner box.

The locomotive and tender will be painted black with white trim except in the sectionalized areas where the following colors will be used:

Coal Pocket -black
Water cistern - dark blue
Boiler and firebox, water side, below crown sheet - light blue
Boiler and firebox, above crown sheet - white
Dry pipe, admission pipe and live steam side of valve and cylinder - white
Exhaust steam side of valve and cylinder, exhaust nozzle, stack - gray
Firebox, boiler tube interiors, smoke box - red
Sand dome - beige
Cab interior - green

In all cases, paint used will be Dupont Dulux with hardener and coated with a non-glossy clear coat.

All side rods and valve gear will be polished and clear coated.

Bell, whistle, safety valves, etc. will be polished and clear coated.

All bearing surfaces will be polished and re-packed with fresh journal pads or grease blocks as appropriate.

Side rods and valve gear, valves and cylinders will be lubricated.

Locomotive and tender will be supplied ready to display except for signage, and ready for transport.

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

D18

September 21, 1994

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear David:

The park has reviewed your sketch and proposed scope of work for the sectionalized steam locomotive. We would like to suggest one change to the scope of work.

The park will plan for the production of a floor mounted wayside exhibit, possibly two. If possible, we would like for you to provide a set of labels identifying the components exposed in the cut away sections. We would envision black on white labels, with 48-point, routed lettering, using a light gauge steel, aluminum or heavy vinyl material. These should be mounted on or near the actual component, avoiding the use of arrows, and applied in a reversible manner. We are open, of course, to your suggestions.

Your assistance in drafting short (perhaps one-sentence) descriptions of each component's purpose, for use on the wayside(s), would also be appreciated.

The park is very excited about the potential of this exhibit and is looking forward to working with you as it is being fabricated. Interpretive Specialist Doug Burkhard and Exhibit Specialists Wayne Dobson and Chris Ahrens will serve as the park's review team.

We share your intent to see this project completed in time for the park's grand opening in July 1995. The park will be happy to keep locomotive #1293 at Steamtown until the following winter.

Please let me know if our comments meet with your approval. Upon receipt of a final scope of work, the park will acknowledge approval in writing as the formal acceptance of the project. Please indicate your anticipated start date. At that time, Doug Burkhard will contact you to discuss project review.

We look forward to hearing from you.

Sincerely,

Calvin F. Hite
Acting Superintendent

cc:
Superintendent, Steamtown NHS w/c incoming
Chief, Visitor Services and Resource Management, Steamtown NHS w/c incoming
Chief of Maintenance, Steamtown NHS w/c incoming

J. DAVID CONRAD
23 BLAKE STREET
IVORYTON, CONNECTICUT 06442

October 6, 1994

Mr. Calvin F. Hite, Acting Superintendent
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503

Dear Calvin:

Thank you for your letter of September 21, 1994, reference No. D18.

I would be pleased to change the proposed scope of work to include that I will supply a set of labels identifying the components exposed in the cut away sections. The labels will be 48 point (minimum) letters routed on a vinyl material, either white on black or black on white. I would be willing to assist your staff with the mounting of the labels as well as drafting short descriptions of each component's purpose.

I enclose a revised scope of work. I anticipate starting on the project within 30 days of receiving your "letter of agreement". Please note that my company: Steam Locomotive Services, Inc. will be the entity to handle this project.

Very truly yours,

J. David Conrad

encl.

Proposed Scope of Work

Sectionalized Baldwin 0-6-0 Locomotive and Tender

The goal of the project is to restore a Baldwin 0-6-0 steam locomotive and tender to its appearance when the property of Spang, Chalfant & Company #8. The right side of the locomotive will be cut-away to show inner surfaces of:

Cylinder and slide valve
Smoke box, exhaust nozzle, and stack;
Steam admission pipe
Boiler and steam dome
Dry pipe
Throttle valve
Firebox wrapper sheet
Firebox side sheet
Several boiler tubes
Cab side
Front sand dome
Injector and boiler check valve
Piping
Tender water compartment
Tender coal pocket

The left side of the locomotive will be restored to its appearance as a freshly repaired locomotive. The locomotive and tender will be mobile so that they can be moved without any dis-assembly.

Sections of the locomotive will be cut away using an abrasive cut-off saw, oxy-acetelene torch, or air arc as appropriate. All edges will be ground smooth or filled as necessary leaving no sharp corners. Areas to be cut away will be as per attached drawing or as agreed upon by National Park Service representatives.

Included in the areas to be cut away are:

Cylinder and valve, to show internal steam passages and piston
Boiler, to show interior bracing, front and rear tube sheets, throttle valve and dry pipe, etc. Some boiler tubes will be complete removed, others will be sectionalized to show inner surfaces.
Firebox wrapper sheet to show water side surface and staybolts as well as both inner and outer sheets cut away to show the firebox interior with grates, etc.
A section of tender side to show the interior of the cistern with baffles, and a section of the coal pocket side to show the coal space. A quantity of coal in a transparent plastic container will be attached to the coal pocket side.

