CENTRAL RAILROAD OF NEW JERSEY

COMBINATION CAR No. 303

HISTORIC STRUCTURE REPORT

Part I

NATIONAL PARK SERVICE
Steamtown National Historic Site
Scranton, PA 18501

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

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Introduction

This report is the first of a two-part study prepared by Steamtown National Historic Site (NHS) on Central Railroad of New Jersey (CNJ) combination car No. 303. The objective was thorough documentation of the car's construction and operating history in preparation for its restoration by Steamtown National Historic Site.

Part one covers the history and physical configuration of the car. Documentation includes car and corporate histories, specifications, evaluation of the car's current condition, component analyses, paint analysis, and restoration recommendations. Part two of the study will document the restoration of the car.

Combine No. 303 operated on the Central Railroad of New Jersey for forty-one years, and has been a component of the Steamtown collection for an additional twenty-two years. Now approaching seventy years of age, No. 303 has suffered the effects of hard service and neglect, and is in poor condition.

However, most of the car's original fabric is intact. The modifications made to the car over the years can be identified and the damage repaired. To that end, car No. 303 is a worthy candidate for preservation and full restoration.

Combination car No. 303 is eligible for the National Park Service List of Classified Structures, and the National Register of Historic Places.

Administrative Data

Management Data

Central Railroad of New Jersey combination car No. 303 is a seventy-two-foot, all-steel baggage/express-coach car, manufactured in 1926 by the Pressed Steel Car Company for use on the CNJ's passenger lines in New Jersey and Pennsylvania. The car is currently undergoing restoration and modification in the Steamtown National Historic Site shops. Number 303 has been a component of the Steamtown collection since 1971.[1]

Proposed Use

The National Park Service will restore the car to correct Central Railroad of New Jersey steam-era appearance and operating condition. Upon completion of repairs, No. 303 will be operated in excursion service. Modifications will be made to enable handicapped Steamtown visitors to use the car.

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.

The Task Directive for this report was approved May 1992.

Proposed Treatment and Justification

Combine No. 303 is representative of steam-era anthracite passenger railroading. However, in its current configuration it does not fit the interpretive theme of Steamtown NHS. A wide range of inappropriate appearance, mechanical, and restorative treatments were applied to No. 303 during the course of its service. Those modifications that have been identified are listed in chapters three and four of this document.

No. 303 will be returned to its correct steam-era appearance and operating condition, except where safety considerations dictate otherwise. Corrective actions will be documented in the completion report.

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[1] See Appendix 1.

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.

Source Materials

Several individuals, institutions, and organizations were contacted for information, and generously made available documentary materials regarding the Central Railroad of New Jersey and Pressed Steel Car Company. Steamtown NHS appreciates the assistance of:

Art Louderback - Historical Society of Western Pennsylvania

Carl Rose - Anthracite Railroads Historical Society, Bridgeport, PA

Dale Woodland - Anthracite Railroads Historical Society, Bridgeport, PA

Physical History and Analysis

The Central Railroad of New Jersey (CNJ) operated for nearly 130 years between Jersey City, NJ, the coal fields of eastern Pennsylvania, and the Jersey Shore. One of the famous northeastern "anthracite railroads," the CNJ was developed to haul coal and industrial products to and from New York Harbor. Equally important to the Central were its extensive passenger and commuter operations in northern New Jersey, where hundreds of trains carried thousands of people on a twice-daily basis.[2] It was for this passenger business that combination cars like No. 303 were built.

The Central was one of the smaller railroads of the region, and for most of its corporate history it was the object of much contention. Hostile competitors such as the Reading Company; Lehigh and Hudson River Railway; Lehigh and New England Railroad; Delaware, Lackawanna and Western Railroad; and the Lehigh Valley Railroad, surrounded the Jersey Central, and over the years it was frequently owned or controlled by these neighbors. The Central's operations were often performed under bankruptcy proceedings or other forms of financial duress. The ultimate disposition of the Central was a function of its traffic base; the railroad was built on coal and passenger service, and, when these two pillars collapsed, the railroad had nowhere to go but down.

The Central Railroad Company of New Jersey was formed in 1849 through the merger of the Elizabeth and Somerville and the Somerville and Easton railroads. The Elizabeth & Somerville was incorporated in 1831, and by 1846 had laid track between Elizabeth and Elizabethport, NJ. The Somerville & Easton was incorporated in 1847 and was built west from Somerville.

Following the establishment of the CNJ, the railroad was pushed to the Delaware River, arriving at Phillipsburg in 1852. By 1864, a series of branches were constructed to the towns of Flemington, Newark, Perth Amboy, and Wharton. That same year, the Central built into Jersey City, thus acquiring important ferry connections to New York City.

The Lehigh and Susquehanna Railroad, completed in 1866 between Phillipsburg, NJ, and Wilkes-Barre, PA, by the Lehigh Coal and Navigation Company, was leased to the Central in 1871. This acquisition took the CNJ across the Delaware River and into the middle of the Pennsylvania anthracite coal fields. This line was later extended north to Scranton by the CNJ subsidiary Wilkes-Barre & Scranton Railroad. In 1879 the Central acquired another railroad, the New Jersey Southern, and gained access down the length of New Jersey to the Delaware Bay near Cape May.

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[2] William L. Rohde, "Coal and Commuters," Railroad Magazine, March 1946, 10.

The acquisition of the New Jersey Southern effectively completed the Central Railroad of New Jersey. The mainline stretched from the profitable coal fields of Pennsylvania, through the greater New York City area, and south through the Garden State. Entering the 1880s, the Central was well positioned to haul both freight and passengers.

The CNJ came under the control of another railroad for the first time in 1883, when it was leased by the Philadelphia and Reading Railroad (P&R). Following the 1887 financial collapse and reorganization of the P&R, the Central resumed its independent status. Four years later the revitalized P&R again assumed control of the CNJ through stock acquisition. At approximately the same time, the Philadelphia & Reading came under the influence of the Baltimore & Ohio Railroad (B&O). The two properties provided the B&O with access to both the highly profitable coal fields of the northeast and the docks of New York Harbor.

The Philadelphia & Reading collapsed again in 1893, resulting in the termination of its lease of the Central and a foreclosure sale of its assets. The Reading Company purchased the majority of the P&R's equipment and property in 1894, and continued operations. In 1901, the Reading Company purchased controlling interest in the CNJ, and operated the railroad as an independent subsidiary. The Central of New Jersey remained a component of the Reading through 1948.

The Central prospered through the early years of the twentieth century. By the mid-1920s, the railroad had acquired or built more branch lines, and was blessed with plenty of passenger and coal traffic. At the end of the decade the Central was ranked as the nation's fifth largest hard coal hauler. Anthracite and bituminous coal accounted for twenty-six percent of the Jersey Central's total revenue.[3] New York harbor served as both terminus and source of much additional business; to receive and transfer coal and other freight across the harbor, the CNJ operated a sizable fleet of ferries and car floats from Pier 18.

During the first half of the century passenger service brought in a reasonable amount of the revenue.[4] The CNJ operated several name trains, such as the Queen of the Valley, the Harrisburg Special, the Mermaid, the Philadelphia Flyer, and the world famous Blue Comet. The operation of these crack trains, along with regular passenger and commuter service, resulted in more than 300 trains in daily operation. In addition, the Central regularly scheduled spespecial excursion trains to destinations such as Atlantic City, NJ;

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[3] Ibid., 20.

[4] Ibid.

Lakewood, NJ, "In the Jersey Pines;" Lake Hopatcong, NJ; Mauch Chunk, PA; and the Pennsylvania State Fair in Bethlehem.[7]

While the Jersey Central enjoyed general good health into the late 1920s, there were signs that the American railroad industry was in decline. The Central was subject to the effects of reduced traffic and increasing costs as much as its larger neighbors.

The commuter operations servicing New York City and northern New Jersey proved to be a hindrance for the CNJ, as the equipment rapidly wore out and the cost of maintaining service rose. In 1924 the Central bought fifty steel coaches, six steel combines, ten steel baggage cars, and two car floats for New York City service. The following year twenty 2-8-2 Mikados, five all-steel combination cars, two steel club cars, and twenty-three steel coaches were added. Notably, the first successful American diesel-electric locomotive, Alco/General Electric/Ingersoll Rand No. 1000, went into service on the CNJ that same year.[8]

Notwithstanding the railroad's best efforts, revenue on all of its passenger routes fell. By 1926 passenger service income had dropped to 15.73% of operating revenue, a decrease of $201,395,720, or 2.08%, from the previous year. The downward trend was inexorable, fueled by increasing competition from buses, trucks, and automobiles.[9] The railroad struggled on, and continued to move a large portion of the populace of northern New Jersey on any given weekday.

The decline in the Central's freight revenues produced an even greater financial blow. All commodities fell following the 1929 stock market crash, including the lifeblood of the CNJ, anthracite coal. Truck companies took away most of the railroad's express revenue after 1932.[10] By 1939, the CNJ faced insurmountable deficits, and on 30 October the railroad filed under Section 77 of the

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[5] Elaine Anderson, The Central Railroad of New Jersey's First 100 Years - A Historical Survey (Easton, PA: Center for Canal History and Technology, 1984), 126.

[6] Ibid., 122.

[7] Ibid., 145.

[8] Ibid., 164.

[9] Ibid.

[10] Ibid., 187.

Bankruptcy Act. Trustees were appointed and in place on 8 January 1940.[11]

World War II provided a brief respite. Traffic levels rose in both freight and passenger service, as people and large amounts of war goods were transported, while the coal industry experienced a revival. The Central of New Jersey and its neighbor urban railroads benefitted.

The resurgence of commuter traffic was partly attributable to the CNJ's passenger fare, a full twenty percent lower than the fares of its competitors.[12] However, the twenty percent difference in pricing resulted in losses as the war wound down. Twenty-seven million passengers rode in 1943, declining to twenty-five million in 1944. By the end of the war, the Jersey Central was losing about $3.7 million annually on its $36 million investment in commuter service.[13]

Contributing to the deteriorating situation was the pressure imposed on the railroad by the New Jersey state tax system. The tax rate, among the highest in the nation, was based on rail mileage in the state, coupled with overall operating income. For the CNJ, which operated one-third of its mileage outside of New Jersey, the resultant annual tax bordered on the confiscatory. In 1937, the combined federal, state, and local corporate tax was equivalent to $19.42 on each share of CNJ stock.[14]

During World War II the state demanded $30 million in back taxes, for the period 1932 to 1940.[15] A portion of this amount was state tax on the Central's profits from its Pennsylvania operations, which were also taxed by the state of Pennsylvania. In an attempt to lessen its tax load, the CNJ established the Central Railroad of Pennsylvania as an independent subsidiary in 1946; the state of New Jersey responded by filing suit in Federal court. Following years of litigation, the state won, and retained the right to claim taxes on the entire Central Railroad of New Jersey system. The Central of Pennsylvania merged back into the CNJ in 1952.[16]

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[11] Ibid., 195.

[12] Rohde, "Coal and Commuters," 15.

[13] Ibid.

[14] Anderson, First 100 Years, 187.

[15] Rohde, "Coal and Commuters," 27.

[16] Gerard E. Bernet, Jersey Central Diesels (Halifax, PA: Withers Publishing, 1990), 8.

The years after World War II were hard for the Central. By the end of the 1940s, the small profit in the freight business was far outweighed by burgeoning passenger service losses. Still, the railroad was able to free itself of direct Reading control in 1948, and, on 1 October 1949, the Central finally emerged from bankruptcy.[17]

The railroad's return to fully independent and solvent status was accompanied by sweeping changes to its public image. Locomotives and rolling stock received new colors, and "Jersey Central Lines" replaced the familiar "Central Railroad of New Jersey." A new "Statue of Liberty" emblem replaced the historic circular logo.[18] The "new" Jersey Central later advertised itself as "The Big Little Railroad."[19]

Unfortunately, financial realities continued to dictate the course of the railroad. After World War II, the Jersey Central suspended the majority of its remaining interstate passenger trains, and concentrated on its suburban operations; by the early 1950s, commuter trains made up 75% of the remaining passenger business.[20] The twice-daily trains were powered by an eclectic mix of steam and diesel locomotives, including a few of the Central's surviving camelbacks, operating out of Jersey City.

Steam operations on the CNJ were concluded in July 1954; by that time, the railroad's traditional freight base was once again in decline. Like the Lehigh Valley, the Lackawanna, and other neighbors, the Jersey Central was unable to find a commodity to replace anthracite coal. Much of its less-than-carload (LCL) commercial traffic was lost to other forms of transportation. The Central faced en masse obsolescence of its equipment, deterioration of its physical plant, and dropping revenues.

The situation worsened through the 1960s. In 1964, the state of New Jersey began subsidizing commuter service, and by 1966 the tax situation had been mollified to some extent.[21] In 1965, the Central and the Lehigh Valley Railroad consolidated their lines along the Lehigh River in Pennsylvania. Both railroads were under severe

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[17] Anderson, First 100 Years , 215.

[18] Ibid., 201.

[19] Ibid., 210.

[20] Ibid., 212.

[21] George Drury, The Historical Guide to North American Railroads (Waukesha, WI: Kalmbach Books, 1991), 58.

financial duress, and the selective abandonment and consolidation of portions of each railroad's line enabled some savings.[22]

In spite of these efforts, on 22 March 1967 the Central of New Jersey again filed bankruptcy.[23] A plan to incorporate the CNJ in a proposed merger with the Chesapeake & Ohio and Norfolk & Western railroads collapsed in 1970 with the bankruptcy of the Penn Central.[24] The Jersey Central's neighbor railroads, the Erie Lackawanna, Reading Company and the Lehigh Valley, were all in serious financial trouble, and, as in dominoes, the collapse of one railroad effected the others. Despite desperate attempts at improving the Central's financial situation, and increased assistance from the state in the form of equipment and subsidies, the "Big Little Railroad" was going down with the others. In 1972, the remaining Central lines in Pennsylvania were turned over to the Lehigh Valley.

The Central Railroad of New Jersey ceased to exist as an independent corporate entity on 1 April 1976. The quasi-government owned Consolidated Rail Corporation (Conrail) assumed ownership of the Central's freight and commuter operations. On 1 January 1983, Conrail transferred the former CNJ commuter routes to NJ Transit Rail, the operating component of the New Jersey Department of Transportation.

The physical remnants of the Central Railroad of New Jersey still in use in 1993 are tracks and a few buildings on the former Raritan Valley, North Jersey Coast, and Hoboken-Jersey City lines. The surviving employees have long since retired or moved to other railroads, and the memories of the "Big Little Railroad" are fading.

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[22] Ibid.

[23] Ibid.

[24] Ibid. A merger of Chesapeake & Ohio and Norfolk & Western railroads was proposed as a counter-balance to the merger of the New York Central and Pennsylvania railroads as the Penn Central.

