

# Carolina Conductor



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Monthly Newsletter of the Carolina Railroad Heritage Association, Inc.

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## Preserving the Past Active in the Present Planning for the Future

**Web Site:** [hubcityrrmuseum.org](http://hubcityrrmuseum.org)

**Facebook:** Carolina Railroad Heritage Association & Hub City RR Museum

### Hub City Railroad Museum and SOU Rwy Caboose #X3115:

Spartanburg Amtrak Station

298 Magnolia Street

Spartanburg, SC 29301-2330

Wednesday 10-2 & Saturday 10-2

### Meeting Site:

Fountain Inn Presbyterian Church

307 North Main Street

Fountain Inn, SC 29644

Third Friday of the Month at 7:00 p.m.

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Articles can be submitted anytime.

# Baldwin Locomotive Works

Part two of the article covers the demise of the company.

## Demise

Between 1940 and 1948, domestic steam locomotive sales declined from 30 percent of the market to 2 percent. By 1949, there was no demand for steam locomotives. Baldwin's attempts to adapt to the changed market for road locomotives had been unsuccessful; the reliability of their offerings was unsatisfactory, epitomized by notorious failures such as their "Centipede" diesel locomotives and their steam turbine-electric locomotives, which proved to be money pits unsuited for their intended service. In July 1948 Westinghouse Electric, which had teamed with Baldwin to build diesel and electric locomotives and wanted to keep their main customer in the rail industry afloat, purchased 500,000 shares, or 21 percent, of Baldwin stock, which made Westinghouse Baldwin's largest shareholder. Baldwin used the money to cover various debts. Westinghouse vice president Marvin W. Smith became Baldwin's president in May 1949. In a move to diversify into the construction equipment market, Baldwin merged with Lima-Hamilton on December 4, 1950, to be-

come Baldwin-Lima-Hamilton. However, Lima-Hamilton's locomotive technology was unused after the merger and market share continued to dwindle. By January 1952 Baldwin closed its factory in Rochelle, Illinois and consolidated Whitcomb production at Eddystone.

In 1953 Westinghouse discontinued building electrical traction equipment, so Baldwin was forced to reconfigure their drive systems based on General Electric equipment. In 1954, during which time they were being virtually shut out of the diesel market, Baldwin delivered one steam turbine-electric locomotive to the Norfolk and Western Railway, which proved unsatisfactory in service. After locomotive production ended, Hamilton continued to develop and produce engines for other purposes. Baldwin engine production was shifted to the Hamilton plant, but in 1960 the Hamilton engines ceased production, the plant was shuttered, and Baldwin engine production moved back to Eddystone. The last locomotives produced by Baldwin were three experimental RP-210 dual power passenger locomotives for the New York Central and New

Continued on Page 3 - Baldwin

# Museum Happenings



The RR Museum is better than the library!



By age 47, it became clear that Lester and his parents had distinctly different ideas on what it meant to grow up and become a successful engineer.



New dining car/china display in the museum on loan from Bo Brown.

## Wanted—Articles for the Carolina Conductor

Submit an article of 200 words or more with some photos and captions and see them in print. Every one of us has some unique railroad experience that would make interesting reading for our membership. Your editor always needs more contributions of railway history and news.

York, New Haven, and Hartford rail lines in 1956.

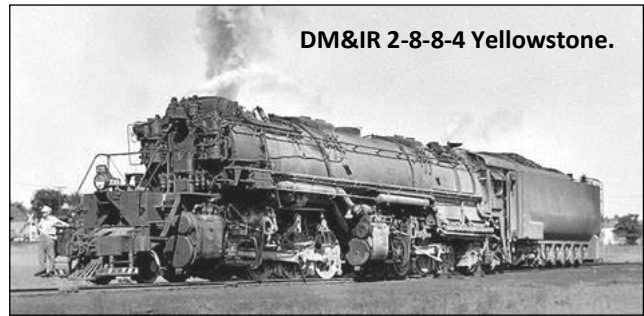
In 1956, after 125 years of continuous locomotive production, Baldwin closed most of its Eddystone plant and ceased producing locomotives. The company instead concentrated on production of heavy construction equipment. More than 70,500 locomotives had been built when production ended. In 1965 Baldwin became a wholly owned subsidiary of Armour and Company. Greyhound Corporation purchased Armour and Company in 1970, and the decision was made to liquidate all production. In 1972 Greyhound closed Baldwin-Lima-Hamilton for good. The "replacement and renewal parts" business was acquired by Ecolaire Inc. and became the "Baldwin-Hamilton Company - A Division of Ecolaire Inc. and lasted till 1991 to receive license fees from other companies using their designs, which was lucrative. When the licenses ran out, all remaining parts were distributed, and the company dissolved.