Piping on the cut away side of the locomotive will be left in place wherever possible. Pipes will be cut away as well to illustrate their functions (water, steam, sand, etc.). Cut away sections will be "stepped", that is boiler jacket cut away to show insulation, insulation cut

away to show outer wrapper sheet, outer wrapper sheet cut away to show inner firebox side sheet, inner firebox side sheet cut away to show firebox interior.

Entire locomotive and tender will be thoroughly cleaned, chipped and/or sandblasted as appropriate, and primed with Dupont Corolar Epoxy Primer.

Boiler jacketing will be installed on the left side of the locomotive over wolmanized pine spacers (to replace insulating material). Jacketing will be primed on both sides and finished coated on the outside. Jacketing on the right side will be cut away to expose the boiler shell and a small portion of insulating material (calcium silicate).

Cab will be restored with all gauges, valves, etc., and woodwork repaired or replaced. A portion of the right cab wall will be cut away to expose the side sheet and door sheet of the outer and inner box.

The locomotive and tender will be painted black with white trim except in the sectionalized areas where the following colors will be used:

Coal Pocket -black
Water cistern - dark blue
Boiler and firebox, water side, below crown sheet - light blue
Boiler and firebox, above crown sheet - white
Dry pipe, admission pipe and live steam side of valve and cylinder - white
Exhaust steam side of valve and cylinder, exhaust nozzle, stack - gray
Firebox, boiler tube interiors, smoke box - red
Sand dome - beige
Cab interior - green

In all cases, paint used will be Dupont Dulux with hardener and coated with a non-glossy clear coat.

All side rods and valve gear will be polished and clear coated.

Bell, whistle, safety valves, etc. will be polished and clear coated.

All bearing surfaces will be polished and re-packed with fresh journal pads or grease blocks as appropriate. Side rods , valve gear, valves and cylinders will be lubricated.

Locomotive and tender will be supplied ready to display and ready for transport.

Vinyl lables with 48 point (minimum) letters identifying components exposed in the cut away sections will be supplied. Assistance will be provided mounting the lables and drafting short descriptions of each component's purpose.

Revision 1-10/6/94-JDC

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
50 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
D18

October 28, 1994

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear Dave:

Thank you for your letter of October 6, 1994, including the revised scope of work relative to the sectionalized locomotive for Steamtown National Historic Site. We have reviewed the revision, including your agreement to provide a minimum of 48-point lettering routed on vinyl labeling for the featured sections of the locomotive. We request that the lettering be increased to one and a half inches. The revised scope of work is approved.

Your interest and initiative in making this trade a reality is greatly appreciated and members of the park staff look forward to reviewing the work while in progress. As we discussed via telephone on Thursday, October 27, scheduled completion of the sectionalized locomotive should be coordinated with the park so that transportation and installation can occur sometime prior to October 1, as part of the Grand Opening agenda.

When you are ready to discuss your proposed work schedule, please contact Doug Burkhard at (717) 961-2033.

Sincerely,

Calvin F. Hite
Assistant Superintendent

cc:
Terry R. Gess, Superintendent, Steamtown National Historic Site
Doug Burkhard, Interpretive Specialist, Steamtown National Historic Site w/c incoming
Dave McCormack, Chief, Visitor Services and Resource Management, Steamtown National Historic Site
C. Bruce Gibson, Chief of Maintenance, Steamtown National Historic Site w/c incoming

J. DAVID CONRAD
23 BLAKE STREET
IVORYTON, CONNECTICUT 06442

November 7, 1994

RECEIVED
CH 11/9
TRS 11/10

Mr. Calvin F. Hite
Assistant Superintendent
Steamtown National Historic Site
150 South Washington Avenue
Scranton, PA 18503-2018

Dear Calvin:

Thank you for your letter of October 28th. I am glad to hear that the revised scope of work has been approved.

It is my recollection from our meeting in August that a "letter of agreement" would be signed by all parties providing a basis to proceed. I would appreciate it very much if this could be done soon. I suppose that NPS signing the revised scope of work would be sufficient. The revised completion date should be noted of course.

Just as soon as we have accomplished this I will be pleased to contact Doug Burkhard regarding the work schedule.

I hope that we can accomplish this very soon because time is running out for me to get started yet this year.

Thank you very much.

Very truly yours,

J. David Conrad

JDC/pac

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

D18

November 20, 1994

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear Mr. Conrad:

Enclosed is the final scope of work for the sectionalized Baldwin locomotive. Through your previous conversations and letters with Calvin Hite, delivery dates and the exchange of the CN #1293 are well defined. The park is anxious for the rapid completion of our joint enterprise.

Please register your agreement with the enclosed scope of work by signing on the line provided, and return one copy at your earliest convenience. The second copy is for your use. I look forward to seeing your work. If the park can be of any further assistance on something which we haven't thought of thus far, please don't hesitate to contact Doug Burkhard at (717) 961-2033.

Sincerely,

Terry R. Gess
Superintendent

Enclosures 2

cc:
Doug Burkhard, Interpretive Specialist, Steamtown National Historic Site w/c encl.
Bruce Gibson, Chief of Maintenance, Steamtown National Historic Site w/c encl.