Charles T. Schoen founded the Schoen Pressed Steel Company in 1892 for the purpose of manufacturing bolsters, brake beams, cast iron wheels, and other railroad car components. By the time of its 1898 reorganization as the Pressed Steel Car Company, Schoen's employees were producing all-steel car frames. Five years later, Pressed Steel offered a complete line of passenger cars; the first order of thirty-five coaches was delivered to the Western Elevated Railroad of Chicago in 1903.[25]

In 1907, Pressed Steel participated in the first mass production of all-steel passenger cars in the United States. The design, an eighty-foot-long, eighty-eight-passenger coach designated the P-70, was developed by the Pennsylvania Railroad (PRR). The PRR ordered two hundred P-70s, and allocated the work among Pressed Steel, American Car and Foundry, and the railroad's own Altoona Shops.[26] Later that year Pressed Steel shared an order for fifty all-steel cars, designed by Lewis B. Stillwell for the Manhattan Tubes subway in New York City.[27] Production of cars for other railroads followwed, and by 1910 Pressed Steel was an acknowledged industry leader, with plants in Pittsburgh, PA, and Chicago, IL.

Leadership brought its share of labor problems. In early July 1909, Pressed Steel employees struck the Pittsburgh plant for more pay. The strike quickly degenerated into a classic labor dispute; management attempted a lock-out of the employees and brought in strike-breakers by boat on the Ohio River, while the strikers surrounded the plant, picketed, and made threats. By 12 August, the mood was ugly on both sides of the fence, and Pennsylvania State Militia troops were called in.

Incidents increased. On 21 August, John Anderson and Salvato Merrana, suspected of being "scabs," were attacked alongside the tracks of the Pittsburgh & Lake Erie Railroad (P&LE) by the strikers and severely beaten. After the two unfortunate men were removed to the hospital, the strikers went on a rampage in nearby Schoenville, attacking people and damaging property. During the smoke and confusion, two sets of strikers ran into each other and

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[25] John H. White, Jr., The American Railroad Passenger Car, pt. 1 (Baltimore: The Johns Hopkins University Press, 1978), 132.

[26] Ibid., 137.

[27] Ibid., 148.

started battling with rocks; each believed that the other group were scabs.[28]

The next day the confrontations escalated into further violence, centered on O'Donovan's Bridge over the P&LE tracks. At about 9:00 P.M. Allegheny County Deputy Sheriff Harry Exley pulled his pistol, and ordered the strikers to disperse, or else he would start shooting. When the strikers refused, Deputy Exley emptied his gun into the milling crowd. Several strikers fired back and Exley fell dead, shot several times. Twenty minutes later general rioting ensued, with several pitched actions between the strikers, local law enforcement, and the state militia. The fighting lasted until well after midnight; the final toll was seven dead and several hundred wounded on both sides.[29] The violence, which achieved national notoriety, ended the strike. Most of the workers returned to the plant, their union's power broken, and production quickly resumed.

In 1910 new, conservative management took charge of Pressed Steel. The new operators continued to build on the company's well deserved reputation for quality; however, they applied a conservative approach to research, design, and production. Innovations in passenger car building such as the production and use of rolled steel and all-welded construction were ignored. The company continued to rivet its cars, which detracted from the sleek, finished, modern appearance that was becoming popular with both railroads and passengers.

Pressed Steel's 1913 annual report listed about $37 million in assets, with gross sales of $30,967,359.76, for a net profit of $2,374,816.07. In describing the company's passenger car department, the report stated "...and while your plant was the first to build steel passenger cars, at no time has the output been large." The directors of Pressed Steel did express optimism that business would pick up, and announced that new buildings were being erected in preparation for the expected upturn in business.[30] The corporate optimism proved unfounded; Pressed Steel's competitors continued to pull ahead with more modern designs, and, by 1915, they controlled most of the steel passenger and freight car business.

While it had lost its industry-leading position, Pressed Steel continued to offer a full line of passenger and freight cars and

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[28] "Strikers Beat Up Two Men," Pittsburgh Gazette-Times, 22 August 1909, p. 4.

[29] "Death Toll Seven," Pittsburgh Gazette-Times, 23 August 1909, p. 1.

[30] Fifteenth Annual Report of the Pressed Steel Car Company (Pittsburgh: Pressed Steel Car Company, 1913), 8.

components. One of the cars depicted in the company's advertisement in the 1922 Car Builder's Cyclopedia was the Cleveland, Cincinnati, Chicago and St. Louis Railroad's combine No. 380, similar to the Central of New Jersey No. 303. Car No. 380 featured the standard Pressed Steel configuration of riveted steel.

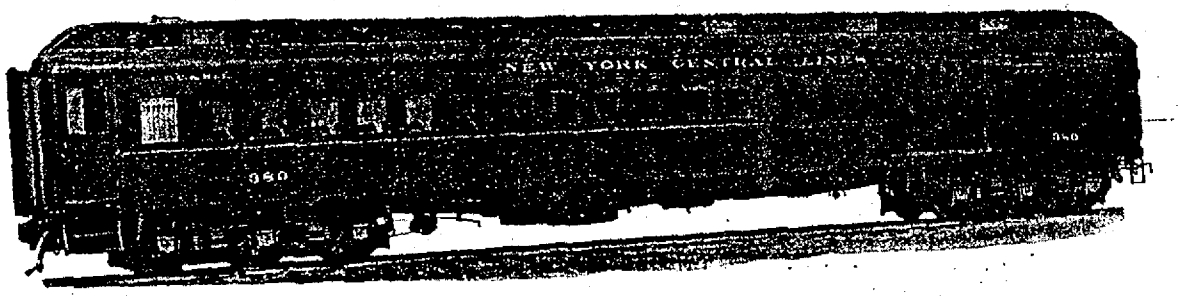

Fig. 1. Cleveland, Cincinnati, Chicago & St Louis combination baggage and passenger car, as advertised by Pressed Steel Car Company in the 1922 Car Builder's Cyclopedia. (New York: Simmons-Boardman Publishing Company, 1922), 966.

Pressed Steel stressed its thirty-one years of continuous growth and profitability in its 1923 Annual Report. According to the report, Charles Schoen's first factory had covered all of thirty-eight acres. By 1923, the company had car production facilities in Pittsburgh, Allegheny, and Chicago, with over 1,042 total acres of property, ninety-one acres of buildings, and sixty-six miles of railroad track. The total annual production capacity for the plants was 49,400 railroad cars.[31] The company's main offices were in the Farmers Bank Building in downtown Pittsburgh, and sales offices were located in Jersey City, NJ; Chicago, IL; New York City, NY; London, England; and Shanghai and Peking, China. Subordinate manufacturers included Western Steel Car and Foundry Company, Koppel Industrial and Car Repair Company, American Steel Company of Cuba, and Lincoln Gas and Coal Company. Corporate net sales from all sources for the year was $2,799,973.55.[32]

However, it turned out that the long-term outlook was bleak. By 1931, Pressed Steel had all but been usurped in the passenger car market by its traditional rivals, American Car and Foundry, Pull-

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[31] Twenty-Fifth Annual Report of the Pressed Steel Car Company (Pittsburgh: Pressed Steel Car Company, 1923), 11.

[32] Ibid.

man, and Standard Steel. Five steel combines, delivered to the Central Railroad of New Jersey between 1926 and 1931, were among the last passenger cars sold by Pressed Steel. While Pressed Steel was able to maintain a profitable export business through its Koppel Division, this alone was not enough to sustain the company's large infrastructure.[34]

Pressed Steel went into receivership immediately after World War II. The company abandoned the passenger car market, concentrated on producing freight cars, and attempted to reduce costs by consolidating its physical plant. By 1948, the Pittsburgh facility was closed, and all production was moved to Chicago. Despite these efforts, Pressed Steel was unable to gain any substantial portion of the freight car market. By the mid-to-late 1950s, the company was out of business.[35]

In 1962, the former Pressed Steel Car Company plant in Pittsburgh, on the Ohio River, was acquired by Allegheny County for construction of a water treatment plant. Thirty years later, the only remains of the former passenger and freight car giant are a few brick buildings on Preble Street, occupied by a trucking firm.

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[33] Standard Steel was founded in 1902 by former Pressed Steel Chief Engineer John M. Hansen.

[34] Art Louderback, phone conversation with the author, 16 June 1992.

[35] The Pocket List of Railroad Officials 225 (New York: The Railway Equipment and Publication Company, 1951), 253; The Pocket List of Railroad Officials 259 (New York: The Railway Equipment and Publication Company, 1959). Pressed Steel appears in the first quarter, 1951, edition of this publication, but does not show up in the third quarter, 1959, edition.

Building Techniques

During the twentieth century, Pressed Steel and its contemporaries used semi-production line methods for the construction of their freight and passenger cars. A typical manufacturing site for these companies included individual car shops, where various aspects of the car assembly process were performed, the requisite yard tracks for moving the cars from stop to stop, and specialty shops where foundry, component, and trim work was done. With a few minor variations, these same features were found throughout the industry.

The car building process was described in some detail in a 1924 Railway Age article.[36] In the erecting shop, the center frame girder was assembled and the pre-manufactured frame and body subassemblies, side pieces, and framing were put in position. At the next station the lower body side posts and cladding were attached. Application of upper body sheets was completed at another location. Prior to final riveting, the alignment of the body was checked with templates and gauges.

Next the car body and frame were sandblasted. Then the remaining piping, wiring, and insulation were installed at the mechanical finishing shop. With the interior paneling complete and the underbody utilities in place, the composite floors were laid.

The final stop was the finishing shop, where the car was painted and seats, trim, and luggage racks installed. Following its final inspection, the new passenger car was ready for delivery to its owner.

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[36] George A. Richardson, "History and Development of Passenger Car Building," Railway Review, 14 June 1924. Reprint. Bethlehem, PA: Bethlehem Shipbuilding Company, n.d. Not paginated.

Central Railroad of New Jersey No. 303 is a combination car, with separate compartments for baggage and passengers. It was built by the Pressed Steel Car Company in 1926. The combination car, or combine, was a minor part of passenger train car construction. Four years after No. 303 went into service, there were a total of 63,900 passenger cars of all types in use in the United States; of these, only 5,270 were combines.[37]

No. 303 is notable as a surviving example of the combination car and early all-steel passenger car construction. As such, it is an important representative of an era of industrial growth, when the craftsmanship of an earlier time slowly gave way to mass produced or "cookie cutter" products.

The all-steel car marked a pivotal change in railroad technology. During the first decade of the twentieth century, the railroads, aided by manufacturers such as Pressed Steel, replaced the traditional wooden car materials with steel. The manufacture of steel cars required concurrent changes in repair techniques and car systems, such as heating, cooling, air brakes, and passenger accommodations. These technological changes swept through the railroad industry.[38]

The switch in materials from wood to iron and steel was common in several industries, including shipbuilding and railroad car construction. Steel cars were easier to maintain than wood cars, and were more fire resistant (car No. 303 retains its wood interior). They were presumed to be more crashworthy, and not as susceptible to "telescoping" as wood cars, although this proved to be false. The advantages of steel cars were many, and above all they symbolized the modern, efficient mode of passenger service that the railroads strived to offer.[39]

The public, always interested in technological advances, applauded the idea of the all-steel car. Their acceptance convinced the railroads and helped overcome the objections of the railroad craftsmen of the Master Car Builders Association. These men had been schooled in car building as a craft, not as a manufacturing process applied scientifically. Building wooden cars required time, patience, and small groups of craftsmen possessing skills handed down from father to son. Steel cars required mass

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[37] White, Passenger Car, part 2, 658.

[38] John P. Hankey, "The End of Innocence," Locomotive & Railway Preservation, January-February 1991, 40.

[39] Ibid.

production techniques that were available only to companies with a industrial (as distinguished from craft) background. Most success ful car builders of the twentieth century possessed this industria manufacturing background, including Pressed Steel. Few traditiona craft-oriented wood car builders survived the transition.[40]

The all-steel combination car was offered in small numbers by sev· eral manufacturers from about 1905 to 1955. After 1955, th(decline of passenger service forced a reduction in the number o: manufacturers, and hence, in the number of cars built.[41] Durin(the 1960s, the number of railroads actively offering passenger service declined, leading to the establishment of the government· operated National Railroad Passenger Corporation, better known a: Amtrak, in 1971. In 1993 the majority of passenger car construc· tion is in the form of commuter service light rail vehicles. Witl the exception of Morrison-Knudsen, the manufacturers are all foreign.

The combine was developed by and for railroads that needed a multi- function car, particularly on less traveled routes. The coach- baggage type was the most common, featuring a large passenger compartment and smaller baggage area. Other types included coach- baggage-mail, lounge-dormitory, cafe-coach, and coach-buffet- parlor. The earliest combination cars were built during the 1850s.

Combines were often coupled to the end of freight trains for branch line use. For many railroads, this enabled the preservation of mail and passenger service at a reduced cost. Combines also served as specialized passenger transportation, as smoking cars, and "isolation" accommodations for blacks and immigrants.[42] For the larger railroads, with highly developed passenger networks, they were particularly useful for inter-line transfers; the entire car, with passengers, mail and baggage, could be easily switched from one train to another.

Along with other passenger car types, combines became larger and heavier over the years, as they progressed from wooden to all-steel construction. They were a regular feature in the consists of many famous passenger trains, such as the New York Central's Mercury and 20th Century Limited, the Pennsylvania Railroad's Broadway Limited, the Atlantic Coast Line's Champion, and the Central of New Jersey's own Blue Comet and Crusader.

The decline of the passenger train following World War II reduced the number of combines in operation. All railroad passenger

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[40] Ibid.

[41] White, Passenger Car, part 1, 117.

[42] Ibid., part 2, 466.

service in the United States, with the exceptions of the Denver & Rio Grande Railroad and Southern Railway, was transferred to the government-operated Amtrak in 1971. No Pressed Steel cars were included in the transfer.

Car History/Period of Construction

Central Railroad of New Jersey No. 303 was a component of the CNJ's late-1920s purchase of forty-five all-steel, seventy-two-foot combines from Pressed Steel.[43] The cars were constructed in two groups, with minor layout and dimensional differences: 259-268, and 269-304. The second group of cars, built in 1926, included two combines built for service on the CNJ's Blue Comet.[44] By 1931, the CNJ had a total of sixty-seven all-steel or steel-sheathed combines in service, comprising seven series of cars, built by either the Pressed Steel Car Company or the Harlan & Hollingsworth Corporation.[45]

During its forty-one years of revenue service on the Central, No. 303 probably worked the lines between such cities as Scranton, Wilkes-Barre, and Jersey City. An old postal form, found inside the safety grating of the baggage compartment's right side heater, indicates that on 12 July 1964 No. 303 was part of CNJ train No. 2421, operating between New York City, NY, and Allentown, PA.[46] Otherwise, no documentary evidence has been found which would indicate which other routes the car specifically worked.