### Later Steam Locomotives



Virginia & Truckee "Inyo".

Baldwin built many 4-4-0 "American" type locomotives. Surviving examples of which include the 1875's Virginia and Truckee RR #22 "Inyo", but it was perhaps best known for the 2-8-2 "Mikado" and 2-8-0 "Consolidation" types. It was also well known for the unique cab-forward 4-8-8-2 articulateds built for the Southern Pacific Company and massive 2-10-2 for the Atchison, Topeka and Santa Fe Railway. Baldwin also produced their most powerful steam engines in history, the 2-8-8-4 "Yellowstone" for the Duluth, Missabe and Iron Range Railway. The Yellowstone could put down over 140,000 lbf of tractive force. They routinely hauled 180 car trains weighing over 18,000 tons. The Yellowstones were so good that the



DM&IR 2-8-8-4 Yellowstone.

DM&IR refused to part with them; they hauled ore trains well into the diesel era, and the last one retired in 1963. One of Baldwin's last new and improved locomotive designs were the 4-8-4 "Northern" locomotives. Baldwin's last domestic steam locomotives were 2-6-6-2s built for the Chesapeake and Ohio Railway in 1949. Baldwin 60000, the company's 1926 demonstration steam locomotive, is on display at the Franklin Institute in Philadelphia.

### Preserved Baldwin Steam Locomotives

There are many Baldwin built steam locomotives currently operating in the United States, Canada, and several other countries around the world. Out of all the Baldwin built steam locomotives that are operational or have operated in recent years, the most recognized locomotives are Reading 2101, Reading 2102, Grand Canyon Railway 4960, Frisco 1522, Frisco 1630, Nickel Plate Road 587, Blue Mountain and Reading 425, Western Maryland Scenic Railroad 734, Southern Pacific 2467, Southern Pacific 2472, Spokane, Portland and Seattle 700, Southern Railway 4501, the oldest surviving 4-8-4 Northern type steam locomotive, Santa Fe 3751, and the last domestic steam locomotive Baldwin built, Chesapeake and Ohio 1309.



Ex-C&O #1309  
on WMSR excursion.

## Narrow Gauge and Unconventional

Baldwin built locomotives for narrow-gauge railways as well. Some of the more notable series built for the Denver and Rio Grande were outside-framed 2-8-2 "Mikados": Fifteen class K-27's, originally built as Vaucrain compounds in 1903, ten class K-36's built



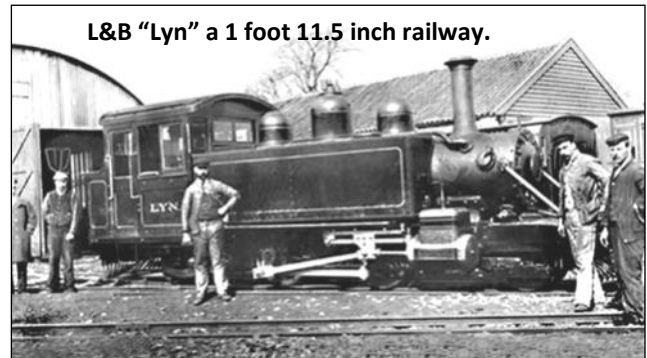
in 1925, and ten class K-37's originally built as standard-gauge 2-8-0s in 1902 but rebuilt for narrow gauge in the D&RGW shops in 1928. Several of all these classes survive, and most are operating today on the Durango and Silverton Narrow Gauge Railroad, the Cumbres and Toltec Scenic Railroad, while some are being restored on the East Broad Top Railroad.

A six-ton, 60-cm gauge 4-4-0 built for the Tacubaya Railroad in 1897 was the smallest ever built by Baldwin for commercial use.