SCOPE OF WORK
SECTIONALIZED BALDWIN 0-6-0 LOCOMOTIVE and TENDER

The goal of the project is to restore a Baldwin 0-6-0 steam locomotive and tender to its appearance when the property of Spang, Chalfant & Company engine #8. The right side (engineer's side) of the locomotive will be cut away to show inner surfaces of:

- Cylinder and slide valve, to show internal steam passages and piston
- Smoke box, exhaust nozzle, and stack
- Steam admission pipe
- Boiler and steam dome, to show interior bracing, front and rear tube sheets. Some boiler tubes will be completely removed, others will be sectionalized to show inner surfaces.
- Dry pipe
- Throttle valve
- Firebox wrapper sheet, to show water side surface and staybolts as well as both inner and outer sheets to show firebox interior, grates, etc.
- Firebox side sheet
- Several boiler tubes
- Side of the cab
- Front sand dome
- Injector and boiler check valve
- Piping
- Tender water compartment, to show the cistern with baffles
- Tender coal pocket, to show the coal space. A quantity of coal in a transparent container will be attached to the coal pocket side.

The left side of the locomotive (fireman's side) will be restored to its appearance as a freshly repaired locomotive. The locomotive and tender will be mobile so that they can be moved individually with out requiring any dis-assembly.

Piping on the cut-away side of the locomotive will be left in place wherever possible. Pipes will be cut away as well to illustrate their functions (water, steam, sand, etc.). Cut away sections will be "stepped". For example, a boiler jacket cut away to show insulation, insulation cut away to show outer wrapper sheet, outer wrapper sheet cut away to show firebox interior.

Sections of the locomotive will be cut away using an abrasive cut-off saw, oxy-acetelene torch, or air-arc as appropriate. All edges will be ground smooth or filled as necessary leaving no sharp corners or edges. Areas to be cut away will be as per design drawing or as agreed upon by National Park Service representatives and J. David Conrad.

The entire locomotive and tender will be thoroughly cleaned, chipped and/or sandblasted as appropriate, and primed with DuPont Corolar™ epoxy primer.

Boiler jacketing will be installed on the left side of the locomotive over Wolmanized™ pine spacers (to replace insulating material). Jacketing will be primed on both sides and finished coated on the outside. Jacketing on the right side will be cut away to expose the boiler shell and a small portion of insulating material (calcium silicate).

Cab will be restored with all gauges, valves, etc., and woodwork repaired or replaced. A portion of the cab's right wall (engineer's side) will be cut away to expose the side sheet and door sheet of the outer and inner box.

The locomotive and tender will be painted black with white trim except in the sectionalized areas where the following color scheme will be used:

Coal pocket - black
Water cistern - dark blue
Boiler and firebox, water side, below crown sheet - light blue
Boiler and firebox, above crown sheet - white
Dry pipe, admission pipe and live steam side of valve and cylinder - white
Exhaust steam side of valve and cylinder, exhaust nozzle, stack - gray
Firebox, boiler tube interiors, smokebox - red
Cab interior - green

In all cases, paint used will be DuPont Dulux™ with hardener and coated with a non-glossy clear coat. Paint colors are to be approved by the National Park Service representatives before use.

All side rods and valve gear will be polished and clear coated. Bell, whistle, safety valves, and similar fittings, will be polished and clear coated.

All bearing surfaces will be polished and re-packed with fresh journal pads or grease blocks as appropriate. Side rods, valve gear, valves and cylinders will be lubricated.

Vinyl labels with 1½" tall letters identifying components exposed in the cut-away sections will be supplied by J. David Conrad. The National Park Service will provide assistance with drafting short label descriptions of each component's purpose.

Agreed and affirmed, this 21 day of November, 1994

Superintendent, Steamtown National Park Service

J. David Conrad

United States Department of the Interior

NATIONAL PARK SERVICE
Steamtown National Historic Site
150 South Washington Avenue
Scranton, Pennsylvania 18503-2018

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:

D2663

January 16, 1996

Mr. J. David Conrad
23 Blake Street
Ivoryton, Connecticut 06442

Dear Dave:

As of the above date, the National Park Service, Steamtown National Historic Site officially accepts the Spang Chalfant locomotive #8 from you in exchange for the Canadian Pacific Railway locomotive #1293. Steamtown National Historic Site is responsible for transporting the Spang Chalfant from Clarks Summit, Pennsylvania to the Site. As previously agreed, you are responsible for moving the #1293 from Steamtown National Historic Site.

After the Spang Chalfant locomotive is on-Site, we are aware that you will need to complete the signage, touch-up the paint, and install all removed parts and devices.

Sincerely,

Terry R. Gess

Terry R. Gess
Superintendent

bcc:
✓Ella Rayburn, Curator, Steamtown National Historic Site
Chris Ahrens, Supervisory Exhibit Specialist, Locomotive Shop, Steamtown National Historic Site

Appendix 3 - Builder's Photograph

8
8
SPANG, CHALFANT & CO. INC.

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