In 1968, the High Iron Company bought No. 303 for use on "railfan" passenger excursions. The car was repainted, renumbered, lettered for High Iron, and assigned the name "Nomad." From 1968 through 1971, High Iron trains incorporating No. 303 operated on several historic railroad lines in the northeastern United States, including former Central Railroad of New Jersey trackage.[47]

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[43] C.R.R. of N.J. Diagrams of Passenger Car Equip't. (Elizabethport, NJ: Central Railroad of New Jersey, c. 1931) 27, 32.

[44] Ibid.

[45] Ibid., 25-27, 32, 35.

[46] Report of Mail Leaving. Postal Transportation Service, Form 5366. Steamtown NHS, Museum Collection, Accession No. 226.

[47] Howard Pincus, ed. High Iron 1971. (New York: Quadrant Press), 3. The High Iron Company, Inc., was established in 1966 by Ross Rowland, Jr., a steam locomotive enthusiast and Wall Street

Most of these trains were powered by former New York, Chicago & St. Louis (Nickel Plate) Railroad 2-8-4 Berkshire No. 759. The Steamtown Foundation "loaned" Nickel Plate No. 759 to High Iron for use on the excursions, with the understanding that the company would restore and operate the engine. In return, High Iron agreed to give a percentage of the excursion profits to Steamtown. As it turned out, the profits from the excursions were minimal.

Car No. 303 was usually placed immediately behind No. 759's second tender; railroad enthusiasts clustered at the car's open baggage doors with their cameras and tape recorders, recording the sights and sounds of their trip (Fig. 2).[48]

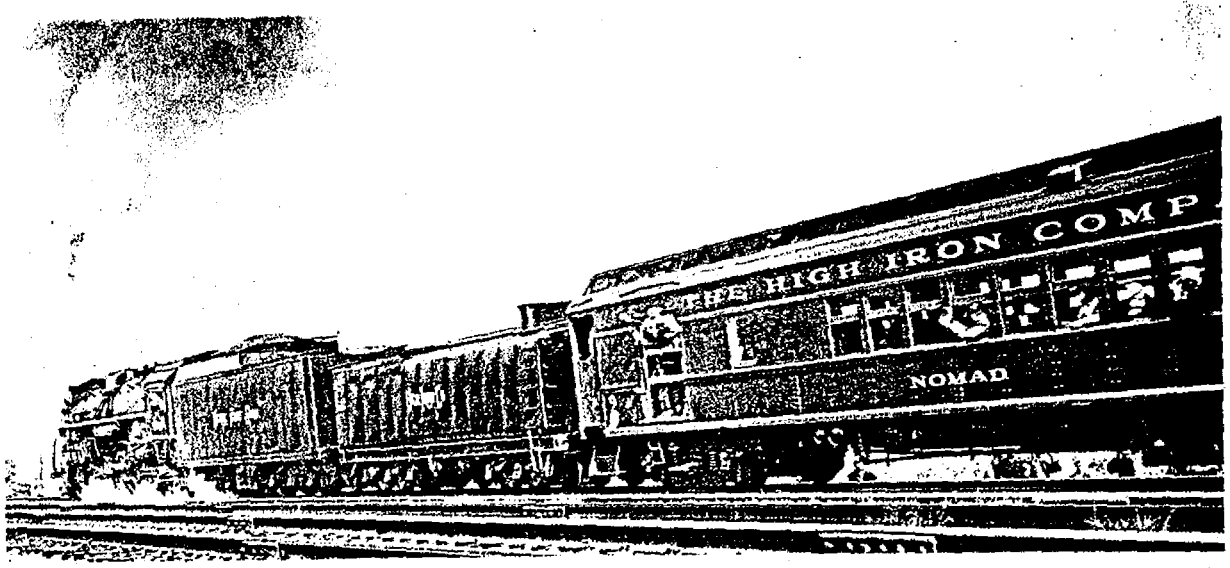

Fig. 2. High Iron Company combine No. 2, "Nomad," behind Nickel Plate No. 759, on excursion from Harrisburg, PA to the Horseshoe Curve near Altoona. Photograph by Don Wood. Howard Pincus, High Iron Company 1971. (New York: Quadrant Press, Inc., 1971), 33.

In May 1969, in commemoration of the Golden Spike Centennial, High Iron operated the "Golden Spike Special Limited," an expensive

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commodities broker. Between 1966 and 1973, High Iron ran several day-trip passenger excursions in Maryland, New Jersey, New York, Pennsylvania, and Virginia. The front inside cover of this publication provides a list of the excursions through 1970.

[48] Ibid., 33.

one-time excursion from New York City to Salt Lake City and back. Ticket sales for the excursion were much less than expected, and the funds that were raised were absorbed by maintenance and personnel costs. By the time the special train returned to New York City, High Iron was in serious financial trouble, and unable to recompense Steamtown for the use of the Berkshire. In 1971, in lieu of payment, combine No. 303 was donated to the Steamtown Foundation.[49]

The car was fairly worn out when it arrived at Steamtown's Bellows Falls, VT, facility, and apparently it was allowed to deteriorate further.[50] No information has been uncovered that would specifically indicate how the car was used while it was in Vermont. It may be assumed that No. 303 saw some local excursion service. Steamtown U.S.A. left Bellows Falls for Scranton, PA, in 1984; No. 303 was moved to its new location in October of that year, along with several other components of the collection. It was subsequently retired due to major running gear and structural problems.

Steamtown National Historic Site was created by the United States Congress on 30 October. On 20 March 1989, the Steamtown collection, including former CNJ combine No. 303, was transferred from the Steamtown Foundation to the National Park Service.

During 1988, the car was placed back in service as a passenger shuttle, carrying park visitors between the former Lackawanna Station and the Steamtown yard. In 1989 the combine was used briefly as the yard shuttle between the park boarding platform, near the Maintenance of Way building, and the roundhouse site.[51] Car No. 303 was retired once again at the end of the 1989. It has not been used since.

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[49] John W. Willever, phone conversation with the author, 7 January 1993.

[50] See pages 39-48 for a description of the car's physical condition following its transfer to the National Park Service.

[51] Tim O'Malley, conversation with author, 22 January 1993.

As Built Specifications - Car No. 303

Reporting marks: CNJ AAR class: CA

Type of car: Combination (baggage/express) Number of cars: 51

Builder: Pressed Steel Car Company Date Built: 1926

Capacity: 48

Light Weight: 123,660 lbs

Length-interior: 62′ 2 7/8" exterior: 72′ 5 1/2"
-passenger compartment: 39′ 11 3/16"
-baggage compartment: 22′ 2 13/16"

Width-interior: 9′ 0" passenger 9′ 1" baggage exterior: 9′ 9 1/2"

Height-interior: 9′ 5" exterior: 14′ 4"

Door openings			
-passenger side	height: 80"	width: 34"
-passenger end	height: 80"	width: 28"
-baggage side	height: 69"	width: 54"
-baggage end	height: 80"	width: 28"
-passenger-baggage	height: 80"	width: 28"

Type of construction: All-steel, with wood interior paneling.

Underframe

Construction:	steel
Center sill:	steel - fishbelly
Needlebeams:	steel
Body bolsters:	riveted steel
Body center plates:	steel
Body side bearings:	steel plate
Buffer:	Miner Friction B-10
Draft gear:	Miner Friction A-5-P-X

Platforms

Construction:	steel
Type:	riveted components
Decking:	steel, safety tread
Steps:	steel, safety tread
Risers:	steel
Couplers:	Sharon

Car Body

Construction:	riveted steel
Body hand rails:	steel, 3/4"
Windows:	wood sashes, O.M. Edwards
Doors:	steel, Morton
Roof:	steel, with copper end panels
Clerestory:	steel
Roof jacks:	two; toilet ventilators
Endsills:	cast steel

Interior

Flooring:	Flexolith on Keystone
Window blinds:	roll-down, National Lockwasher Co.
Clerestory	steel
length:	72′
width:	77"
height:	17"
Headlining:	Agasote
Partitions:	wooden, "A" end, floor to ceiling, 22′ 3" from car end, baggage compt wooden, "B" end, floor to ceiling, 5′ 1" from car end
Toilet:	One, "B" end, Eckert #40, dry hopper
Seats:	24 H&K Deluxe No. 900 pressed steel
Lighting:	electric
Water cooler:	"B" end, single, wall-mount
Basket racks:	84", steel rod, Adlake

Trucks

Type:	cast[52]
Wheelbase:	unknown
Truck center plates:	unknown
Truck side bearings:	unknown
Springs:	
bolster:	unknown
equalizing:	unknown
pedestals:	unknown
wheels:	unknown
brake beams:	Davis

Brakes

Type:	Westinghouse UC-type
Brake stands:	ratchet, Lindstrom-type
Truck brake:	Clasp

[52] See comments on the trucks, pages 44-45.

Finish

Exterior:	Primed and painted
Interior:	
passenger walls:	varnished inlaid mahogany
passenger ends:	varnished inlaid mahogany
passenger ceiling:	varnished mahogany w/painted Agasote
baggage walls:	painted steel
baggage ends:	painted steel
baggage ceiling:	painted steel

EXTERIOR DETAILS

Roof - The car was built with a clerestory roof and rounded, bullnose-style ends. Since use of windows in the clerestory declined after the 1910 introduction of the Garland ventilator, it can be assumed that No. 303 had no clerestory windows.[53] At least two Garland A-1 ventilators, spaced proportionally over the passenger compartment, were installed on each side of the clerestory.

The rounded ends of the main roof were fabricated from copper sheet.

Doors - The original passenger compartment and end doors on No. 303 were steel, with ornate cast iron door handles. A windowless steel door was placed between the passenger and baggage compartments. The metal doors were produced by the Morton Manufacturing Company of Chicago, IL.[54] The baggage compartment sliding doors were wood.

Diaphragms - The car was equipped with two-fold U-shaped canvas and iron diaphragms, manufactured by the Morton Manufacturing Company of Chicago, IL under the "Rex" brand name.[55] Each diaphragm was equipped with an iron face plate.

Body - The body of the car was made from riveted steel plate. Cast iron flag holders were placed at the four corners of the car

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[53] White, American Passenger Car, pt. 2, 407.

[54] C.R.R. of N.J., 32.

[55] Ibid.

UNDERBODY DETAILS

Frame - The car had a steel underframe, with side and end framing and platforms.

Draft gear - The buffers and draft gear utilized springs and friction devices to serve as shock absorbers between the frame and the coupler. This served to reduce violent coupling motions and made for smoother acceleration and deceleration while the train was en route.

Car No. 303 was equipped with buffers and draft gear manufactured by the W. H. Miner Company of Chicago, IL. The buffers were Miner Type B-10, with 5 1/2" of travel; the draft gear was Miner Type A-5-P-X, with 2 1/2" of travel.[56]

Power supply - Passenger car electrical systems were developed to provide power for onboard lighting, and later, air conditioning. The earliest battery-powered systems were installed in 1881; by 1900 many American railroads were using truck-mounted, belt-driven generators to provide power while the car was in motion. By 1915 most generators were mounted on the car frame, greatly enhancing their reliability. Batteries provided power to the car when the train was at rest or at low speed.[57]

The electrical system on car No. 303 was manufactured by the Electric Storage Battery Company of Philadelphia, PA. Direct current car power was furnished by a truck-mounted, belt-driven generator, tied into the battery system. The generator was an Electric Storage Battery Company Type 939, mounted on a constant-tension truck suspension bar. The rated generator capacity was 3 kilowatts.[58]

The car battery and lighting systems were manufactured under the Exide brand name. Exide 16-cell batteries provided power to the car when it was at rest. At 30 miles-per-hour, the generator cut in, providing power to the car and recharging the batteries.

Inter-car electrical connector plugs were mounted in the vestibules, below the end doors. The plugs were connected between the

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[56] Roy V. Wright, ed., Car Builder's Cyclopedia of American Practice, 10th ed. (New York: Simmons-Boardman Publishing Company, 1922), 501.

[57] White, Passenger Car, pt. 2, 424-426.

[58] C.R.R. of N.J., 32.

cars to provide electrical continuity throughout the train. If one car's generator dropped off line, or the batteries failed, the other cars would continue to provide electricity to the affected car.

Brakes - Car No. 303 was equipped with a Westinghouse UC air brake system, described as the "standard" for passenger car equipment in the 1922 Car Builders' Cyclopedia.[60] Components included a Type Q brake cylinder, U-12 universal valve, and service, auxiliary, and emergency reservoirs. The car was fitted with Clasp truck brakes, mounted on mechanically actuated Davis Brake Beams.[61] The hand brakes were actuated by brake stands, mounted in both vestibules.

No. 303 was equipped with a valve-actuated emergency brake system. The car's valves were mounted in the toilets at both ends of the car.

Air conditioning - not installed.

Trucks - CNJ documents describe car No. 303's trucks as being cast steel; however, no information is provided on the specific design or manufacturer.

The trucks are known to have been four-wheel, with 5 1/2" X 10" axles (in reference to the journal size). Based on contemporary designs, the truck probably had a center-mounted multiple elliptical spring, with a single bolster coil spring to each side.[62]

Car No. 303 was equipped with Miner Safety Locking Pins for truck mounting. The access port was in the deck of the car. The locking pins ensured that the trucks would remain attached to the car in the event of a derailment. Cars without locking pins used safety chains, attached from the truck to the car body, for the same purpose.[63]

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[59] The locomotive received power from a separate engine-mounted steam-powered generator.

[60] Wright, Cyclopedia, 790.

[61] C.R.R. of N.J., 32.

[62] Ibid.

[63] Willard Sturdevant, conversation with author, March 1992.

Couplers - Car No. 303 was delivered with Sharon couplers, manufactured by the National Malleable Castings Company of Cleveland, OH. The couplers were top-lift design (the locking pin was withdrawn from the top, enabling coupling and uncoupling). Coupler length from the anchor to the knuckle was 30 1/2".[64]

INTERIOR DETAILS

Fig. 3. Interior view of a CNJ passenger coach compartment, showing parcel racks, floor material and walkover seats, 14 April 1932. Photograph No. 30 from the Reading Company Collection, Pictorial Collections and Audiovisual Services Department, Hagley Museum and Library, Wilmington, DE.

Seats - Twenty-four car seats were installed, twelve per side; the specific model has not been determined. Combines 300 and 302, built for the Blue Comet, were fitted with "H&K" Deluxe #900 rotating seats.[65] Combine No. 303's CNJ contemporaries were equipped

[64] Wright, Cyclopedia, 590.

[65] C.R.R. of N.J., 32.

with standard "H&K" walkover seats, with seat backs that could be slid across the cushion to change the direction of seating. "H&K" was the brand name for Hale & Kilburn Corporation of Philadelphia, PA.[66]

The upholstery material for CNJ passenger cars was a dark, black-green mohair fabric.

Heating system - The car was equipped with a steam vapor heating system, manufactured by the Vapor Car Heating Company of Chicago, IL. The steam vapor system was the most widely-used method of car heating during the early part of the twentieth century.[67]

Steam was piped from the locomotive to all of the cars through metal couplers. The steam entered the top end of a vapor regulator, mounted underneath the car, where it was reduced to atmospheric pressure. The steam was then circulated through the car's under-seat piping at a temperature of 212 degrees. Once the steam had completed its circuit of the car, it was returned to the lower portion of the vapor regulator, where the remaining vapor and water were vented to the atmosphere.[68]

Car No. 303 was fitted with Vapor Car No. 440 vapor regulators.[69] Steam flow into the interior of the car was regulated by No. 122 cut-out valves, four of which were mounted on the floor in the center of the passenger compartment.[70]

Toilet - Car No. 303 was originally equipped with a single toilet, located at right side of the "B" end of the car. The commode was a porcelain Eckert #40 dry hopper, mounted directly to the floor of the car, with a wood seat and cover.[71] The dry hopper discharged directly onto the track.

The car's circuit breaker and electrical distribution box were mounted on the forward wall of the toilet compartment.

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[66] Wright, Cyclopedia, 1186.

[67] Ibid., 863.

[68] Ibid.

[69] Ibid., 876.

[70] Ibid., 873.

[71] C.R.R. of N.J., 32.

The CNJ referred to the onboard toilets as "saloons."

Lounge - A seat, measuring 19" W X 56" L, was mounted lengthwise opposite of the toilet compartment.

Baggage racks - The Adlake-brand baggage racks were constructed of steel tubes, and measured twelve inches wide by eighty-four inches long.[73] Adlake was the brand name for interior furnishings manufactured by the Adams & Westlake Company, Chicago. The company also manufactured railroad lanterns and other materials under the Adlake name.

Ceiling - The passenger compartment ceiling material was Agasote, a brand name product of the Pantasote Company, New York, NY.[74] Agasote was a wood fiber material with insulating qualities, capable of being sanded to a smooth finish. After application and preparation, the ceiling was painted.

Car ends - The vestibules were equipped with Edwards trap doors, manufactured by the O.M. Edwards Company, Inc., of Syracuse, NY.[75] The doors were raised to allow passenger boarding; once boarding was completed, or, if the passengers were coming into the car from a raised platform, the trap doors were lowered. The doors were locked in the down position by trap door locks.

A metal-frame water cooler was installed at the passenger end of the car, adjacent to the toilet door, on the right side of the door.

The passenger compartment car ends had two wood partitions, one separating it from the toilet and lounge compartment at the "B" end, and the other setting off the baggage compartment at the opposite end. The partitions and walls in the passenger compartment were surfaced with inlaid mahogany. The car number was centered over the doorway, with safety or informative messages to either side.

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[72] Ibid, 27.

[73] Ibid.

[74] Ibid.

[75] Ibid., 32.

On the "A" end, passenger compartment:

303

Passengers
Must Not Put Their Heads or Arms Out the Window
Personal Injury or Loss of Life May Result
From Neglect of This Notice

On the "B" end, passenger compartment:

303

Passengers
Must Not Put Their Heads or Arms Out the Window
Personal Injury or Loss of Life May Result
From Neglect of This Notice

Toilet

The messages were lettered in Roman style gold leaf. The large capitals were one inch tall, and the small capitals were one-half inch tall.

Side walls - The side walls were finished inlaid mahogany; the style of inlay matched the end walls. The wall panels fit over the side framework of the car and could be easily removed for maintenance.

The floor-mounted heating pipes and safety covers ran the length of the walls.

Lighting - Four electric overhead lights were installed in the passenger compartment. The style and type of the original light globes has not been determined. Two countersunk electric lights were placed in each car vestibule over the steps. The lights were similar in style to Safety Car and Heating Company fixture No. 9060.[76]

Two exposed overhead lights were mounted in the baggage compartment. The housing was similar to Safety Car Heating and Lighting Company's electric fixture No. 19211 (Fig. 4).[77] An additional shielded light was mounted horizontally on the rear wall of the baggage compartment, to the right of the door.

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[76] Wright, Cyclopedia, 933.

[77] Ibid.

Baggage compartment - A small storage locker was installed at the front end of the compartment, on the left side. It measured 79" H X 30" W X 13" D. A single, shielded electric light was mounted on the opposite wall.

The baggage compartment had a single window on each side wall. Each window measured 28" W X 33" H and was placed thirty inches off the floor, in a cutout portion of the wall heater. Each baggage door had a four-pane window of clear glass, measuring in total 10" W x 28" H (Fig. 5.). These windows did not have shades.

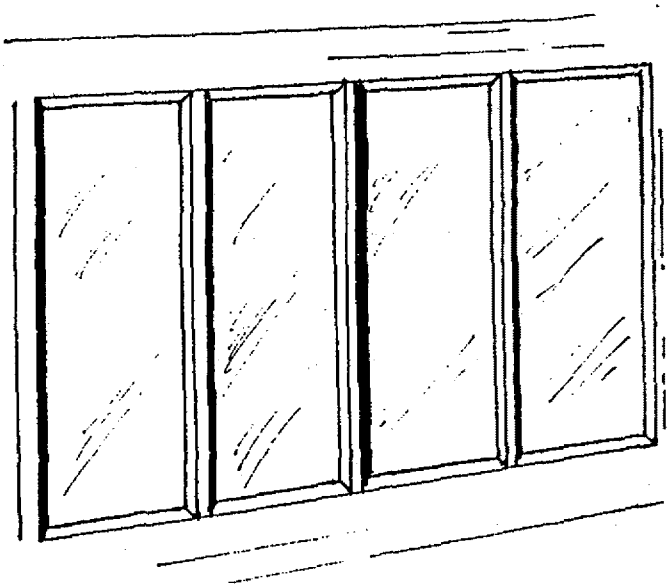

Fig. 5. Baggage door windows. Illustration by author.

Both baggage doors retracted into a protective cover, similar in design to a wooden pallet, measuring 4′ 5" H X 6′ 8" W.

The compartment was equipped with two sidewall-mounted Vapor Car Heating Company wall heaters, placed at the rear of the compartment against the passenger compartment partition. Floor-mounted Vapor Car No. 120 cut-off valves controlled the flow of steam to the heaters, allowing some adjustment of the compartment temperature.[80] The valves and intake piping were protected by a 28" L X 11 1/2" W X 8 1/2" H sheet metal cover on each side of the baggage-passenger compartment door.

The heater pipes were fully enclosed in iron mesh safety grates; the total size of the assembly was 4′ 10" H X 8′ 7" W. Cutouts measuring 31" H X 36" W provided clearance for the side windows.

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[80] Wright, Cyclopedia, 14th ed., 875.

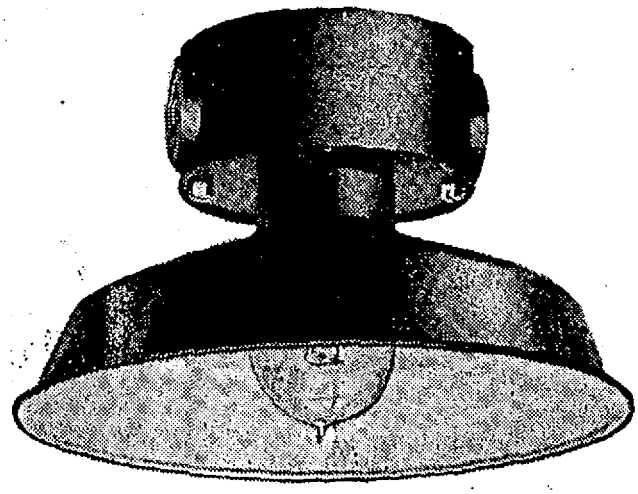

Fig. 4. Safety Car Heating and Lighting Company electric fixture No. 19211. Roy V. Wright, ed., Car Builder's Cyclopedia of American Practice (New York: Simmons-Boardman Publishing Company, 1937), 734.

Windows - The car had twelve O.M. Edwards wooden-sash windows on each side. The last windows at the "B" end in the toilet/lounge compartment were of a translucent engraved design, similar to windows marketed by the Pressed Prism Plate Glass Company of Chicago, IL.[78]

Each passenger window was fitted with a roll-down window shade, with the mechanism hidden behind a wooden panel. The shades were manufactured by the National Lockwasher Company of Newark, NJ.[79]

Flooring - The floor was Flexolith, mounted on Keystone. Flexolith was a fiber composition material, with plastic-like qualities, that hardened to the consistency (if not weight) of concrete. Flexolith was manufactured by Tuco Products Corporation, New York, NY.

Keystone was the brand name for a corrugated metal floor panel developed by the Berger Manufacturing Company. The two materials gave the car a sturdy, yet lightweight, floor that withstood constant daily use by passengers.

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[78] Roy V. Wright, ed., Car Builder's Cyclopedia of American Practice. 14th ed. (New York: Simmons-Boardman Publishing Company, 1937), 734.

[79] C.R.R. of N.J., 32.

Maintenance and Repairs

No Central of New Jersey maintenance records have been located for combine No. 303.

Maintenance work performed on the car by the Steamtown Foundation and Steamtown National Historic Site is documented in shop maintenance records. The records indicate that maintenance and repair activities took place in 1981, and between 1989 and 1992.

May 1981 -
- Cleaned, oiled, tested and stenciled the universal valves
- Repacked journals[81]

May 1989 -
- Replaced two angle cocks
- Replaced 3/8" threaded plug
- Replaced two brake shoes
- Replaced door latch (at S.E. trapdoor)
- Replaced coupler Lock
- Replaced U.V. valves
- Replaced U.V. valves
- Replaced cord on both conductors valves
- Re-wrapped wire on insulation on heat pipes
- Re-aligned trap latch on N.W. door
- Heat and bend "B" Pipe Bracket at "B" end
- Shim side bearing

June 1989 -
- Replaced bolt for the hand brake dog

July 1989 -
- Built up dog for hand brake

January 1990 -
- Replaced buffer and draft gear pin

February 1990 -
- Repaired buffer stems

March 1990 -
- Replaced bolster wear plates on truck frame (4)
- Replaced equalizing brake lever guides on truck
- Replaced bolts in live & dead lever guides on truck
- Pinned equalizer bar for equalizer spring pocket (4)
- Replaced equalizer springs (4)

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[81] "Repair Report Car #SF 303." Steamtown NHS Library, Steamtown USA File, Cabinet 1, Drawer 2. The maintenance was conducted by Fred Bailey.

March 1990 continued -
New bushings installed in truck frame for swing hangers
Built up and remachined swing hanger arms
Installed new swing hanger bushings both ends of swing hanger arm
Installed new swing hanger axles

November 1990 -
Replaced four bolster wear plates on bolster

December 1990 -
Replaced pedestal straps
Replaced bolts on side bearing riser to bolster
Replaced bolts on air & signal line bracket to frame
Replaced buffer stem retainer casting with Weldment
Replaced elliptical springs in truck
Repaired car body corner at bottom
Replaced car body end sheet at bottom
Repaired trap door hinge bracket
Replaced car body endsheet bottom brace

January 1991 -
Repaired equalizer spring pocket pins
Repaired end sill casting
Repaired bottom of signal line stand pipe
Repaired bottom of collision post
Repaired corner of vestibule end sheet at door jamb
Repaired outside corner of vestibule end sheet
Replaced bottom of vestibule end sheet
Replaced three step treads, three step risers and two step sides.
Replaced bolts in the spring plank safety straps
Replaced four equalizer coil springs
Repaired equalizer spring pocket pins in

February 1991 -
Remachined four swing hanger arms
Repaired car body end sheet at the bottom of the sheet
Replaced bolts in equalizing brake lever guide on truck
Replaced bolts in #2 and #4 center brake beam hangers
Replaced outside pedestal liners on #2 pedestal
Replaced #2 and #3 brakeheads
Replaced #2 and #3 brake beam hanger bushings in truck frame
Replaced #2 and #3 brake beam hangers
Replaced #2 and #3 brake beam hanger pins
Repaired car body corners
Replaced #3 brake beam hanger bushings in truck frame
Replaced #2 and #3 brake beam hangers
Replaced four #2 journal box pedestal liners
Replaced outside pedestal liner on #2 pedestal
Replaced inside pedestal liners on #2 pedestals

March 1991 -

Replaced buffer stem retainer casting with weldment
Replaced (3) step treads
Replaced (3) step risers
Replaced (2) step sides
Replaced bolster wear plates on truck frame (4)
Replaced bolster wear plates on bolster (2)
Replaced pedestal straps
Replaced collision post

April 1991 -

Replaced #2 brake head
Replaced #1 and #2 journal boxes outside the pedestal liners
Tightened #1 and #2 journal boxes inside the pedestal liners
Tightened #2 journal box pedestal liners
Replaced bottom of vestibule corner posts
Replaced #2 and #3 brake beam hanger bushings in the truck frame
Replaced #2 and #3 brake beam hanger pins
Replaced #2 and #3 brake beam hangers
Repaired end sill castings
Repaired inside corners of the vestibule end sheets
Replaced side bearing on truck bolster
Replaced swing hanger bushings in truck frame
Replaced bottom of vestibule end sheet
Replaced bottom of vestibule corner post at door jamb
Replaced outside of vestibule corner post
Repaired hand brake shaft

May 1991 -

Replaced hand brake shaft chain spool
Replaced "J" bolt for hand brake chain
Replaced lower hand brake shaft bracket
Replaced lower hand brake shaft bracket brace
Replaced threaded end, nut and cotter pin in lower hand brake shaft at bracket

December 1991 -

Installed four new swing hanger pins at truck frame
Installed new swing hanger axles
Installed new cotter pins for swing hanger arm pins and swing hanger axles
Installed new swing hanger axle nuts and washers
Installed new elliptical truck springs
Repaired hand brake latch

January 1992 -

Repaired rivets in the frame at draft gear pocket

January 1992 continued -
Replaced draft gear yoke[82]

Modifications

By 1931, the lengthwise-mounted lounge seat, opposite the toilet at the "B" end of car No. 303, had been removed and replaced by an additional toilet.[83]

At some later point during car No. 303's service on the Central Railroad of New Jersey, an air conditioning plant was added to the car. The installation was probably made during the late 1940s, when the car was overhauled and repainted for service behind diesel engines. The manufacturer of the system is unknown.

An electric motor and compressor were installed in an underframe box on the left side of the car; two condensers were installed in boxes on the right. The left side toilet compartment was converted to an electrical control box. The original circuit breaker and distribution box were removed from their cabinet in the right side toilet compartment and wired into additional panels and electrical controls. A squirrel cage blower was installed next to the electrical cabinet to bring refrigerated air up into the car.

Air was dispersed throughout the passenger portion of the car through an add-on ceiling-mounted air duct, twenty-two inches wide by five inches deep. The addition of this duct required modifications to the compartment's overhead lighting. Four globe lights, with a frosted Jersey Central Lines "Statue of Liberty" logo, were mounted directly to the duct. The globe was similar to the Luminator, Inc. model No. P-601 (Fig. 6).[84] The "Statue of Liberty" emblems are representative the post-World War II Central Railroad of New Jersey.

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[82] "Original Record of Repairs, Car No. 303." Locomotive Shop Foreman's files, Maintenance Division, Steamtown NHS, Scranton, PA. The maintenance was conducted by Car Mechanic Willard Sturdevant.

[83] C.R.R. of N.J., 27.

[84] Wright, Cyclopedia, 14th ed., 802.

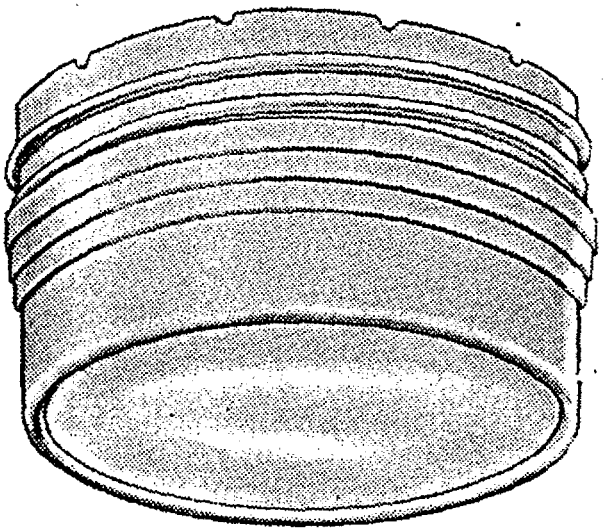

Fig. 6. Luminator, Inc., globe model No. P-601. Roy V. Wright, ed., Car Builder's Cyclopedia of American Practice (New York: Simmons-Boardman Publishing Company, 1937), 802.

Physical Studies

As discussed earlier, combination Car No. 303 has been in revenue service for forty-five of its sixty-seven years. Since its 1971 delivery to Steamtown U.S.A., the car has been subjected to lengthy periods of inactivity, exposure to the elements, occasional vandalism, neglect, and deferred maintenance.

Pursuant to Steamtown National Historic Site's intention to restore the car, a thorough examination of the car's current condition and restoration activities was begun in earnest in February 1992.

Component Analysis

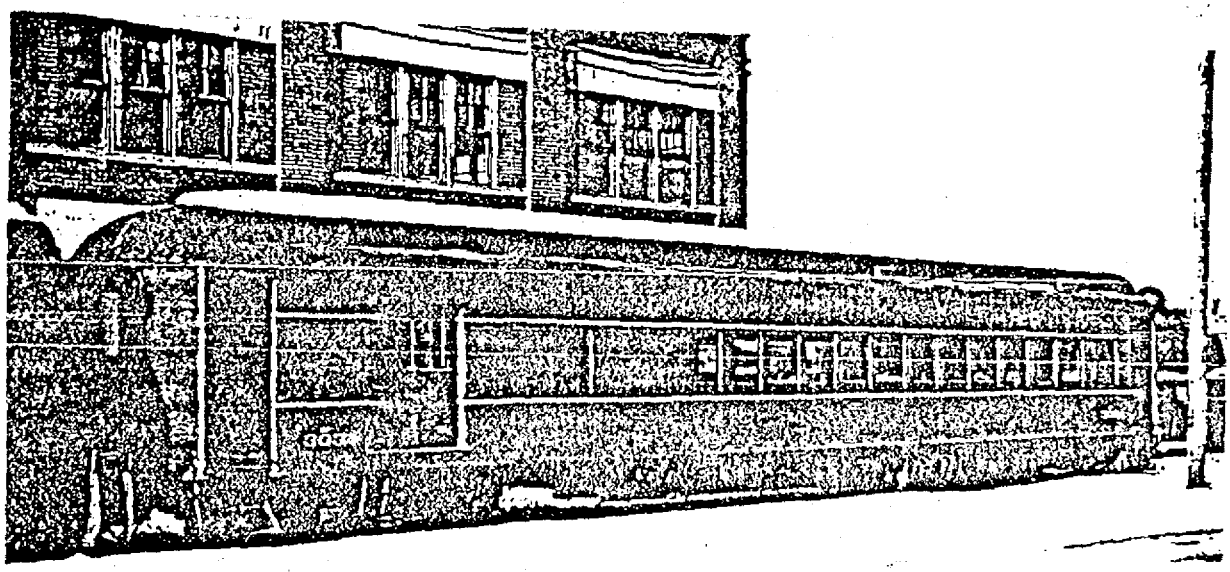

Fig. 7. CNJ combination car No. 303 prior to restoration. Gordon Chappell, Flanged Wheels on Steel Rails: The Railroad Cars of Steamtown. Draft. (Denver: National Park Service, 1991), 34.

Modified Specifications - Steamtown NHS, 1992

The following changes or modifications were made to combination car No. 303, prior its acquisition by the National Park Service:

Underframe - air conditioning components added

Platforms - no modifications

Architectural and Restoration Data

Car Body	
Doors:	steel dutch doors
Roof jacks:	removed from former toilet; one remains on the right side.
Interior	
Window blinds:	out of car
Seats:	out of car
Basket racks:	out of car
Air conditioning:	Ceiling ducting, electrical closet and blower fan added
Trucks	
Type:	cast, Pullman Standard
Wheelbase:	8'
Truck center plates:	friction
Truck side bearings:	Miner
Springs:	
bolster:	quintuple elliptical
equalizing:	triple-coil, two each side
Pedestals:	cast steel
Wheels:	36" drop-forged
Brake Beams:	Davis

Brakes - no modifications

Finish - no modifications

EXTERIOR DETAILS

Car body - The exterior of the car has serious end rust, and slightly less severe side panel rust. There is some evidence of panel bowing and deformation, particularly on the lower portions of the structure and at overlapping panels. Multiple rivets are worn or completely missing.

Fifteen three-part, U-shape iron beams comprise the structural side frames of the car. All have suffered considerable rust damage where the lower window frames meet the structural members. The worst damage is at the end windows, where the side frames have rusted through. The window sills, constructed of pressed steel formers and oak sill supports, have sustained similar damage (Fig. 7.).

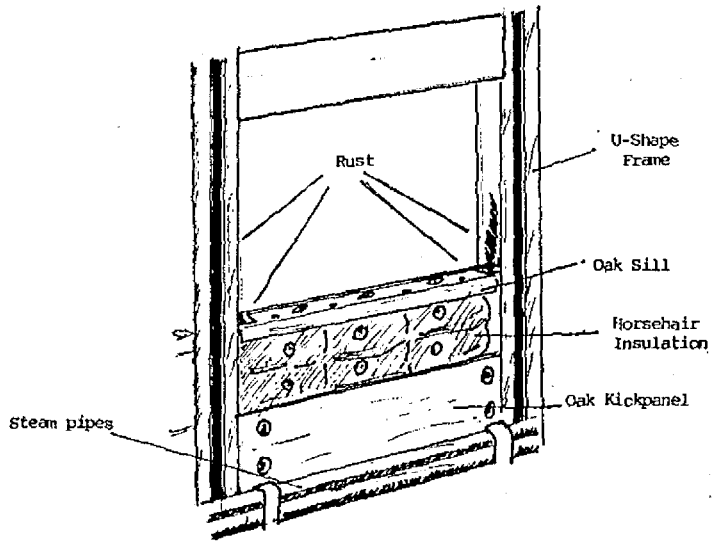

Fig. 8. Schematic of the side frames and supporting structure of No. 303, showing rust damage. Illustration by author.

Repair and restoration work on the frames and window sills was in progress when this document was completed. A detailed description of the repair work will be provided in the completion report.

Roof - The ventilators have some minor rust damage on the side panels.

There is evidence that there may have been additional ventilators fitted to the clerestory at one time. Bolt-on metal plates have been found at three locations on each side of the car: two over the baggage compartment, and one additional location in the passenger compartment. It has not been determined whether ventilators were actually placed in these locations.

The roof is torn and pitted in multiple locations, with rust on exposed portions. The end panels of the clerestory roof are severely rusted through in several locations.

Diaphragms - The car diaphragms have been removed due to their deteriorated condition.

Doors - High Iron Company replaced the car's original steel doors with wooden three-quarter Dutch doors. The doors at the "B" end have been removed and are stored on site.

The door between the baggage and passenger compartments made the

trip down from Vermont with the rest of the car, but was removed at some point after No. 303's arrival in Scranton. The whereabouts of the door is unknown.

The platform door in the baggage compartment has a plaque stating "Passengers are not allowed to stand on the platform." The plaque has been painted over.

UNDERBODY DETAILS

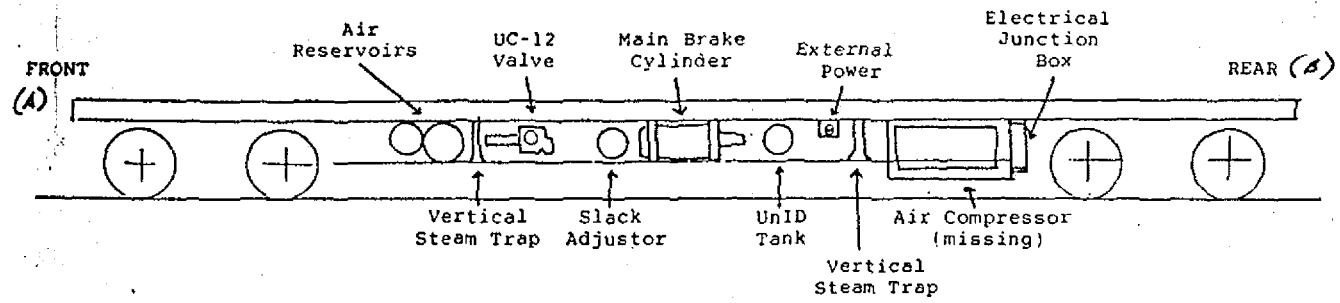

Fig. 9. Underbody equipment on combine No. 303, left side. Illustration by author.

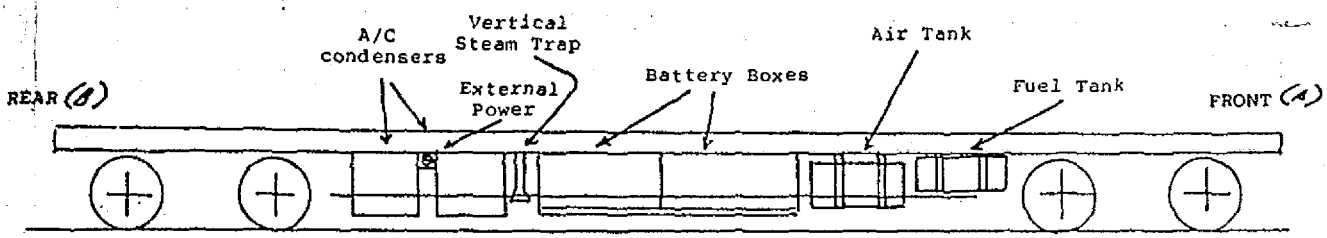

Fig. 10. Underbody equipment on combine No. 303, right side. Illustration by author.

Frame - The frame appears to be in good condition.

Draft gear/buffers - The disposition of the original draft gear on No. 303 is unknown. New draft gear and buffers were installed at the "A" end of the car during 1990.

Power supply - The car's generator was removed at an undetermined point during its service. All conduit and wiring remains intact. The car has additional Pyle-National inter-car connector

plugs mounted at the top of the vestibule doors. All of the plugs have been disconnected from the car's electrical system.

Brakes - The brake system is intact, containing a mixture of Westinghouse and New York Air Brake Company components (these are interchangeable). Westinghouse equipment predominates.

The brake systems will be thoroughly checked during the restoration/maintenance process.

Air conditioning - The equipment in car No. 303 has been inoperative for an indeterminate amount of time. The electric motor and compressors have been removed. While the electrical cabinet still has its panels and breakers, the system as a whole is considered irreparable.

Trucks - Railroads regularly changed trucks, using whatever was available when it came time to overhaul the car and its running gear. As a result, cars rarely have their original trucks installed.

Fig. 11. Pullman Standard four-wheel passenger car truck, installed on the "B" end of Combine No. 303. Photograph by author.

Combine No. 303 currently rides on Pullman Standard cast steel, four-wheel trucks, with quintuple leaf bolster springs, and triple-coil equalizer springs. The "B" end truck has a bad center casting which will be replaced.

The pedestals have been "mixed and matched" with those off other trucks. Cast lettering on the pedestals consists of:

"A" left -	PS 13256	P4456
"A" right -	P 14393	P14393-3
"B" left -	PS 13256	PS 13256
"B" right -	21779-1 6-30	P33-3256 P7791-1 4-30

"6-30" and "4-30" indicate the cast date for the pedestal.

The disposition of the original issue cast steel trucks is unknown.

Couplers - The car's Sharon couplers are not certified for common-carrier use by the Federal Railway Administration.

Fig. 12. Sharon-type coupler installed on Combine No. 303. Photograph by author.

INTERIOR DETAILS

Seats - Rattan-upholstered seats were installed during the car's operations by Steamtown U.S.A. Rattan was used by the Delaware, Lackawanna and Western Railroad for passenger car seat, but not by the CNJ. The material is incorrect for No. 303.

The Hale & Kilburn seats currently fitted to the car are probably correct. At the time of this report, the seats have been removed from the car for clean- ing, repair, and painting. They will be reupholstered in black naugahyde prior to reinstallation.

Heating system - The steam heating system is operational on car No. 303. All cut-off valves and vapor regulators are intact and functional. The only apparent non-original equipment are the inter-car flexible steam couplers.

The metal protective covers in the passenger compartment have been tagged and removed while repairs are in progress.

All interior steam plumbing is painted the same shade of red as the floor.

Toilet - The toilet seat and hopper have been removed from the car. A plate will be bolted over the hole in the floor and repairs will made elsewhere as required. The plan at this time is to lock the compartment and use it for storage.

The compartment is currently painted a dark mahogany red; see page 83 for a description of the paint found in the compartment. The prismatic plate glass window is intact and in good condition.

Baggage racks - The baggage racks are intact and out of the car while restoration is being performed. They will be reinstalled.

Ceiling - At some point during the car's Steamtown Foundation service the ceiling panels in No. 303 were painted Old English Ivo-ry. The paint is a *color brand name* of Kyanize Paint, Inc. of Everett, MA.

Investigation of other Central of New Jersey passenger cars in the Steamtown collection has revealed the presence of detailed gold leaf scroll work, applied to a base coat of light green and Pullman green (Fig. 13).

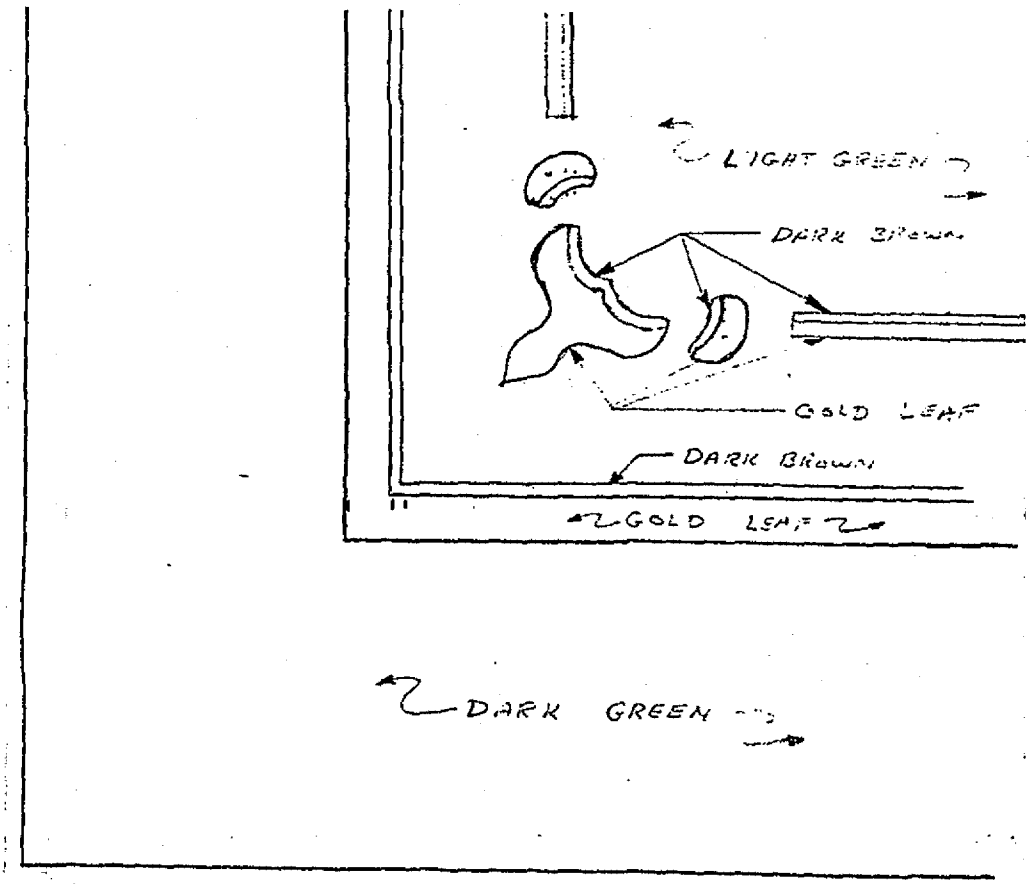

Fig. 13. Sketch of gold leaf detailing found on interior roof panels of Central Railroad of New Jersey passenger cars in the Steamtown collection. Illustration by Willard Sturdevant.

This decorative detailing is undoubtedly underneath the Old English Ivory and other layers of paint on the ceiling panels of No. 303. It should be restored.

There are four access doors mounted on the clerestory wall in the passenger compartment, two each side. The doors measure 7 1/2" W X 28 1/2" L, and provide access to the car ventilators. All of the doors have been secured to the clerestory with carpet nails.

Vestibule - The vestibule area is reasonably intact. The floor and vestibule steps at both ends of the car have suffered rust damage and are being replaced.

Interior ends - The upper portions of the passenger compartment end panels are in excellent condition. The original gold leaf mes-

sages and car number are intact and readable at both ends of the car.

The mount for the water cooler, adjacent to toilet compartment, is intact but rusty. The water cooler has been removed.

Side walls - The oak lower side walls are intact and in good condition, suffering only from normal wear and tear.

Lighting - The four Jersey Central globe lights are intact and in place. All car lighting is intact and operational.

Windows - The window frames are rotted through at several locations. All frames have been removed for inspection and repair.

The window shades have been removed from the car windows. They will be reinstalled.

Deck - Most of the passenger compartment floor is in good shape, with some gouges and nicks. A portion of the floor at the "B" end of the car, measuring approximately 8" W X 33" L, has sustained serious damage, and is missing several chunks of the original Flexolith. This area will be repaired with "Fleet Patch," manufactured by Randustrial of Cleveland, OH. This material has properties similar to Flexolith.

Baggage compartment - The compartment is in poor condition. The sheet metal floor has several large rust holes in it of varying sizes.

The Steamtown Foundation sandblasted the compartment down to bare metal, and repainted it in Old English Ivory and Tudor Brown. Both are products of Kyanize Paint.

There are four access doors mounted on the clerestory wall, two per side. The doors measure 7 1/2" W X 28 1/2" L, and probably indicate the former location of ventilators. The pull handle on the front right side door has been removed. All of the doors have been secured to the clerestory with carpet nails.

During the cosmetic restoration and maintenance cycle the baggage compartment will be modified to enable handicapped access to the car. Details of the installation are to be determined.

Paint Schemes

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

The CNJ went through four unique paint schemes during its lifetime: early steam, late steam, diesel, and finally, a design for shared operations with the New Jersey Department of Transportation. While the changeovers were primarily image or equipment driven, the company's perennially depressed economic status played an equal part in determining what equipment was painted. For example, many marking combinations appear in photographs, sometimes on the same train;[85] financial problems prevented the Central from standardizing its equipment.

By plan or necessity, the Jersey Central used a number of passenger colors, including Pullman Green, Sea Mist Green, dark blue-green, dark green, light green, blue, and olive. Trim also varied, as did the presentation of the road's name and letter style. There was much mixing and matching of schemes throughout the life of the railroad.

Original Scheme

An 1855 photograph of CNJ coach No. 159 shows an all wooden car painted in dark green. Roman style lettering, approximately twelve inches tall and centered over the windows, displayed the initials of the company:

C.R.R. of N.J.

The car number was approximately eight inches tall, centered on the body below the windows (Fig. 14).

[85] Kenneth Ganz and Thomas Campion. Interim Stabilization Report (study, Steamtown NHS, 1991), 1. Several of these reports were prepared in early 1991 for locomotives and passenger cars in the Steamtown collection.

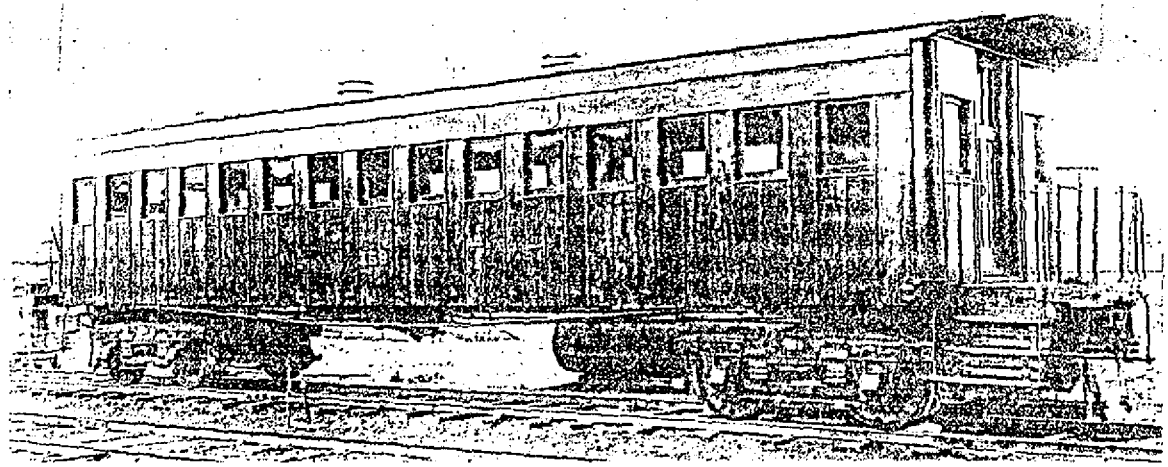

Fig. 14. Example of the first Central Railroad of New Jersey passenger car paint scheme, as depicted by coach No. 159. From John White, Jr., The American Railroad Passenger Car, pt. 1 (Baltimore: Johns Hopkins University Press, 1978), 26.

During this period, CNJ locomotives were painted black, with either block Gothic "C.R.R. OF N.J.," or the round CNJ herald.[97] These markings remained in service through the mid-1930s, at which time the CNJ introduced its second paint scheme.

Second Scheme

During the mid-1930s the Jersey Central went to its second scheme; the railroad began to spell out its name on the passenger cars, and attempted to adopt a "standard" shade of Pullman Green paint. The cars were delivered from the manufacturer completely painted green, including roof, trucks and vestibules.[98]

According to Anthracite Railroads Historical Society member Carl

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[97] Bernet, Diesels, 164.

[98] See Appendix 2.

Rose, the cars were repainted by CNJ shop personnel during their first overhaul with a black roof and dark olive green trucks, to the following specifications:

Body - Pullman shade, as per sample submitted by the railroad company.

Roof - The roof was painted with three coats of K&S Preservative for Metal Roofs.

Frame - One coat Sherwin-Williams Kromik primer and one coat Metalistic Black were applied.

Trucks - The trucks were primed and painted with carbon black, then topped with one coat Sherwin-Williams olive green.

According to Mr. Rose, the formula for Pullman Green varied from railroad to railroad. During periods of tight finances the shops were known to stretch the available green paint by mixing in black, producing a darker shade.

Additional details on the second scheme were provided by former Steamtown Foundation contractor Ed Blossom. He indicated that carbon black served as a cheap primer, under a coat of dark olive green. Boiled linseed oil was mixed with carbon black, applied, and then dried.

Lettering consisted of full "Central Railroad of New Jersey," five inches high by thirteen to seventeen inches wide, Extended Railroad Roman style, in imitation gold. The car numbers were in the same style, five inches high by five inches wide, placed below the second window, centered top to bottom, at both ends of the car (measurements were taken from combine No. 303).

Finally, photographic references indicate that the handrails were painted the body color (Fig.15).

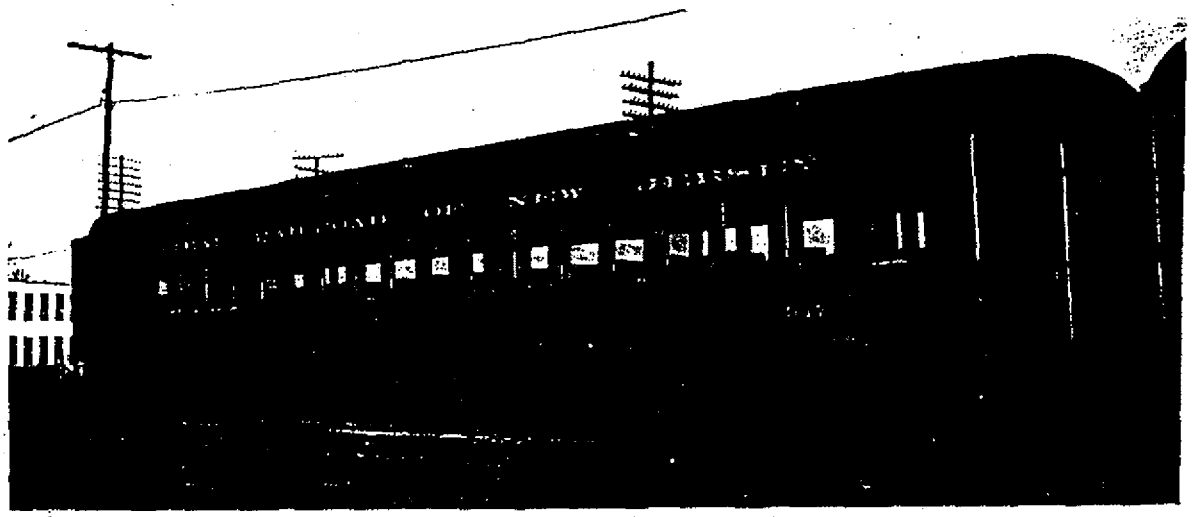

Fig. 15. Central Railroad of New Jersey suburban coach No. 947, in the railroad's second passenger paint scheme. Central Railroad of New Jersey photograph, collection of Willard Sturdevant.

This second scheme is the period chosen for the restoration of combination car No. 303.[88]

Third Scheme

During the late 1940s and early 1950s, the CNJ changed the paint schemes on its passenger cars and locomotives. The equipment was repainted in a bluer shade of green, and the railroad's new "Statue of Liberty" emblem was placed at the lower corners of each car. The lettering style was changed to Spartan Bold, five inches tall by five inches wide, and reading "Jersey Central Lines." Combine No. 303 received the new lettering and the "Liberty" heralds.

A photograph of CRP Railway Post Office No. 66 depicts a variation of the third scheme (Fig. 16). The markings for the Jersey Central Lines remain, but the "Statue of Liberty" logo is absent. The car number is centered on the body, below the lower window line, with the CRP initials centered above the numbers.

[88] See page 63 for explanation of the selection of the second scheme.

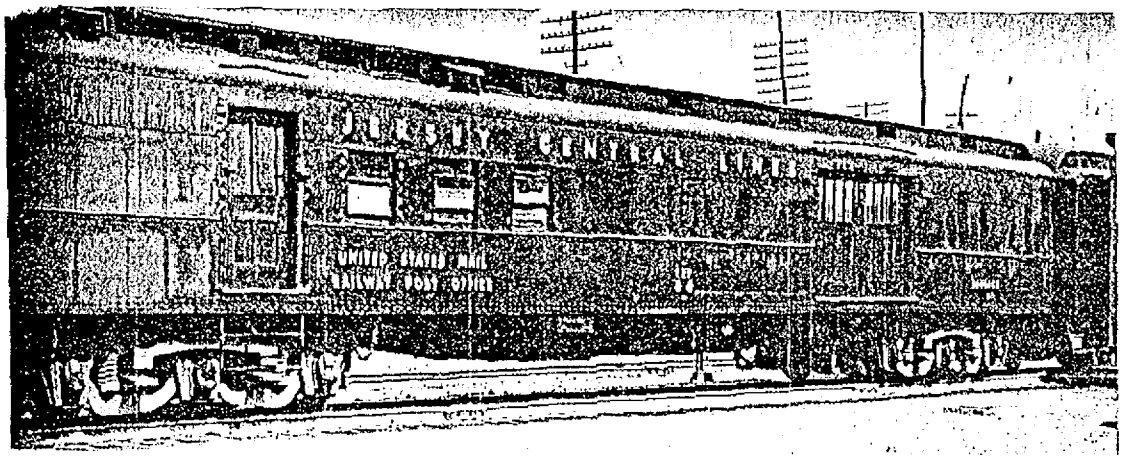

Fig. 16. The third Central Railroad of New Jersey paint scheme, minus the "Statue of Liberty" markings, on Central Railroad of Pennsylvania Railway Post Office car No. 66. Railroad Magazine, January 1968, 19.

Fourth Scheme

Photographs of early 1970s CNJ consists document a fourth paint scheme. The new markings were created for suburban cars assigned to joint CNJ-New Jersey Department of Transportation commuter operations.

The cars were dark blue, with a broad yellow letter board. A thin yellow stripe (approximately two inches wide) was painted below the window line, encircling the body.[89] The car number was centered at mid-body. The CNJ liberty head emblem was applied at the left corner of the car; "Central Railroad of New Jersey" replaced "Jersey Central Lines" on the circular emblem (Fig.17).

A circular red and black New Jersey Department of Transportation arrowhead emblem was placed at the opposite end of the car. Lettering consisted of "CNJ" in Spartan Bold, approximately twelve inches in height, at the left end above the windows.

[89] Chris Baer, conversation with author, 15 March 1993.

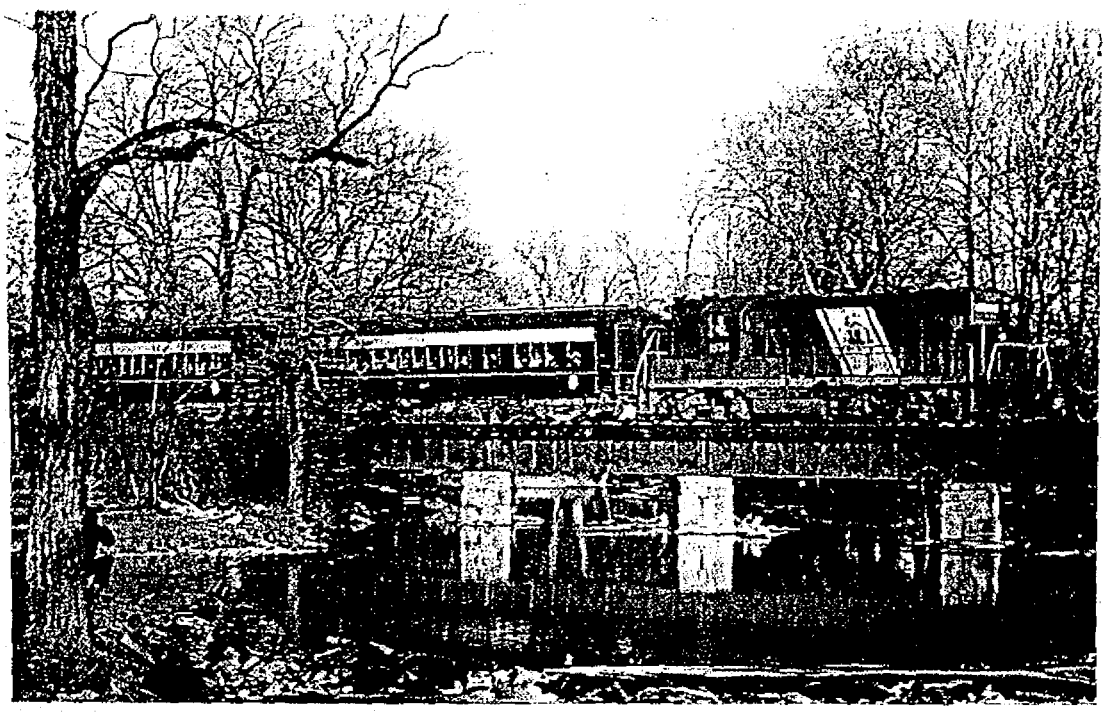

Fig. 17. Joint-use Central of New Jersey/New Jersey Department of Transportation coaches display the fourth scheme as the train crosses a trestle at Middle Valley, NJ. Bob Pennissi, The Northeast Railroad Scene, Vol. 5: The Jersey Central (Flanders, NJ: Robert Pennissi, 1980), 66.

Interior Colors

Minimal documentation has been found to indicate the proper interior colors of CNJ passenger cars. Paint analysis of the passenger, toilet, and baggage compartments of No. 303 was performed to determine the correct markings and colors.

Paint Analysis

Paint analysis on combine No. 303 was performed by Steamtown NHS maintenance shop personnel and volunteer car mechanics. This analysis was started in May 1992, when restoration began on the car, and is continuing.

Several areas of the car's exterior were mechanically sanded, exposing paint layers in gradient sections. Each layer was visually compared to color chips from the Munsell Book of Color, and the chip appearing most representative of the color was selected. The colors, listed from the top, or most recent application, are:

1- Deep sea green (Munsell 10G 2/2); painted and lettered for the Central Railroad of New Jersey by Steamtown NHS.

2 - Maroon (Munsell 5R 2/6); lettered for the Canadian Pacific Railway (CP); relettered for Vermont Valley by Steamtown U.S.A.

3 - Medium blue (Munsell 2.5B 5/8); no lettering identified.

4 - Tuscan red (Munsell 5R 3/4); lettered for High Iron Company, later Steamtown U.S.A.

5 - Sea green (Munsell 5R 2/6); lettered for High Iron Company by Steamtown U.S.A.

6 - Dark green (Munsell 5GY 2/1); lettered twice for Central Railroad of New Jersey (imitation gold, slightly brighter than Munsell 2.5Y 8/8.) and twice for Jersey Central Lines.

7 - Primer gray (the bottom layer).

The car retained its original Pullman Green color throughout its service life on the railroad. When the third design was introduced by the railroad, only the letter board was repainted with the new color. The "Liberty Head" emblems were applied at the lower corners of the body.

In 1967, the Central sold No. 303 to the High Iron Company, which repaired and modified the car for passenger excursions. High Iron painted the combine light sea green, relettered it for the company in nine-inch-tall Railroad Roman, and named the car "Nomad." Around 1970, High Iron repainted the car in a shade of red close to Pennsylvania Railroad Tuscan. A one inch yellow stripe, placed below the letter board, was added to the length of the car. A second car-length yellow stripe, approximately two inches wide, was placed at the extreme lower portion of the body. At the corners of the car, the lower stripe segued into three foot tall artistic design resembling a bass clef. The car remained lettered in Railroad Roman style.

Initially, Steamtown kept the red color. The right side was relettered "STEAMTOWN," in twelve inch, block style. The left side was not lettered.

Around 1971, No. 303 was repainted blue with no lettering. In 1980, maroon paint was applied, with six inch high, extended Railroad Roman lettering for the Canadian Pacific. In 1984, immediately prior to the car's move to Scranton, the CP lettering was replaced by "Vermont Valley," in 5 1/4" H, extended Railroad Roman.[90]

Former Steamtown Foundation Assistant General Manager Fred Bailey has stated that Steamtown regularly repainted passenger cars in whatever paint that was on hand. At one time there was a large amount of blue paint at the site, so several of the cars were painted blue. Later, combine No. 303 and several other cars in the collection were painted for the Canadian Pacific, partially because there was plenty of maroon paint on hand and partially because Steamtown U.S.A. director Don Ball wanted a Canadian Pacific-marked train for excursion use.[91] Obviously, activities such as these were done with no intent for accuracy.

The National Park Service, in an attempt to present a correct Central Railroad of New Jersey appearance, repainted No. 303 in 1988. The shade of green selected was darker and bluer than the CNJ's Pullman green, and therefore, was incorrect. The car lettering was a poor facsimile of the correct Extended Railroad Roman style. This ersatz paint scheme was on No. 303 when it was rolled into the Steamtown NHS maintenance shops for restoration.

Finally, one of the long time Steamtown rumors has maintained that No. 303 was assigned to the CNJ's famous Blue Comet. Cars painted for the Blue Comet had a Royal Blue car body, Jersey Cream window strip, belt rail and sash, Royal Blue doors, and Navy blue roof, steps and underbody. Paint analysis of No. 303 and conversations with Fred Bailey have confirmed that the rumor is false.[92]

An interior paint survey focused on the baggage compartment and toilet areas of the car. Visual inspection revealed a wide variety of colors and applications. The paint layers were not compared to the Munsell system.

The original baggage compartment color was light tan or butterscotch. The paint was found underneath the baggage door hardware and the wall heater safety grating, which were not removed when the compartment was sandblasted. When the CNJ overhauled No. 303 in the

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[90] Vermont Valley was one of the names devised at Bellows Falls by the Steamtown Foundation for its excursion operations.

[91] Fred Bailey, phone conversation with the author, 20 March 1992.

[92] Ibid.

late 1940s, the interior was repainted seafoam green. Remnants of this paint were found in the interior of the storage box at the front of the baggage compartment, and under the protective covers for the heater valves.

The toilet end of the car is painted Old English Ivory with Tudor Brown. The following paint layers were found on the passageway walls, between the toilet and electrical cabinet, by sanding in May and June 1992 (listed from top to bottom):

1 - Tudor Brown
2 - Light brown
3 - Light tan
4 - Seafoam green
5 - Dark brown
6 - Light brown
7 - Tan
8 - Dark brown
9 - Light brown
10 - Light tan

The applications of light brown, dark brown, and tan or light tan, show evidence of graining. The Central applied a wood grain effect to the metal walls in an attempt to simulate the mahogany walls of the passenger compartment. This wood graining was applied to all exposed vertical surfaces in the passageway, including the corner angles. Apparently, either High Iron or the Steamtown Foundation attempted a similar effect after obtaining the car, as indicated by the presence of light brown and light tan over the seafoam green. The final layer of Tudor Brown was applied by Steamtown U.S.A.

The following paint layers were found on the back wall of the water cooler (listed from top to bottom):

1 - Tudor Brown
2 - Burnt orange
3 - Reddish-orange
4 - Burnt orange
5 - Pullman green

Obviously, the indication is that the base coat of the water cooler, and possibly the surrounding walls, was Pullman green. No evidence has been found of attempted graining, but, this portion of the pas- sageway was concealed by the water cooler. It is conceivable that this end of the car was delivered in Pullman green by the manufac- turer. The orange shades of paint may have been applied at a later date for protective reasons.

The toilet compartment currently is painted the same shade of mahogany red as the deck of the car. Sanding at three different

positions in the compartment between May and June 1992 revealed three different combinations of paint.

The following paint layers were found in the toilet compartment on the inside wall of the car's body (listed from top to bottom):

1 - Mahogany red
2 - Old English Ivory
3 - Butterscotch

The following paint layers were found on a portion of the toilet wall formed by the water cooler (listed from top to bottom):

1- Mahogany red
2 - Old English Ivory
3 - Light tan
4 - Flesh
5 - Mahogany red
6 - Dark gray
7 - Medium gray
8 - Light gray
9 - Mahogany Red
10 - Reddish-brown

It would appear that the original color of the toilet compartment was the light reddish-brown. It has not been determined which colors were applied by the CNJ, and which were applied by the later owners.

The space occupied by the electrical cabinet and blower motor was originally the car's lounge area. The following paint layers were found on the car wall portion of the cabinet, by sanding, in May and June 1992 (listed from top to bottom):

1 - Light olive green
2 - Dark Pullman green
3- Reddish-brown

There is evidence of gold detailing on the roof panel of the compartment.

The blower cabinet wall has the following paint layers (listed from top to bottom):

1 - Medium gray-green
2- Light gray
3 - Light gray-green
4 - Light gray

Based on the evidence, the assumption can be made that the toilet and lounge compartments of No. 303 were originally painted a light reddish-brown. This color would have complemented the wood graining of the passageway and the natural wood of the passenger compartment. No evidence has been found of graining in the toilet or lounge.

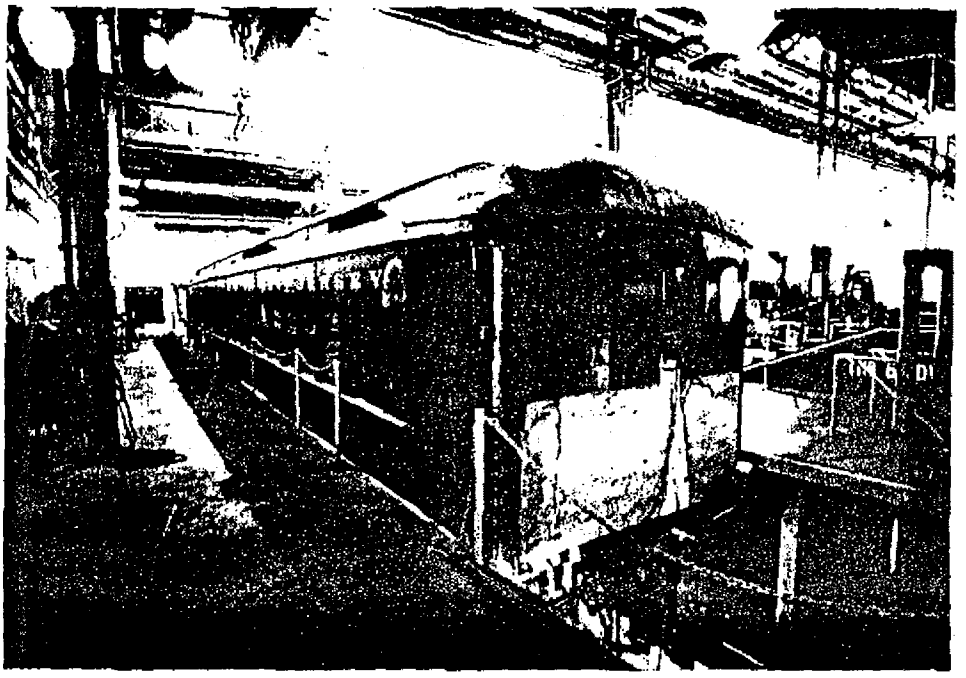

Fig. 18. CNJ combine No. 303 under repair in the Steamtown NHS shops. Photographer unknown. Steamtown NHS Library, Building Files, "CNJ Combine No. 303."

Combine No. 303 currently sits, partially disassembled, in the Steamtown NHS shops. Repairs on the car are in progress and involve substantial metalwork and interior/exterior corrective measures. new metal and wood components are date stamped "1993" to document the replacement.

- The original iron and canvas diaphragms were removed, due to deterioration and body damage. Original style diaphragms are no longer available, therefore the use of AMTRAK-style diaphragms (rubber, tube-type) is being considered.

- All car body, car end and roof rust is being sanded and patched with layers of fiberglass and bondo. Zinc chromate primer purchased from the General Services Administration is applied as a primer. Where required sheet metal is riveted in as a backing for the patch.

- The rusted side frames are being cleaned and ground to bare metal. Where necessary, metal patches are being applied to replace sections of the frames. Upon completion of repairs,

the side frames are covered with a layer of bondo, and sanded to a smooth finish.

- The oak window sill supports are being repaired or replaced, as required.

- The wood window frames are being repaired or replaced as necessary. Upon completion of repairs they will be primed and painted.

- All interior wood panels are being sanded and varnished as needed.

- The seat frames will be cleaned, painted dark olive green, and reinstalled.

- The heating system protective covers will be cleaned and reinstalled.

- The floor will be cleaned, repaired, and painted.

- Upon completion of all bodywork and repairs, the car body will be mechanically sanded or sandblasted, primed, and repainted in correct Central Railroad of New Jersey colors and markings. Lettering will be contracted.

- Handicapped accessible equipment will be installed in the baggage end. The type of wheel locks and required appliances and method of installation will be determined.

- The center casting of the "B" end truck will be replaced.

- Sharon-type couplers are not certified by the Federal Railroad Administration for common-carrier use. As a museum/excursion operation, Steamtown NHS is exempt. However, for visitor safety reasons, the Sharon-type couplers on No. 303 should be replaced by AAR type D or E couplers.

The initial intent with combine No. 303 was to do a basic cosmetic restoration, with emphasis on painting the car and quick repairs to return it to running condition. As more and more structural damage was discovered, the light restoration turned into a major rehabilitation. The previous owners "repaired" body and frame rust by stuffing the holes with steel wool and bondo. These actions contributed to the deterioration of the car and now require painstaking correction.

Evaluation of the Proposed Use On the Integrity of the Car

Past repairs and modifications to No. 303 have affected the historic integrity of the car. Due to advanced rust damage, multiple portions of the body are being replaced. The repairs to the fabric of combine No. 303 are described in detail on pages 40-43.

Ongoing use of the combine No. 303 by Steamtown National Historic Site will have an additional impact on the integrity of the car. Steamtown NHS will place the car in mainline steam service. Normal wear and tear will occur through usage. Any degradation of the structure will be documented and corrected during routine and scheduled off-season maintenance.

Restoration Recommendations

As a rare surviving example of a steam-era combination car, Central Railroad of New Jersey No. 303 is a suitable candidate for restoration. The car has had minimal exterior physical modifications, such as the application of non-original paint, which can be easily corrected. Interior modifications, including the air conditioning and the degredation of the bodywork, will require more effort.

Several factors were considered in the process of selecting a restoration period for combine No. 303: the degree to which loss or alteration of existing historic fabric resulting from the restortion can be tolerated; the amount of historical documentation available to support various restoration alternatives; the cost of restoration; and how well the restoration would fit the interpretive themes of the park.

One of the four major interpretive themes of Steamtown is to develop and present "the history of railroads in the steam era (1850-1950), with emphasis on the northeastern United States."[93] Combination car No. 303 fully fits this interpretive theme. It retains sufficient physical integrity to warrant its restoration to 1930s-1940s condition and appearance.

Car No. 303 requires a complete mechanical overhaul and restoration. This should include the rebuilding of the running gear and other mechanical components. Roof repairs, stabilization of the car frame

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[93] U.S. Department of the Interior. Steamtown National Historic Site, Pennsylvania, Railroad Yard Design Program/Interpretive Concept (Denver: National Park Service, Denver Service Center, 1989), 3.

and body, and restorative treatments of the interior are being performed with the intent of cutting out and repairing deteriorated components of the car, and preventing future damage.

The ceiling panels should be carefully stripped to reveal their decorative designs. The original two-tone green and gold detailing should be restored.

Finally, in order for No. 303 to be fully returned to its proper steam-era appearance and condition, all remaining under car and interior components of the air conditioning system must be removed as it does not fit the steam-era configuration of the car. All air conditioning-related under car boxes and equipment should be removed. The air conditioning duct in the passenger compartment should be removed, and proper period light fixtures reinstalled. The electrical cabinet and squirrel cage blower should be removed, and the space returned to its original configuration as a lounge area, with lengthwise-mounted seat. The original circuit breaker panel and distribution box should be remounted on the wall of the toilet compartment.

Upon the completion of the interior and mechanical restoration, combine No. 303 should be painted in the second Central Railroad of New Jersey passenger paint scheme of the mid-1930s to the early 1950s, as described on pages 50-52. The Pullman Green and gold passenger scheme was the CNJ's standard livery for approximately twenty years. It is classic steam era design, and strongly evocative of the Central at the height of its prosperity.

Appendix 1 - Legal Documentation

Two pieces of documentation were identified concerning No. 303's post-CNJ service and sale to Steamtown U.S.A.

One is a 6 February 1967 letter from W.W. Boyce, purchasing agent of the Central Railroad of New Jersey, to F. Nelson Blount, Steamtown U.S.A. In the letter, Boyce indicated that eleven passenger coaches and one combine were available for sale or donation to the museum.

The second item is the Steamtown Foundation's Depreciation Schedule of 1988, also known as the assessed property list. The schedule was developed in preparation for the transfer of the foundation's locomotives and rolling stock to the National Park Service. Combine No. 303 is listed as a 1971 donation to the Foundation, with a 1988 value of 0 dollars.

These two documents confirm No. 303's availability for sale in 1967, and donation to Steamtown U.S.A. in 1971.

THE CENTRAL RAILROAD COMPANY OF NEW JERSEY

P. O. BOX 151 • ELIZABETHPORT, N. J. 07206 • Telephone ELIZABETH 2-7500 •

W. BOYCE
Purchasing Agent

February 6, 1967

File 57

Mr. F. Nelson Blount
Steam Town U.S.A.
Box 71-L
Bellows Falls, Vermont 90472

Dear Mr. Blount:

It was a real pleasure meeting you and Mr. McLeer last week and I really enjoyed talking with you both. I read the pamphlet that you left with me with real interest.

You stated that you are looking for two gondolas or coal hopper cars for use in your operation. As I explained to you, the cars that we have offered for sale are all in need of major repairs, but we will keep you in mind if anything half way decent comes along.

We have made a note on our file that you are also interested in 11 coaches and 1 combine car. These will be available approximately around April 1st and you will be so notified.

Regarding the aluminum sash which has been installed in our 'new look' cars in place of the wooden sash; these items were purchased in 1958 and the price for the glass and frame at that time was $28.28 each. Mr. Francis H. Young, Jr., representing the Transportation Division of the Adams & Westlake Company, whose office is at 744 Broad Street, Newark, N.J. 07102, was recently a visitor to this office and he informed me that the present day price of this aluminum sash and glass is approximately $40.00 per window.

If you are interested, Mr. Young advised that he would be glad to furnish you with any additional information that you may require.

Yours very truly

W. W. Boyce

Purchasing Agent

DONOR	DESCRIPTION	NUMBER	ACQUIRED	PRICE	DONATED	TOTAL
	LOCO #2124	2124	1965		10,016.37	10,016.37
	[illegible] #4012	4012	1965	5,169.36	25,000.00	30,169.36
	[illegible] ISLAND	903	1965		6,000.00	6,000.00
	LOCO #2816	2816	1965		8,500.00	8,500.00
	LOCO #3364	3364	1965		3,431.20	3,431.20
	LOCO #737	737	1965	3,630.00	1,048.00	4,678.00
	MINA. LOCO #8		1965	393.71		393.71
	#30053	30053	1967	4,721.96		4,731.96
	[illegible]VETON #7	7	1969		15,500.00	15,500.00
	DANAHATCO COACH		1969	329.81	21,500.00	21,829.81
	[illegible] #1266	1266	1969	349.60	17,500.00	17,849.60
	[illegible] M #959	959	1969	190.25		190.25
	RUTHRD #2777	2777	1970	625.00		635.00
	[illegible]RR #X170I	170	1970	625.00		625.00
	[illegible]RR #129	129	1970	450.00		450.00
	LOCO #104	104	1971	1,559.40	5,000.00	6,559.40
ESTATE	[illegible] #6039	6039	1971		12,316.00	12,316.00
ESTATE	[illegible] #790	790	1971		14,364.00	14,364.00
ESTATE	LAMINO #3	3	1971		3,276.00	3,376.00
ESTATE	[illegible] #1923	1923	1971		4,095.00	4,095.00
ESTATE	[illegible] ELEC #1	1	1971		3,055.00	3,055.00
ESTATE	MEADOW RVLR #1	1	1971		4,914.00	4,914.00
ESTATE	[illegible] #519	519	1971		16,443.00	16,443.00
ESTATE	N.A.SIL #210	210	1971		5,323.00	5,333.00
ESTATE	[illegible] #38	38	1971		3,457.00	3,457.00
ESTATE	NKP #759	759	1971		20,538.00	20,538.00
ESTATE	[illegible]VLY #15	15	1971		16,443.00	16,443.00
ESTATE	[illegible] BK #43	43	1971		4,095.00	4,095.00
ESTATE	[illegible] H # 3713	3713	1971		12,316.00	12,316.00
ESTATE	[illegible]-SCHLN #1	1	1971		8,221.00	8,221.00
ESTATE	BULLARD #2	2	1971		2,047.00	2,047.00
ESTATE	[illegible] #47	47	1971		14,364.00	14,364.00
ESTATE	[illegible] #1395	1395	1971		12,316.00	12,316.00
ESTATE	[illegible] #3377	3377	1971		18,490.00	18,490.00
ESTATE	[illegible] #5288	5288	1971		12,316.00	12,316.00
ESTATE	[illegible] #2317	2317	1971		101,752.99	101,753.99
ESTATE	[illegible] #2929	2929	1971		12,316.00	12,316.00
ESTATE	[illegible] HM #44	44	1971		6,221.00	6,221.00
ESTATE	[illegible] H #84	84	1971		3,276.00	3,376.00
ESTATE	[illegible] M #228	228	1971		819.00	819.00
ESTATE	[illegible] RR #253	253	1971		3,276.00	3,276.00
ESTATE	[illegible] LP #124	124	1971		409.00	409.00
ESTATE	[illegible] LP #102	102	1971		189.00	189.00
ESTATE	[illegible] RR #28	28	1971		1,638.00	1,630.00
ESTATE	[illegible] #50	50	1971		409.00	409.00
ESTATE	[illegible] #51	51	1971		409.00	409.00
ESTATE	SLJ.&.LC #53	53	1971		189.00	189.00
ESTATE	[illegible] H #W3013	3013	1971		409.00	409.00
ESTATE	[illegible] #60	60	1971		409.00	409.00
ESTATE	[illegible] L LOADER		1971		409.00	409.00
ESTATE	RUT RR #X170I	170	1971		819.00	819.00
ESTATE	RUT RR #X170	170	1971		1,638.00	1,638.00
	COACH #718	718	1971	602.62		602.63
	COACH #719	719	1971	602.62		603.63
[illegible]CO	CNJ COMBINE #303	303	1971		.00	.00
	COACH #1022	1032	1972	1,315.00		1,315.00
	COACH #1026	1026	1972	1,315.00		1,315.00
	COACH #1062	1062	1972	1,315.00		1,315.00
	COACH #550	550	1972	1,315.00		1,315.00
	COACH #580	580	1973	1,315.00		1,315.00
	COACH #589	589	1972	1,315.00		1,315.00
	COACH #613	613	1972	1,315.00		1,315.00
	BAG CAR #485001	485001	1972	1,100.00		1,100.00
	BAG CAR #251	5251	1972	1,100.00		1,100.00
	LOCO #1246	1246	1973	20,000.00		20,000.00
	LOCO #1293	1293	1973	20,000.00		20,000.00
	CABOOSE	29	1974	500.00		500.00
	VTR BOXCAR #526	526	1974	618.00		618.00
	VTR BOXCAR #503	503	1974	618.00		618.00
	LIRR #7018	7018	1974	936.00		936.00
	LIRR #7045	7045	1974	936.00		936.00
	LIRR #7091	7091	1974	936.00		936.00
	LIRR #7082	7082	1974	938.00		936.00
	LIRR #7099	7099	1974	21,174.27		21,174.27
	LIRR #7127	7127	1974	936.00		936.00
	LIRR #7128	7128	1974	936.00		936.00
	LIRR #7436	7436	1974	936.00		936.00
	LIRR #7468	7468	1974	936.00		936.00
	LIRR #7483	7483	1974	936.00		936.00
K. RR	EL #2	2	1974	3,336.20		3,336.20
K. RR	EL #3	3	1974	3,326.20		3,336.20
K. RR	EL #4	4	1974	3,326.20		3,326.20
RR-NJ	CNJ #1006	1006	1974	3,155.20		3,155.20
RR-NJ	CNJ #1009	1009	1974	3,155.20		3,155.20
RR-NJ	CNJ #1021	1021	1974	3,155.20		3,155.20
RR-NJ	CNJ #1023	1023	1974	3,155.20		3,155.20
RR-NJ	CNJ #1132	1132	1974	3,155.20		3,155.20
LRR	1927WHITCB LOCO		1974	1,400.00		1,400.00
NJ	LOCO #6816	6816	1974	.00		.00
RR	WOOD BOXCAR #8194	8194	1974	.00		.00
RR	WOOD BOXCAR #8195	8195	1974	.00		.00
LEP	1 USED 1936LOCO		11/ 5/73	700.00		700.00

Appendix 2 - Written Statement of Willard Sturdevant, Car Mechanic Steamtown NHS

While removing paint from the roof and sides of coach No. 1157 I found Pullman Green paint as the first layer of paint on top of the primer coat on the metal.[94]y I also found Pullman Green as the first layer of paint, after primer, on the truck side frames.

When cars and locomotives were built they would be painted for the railroad that was buying them and place into service as delivered from the factory. The CNJ coaches were painted Pullman Green; roofs, sides and frames including trucks when delivered and placed into service as soon as they received them without repainting them, as cars and locomotives were sent to the shop for repairs, repainting sometimes would be done at that time. The roofs, as far as I can tell, did not get painted black until the CNJ repainted the coaches to a later paint scheme which was the early diesel era paint scheme; black roof, Pullman Green or Deep Sea Green sides and black frames & truck frames.

In all of the old black & white photos that I have seen, there is no difference in the shades of darkness to tell if the roofs were black, from what I have found on the cars, seen in old photos and know from reading books on railroads, I am positive that the coaches were delivered Pullman Green from roof to trucks and that's how they were placed into service, with no changes being made until the early 50's.

Willard Sturdevant
Railroad Car Mechanic

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[94] Coach No. 1157 is another former Central Railroad of New Jersey passenger car in the Steamtown NHS collection. Mr. Sturdevant is a car mechanic in the maintenance division and is currently assisting with the restoration of No. 303.

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