In the late 1890s, many British builders were recovering from an engineers' strike over working hours, leaving backlogs of orders yet to be fulfilled. This prompted British railways that were in immediate need for additional motive power to turn to Baldwin and other US builders. Examples of engines built in response include three batches of 2-6-0 tender engines

for the Midland Railway, Great Central Railway, and Great Northern Railway, respectively, as well as the Lyn, a 2-4-2T (tank locomotive) for the 1 ft 11.5 in gauge Lynton and Barnstaple Railway in England in 1898. The Cape Government Railways of South



Africa also bought engines from Baldwin as a result of the strikes. Unfortunately, many of these engines were unpopular with the crews due to their designs being atypical, and many, including all of those built for the three standard gauge British railways and the Lynton and Barnstaple's Lyn, were scrapped when no longer needed. A replica of the latter locomotive has been constructed for the revived Lynton & Barnstaple Railway.

Also during the late 1890s, two 2-6-2T "Prairie" tank engines were built for the Victorian Railways (V.R.) who gave them an "NA" classification and road numbers of 1A and 2A. They were used as a trial on the new 2 ft 6 in narrow-gauge railways. Fifteen more NA class locomotives were built by the V.R., numbered 3A-17A. Unfortunately, only six have survived and both original Baldwin engines were among those scrapped.

To supply troops in France, 495 4-6-0PTs were built to the order of the British War Department in 1916/7. After the war surplus locomotives were sold, finding new uses in France, Britain, and India.

In Britain examples were used on the Ashover Light Railway, Glyn Valley Tramway, Snailbeach District Railways and the Welsh Highland Railway.

The Welsh Highland Railway in Wales bought No 590, in 1923. It was apparently unpopular with crews although photographs show that it was used regularly until the railway was closed. It was scrapped in 1941 when the derelict railway's assets were requisitioned for the war effort. Some of the surviving examples in India

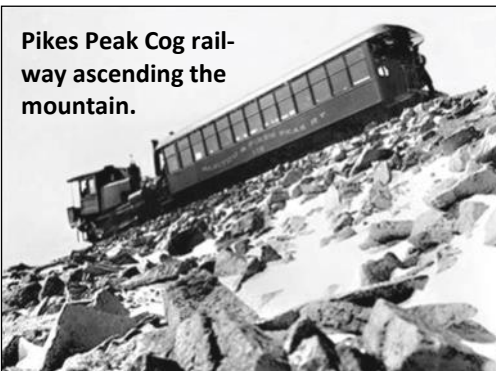
have since been imported to the UK, one of which by the Welsh Highland Railway Ltd. who has restored it to represent the scrapped 590. Other Baldwin 4-6-0PT's imported from India include one owned by the Leighton Buzzard Railway-based Greensand Railway Trust that has been restored to working order, as well as two acquired by the Statfold Barn Railway in March 2013.

**Statfold Barn Railway 4-6-0 trench locomotive.**



Baldwin also built six engines for the Manitou and Pike's Peak Railway, three of which were delivered in 1890, with the fourth being delivered in 1897. These engines featured steeply inclined boilers and used the Abt rack system to propel them up the average 16 percent grade. The last Baldwin engine was taken out of regular service in 1955. During the following years, the engines were used as back-up engines and for snow removal. Three of the engines are currently on static display around Colorado. No. 1 is located at the Colorado Railroad Museum in Golden, Colorado. The other two are on display located in Manitou Springs, Colorado: No. 2 near city hall and the other No. 5 at the Manitou and Pike's Peak Railway depot. The engine No. 4 is still in limited operation for photo opportunities and special events. Engines No. 3

**Pikes Peak Cog railway ascending the mountain.**



and No. 6 were scrapped and used for parts over the years.

Builder plate number 12288, a 36" 2-6-0 was built

**Argent Lumber #6 seen at Hardeeville, SC still sporting the SS&S lettering on its tender.**



by Baldwin in 1891 for the Surry Sussex & Southampton Railway in Virginia. The SS&S installed Southern valve gear, a graceful outside drive gear. The 6 was eventually sold to the Argent Lumber Company in South Carolina. In 1960, the 6 was purchased by southeastern Iowa's Midwest Central Railroad. It was the first locomotive to operate on a regular basis at the MCRR and was their main engine until 1971 when it was taken out of service for a major overhaul.

The Walt Disney World Railroad (WDWRR), which runs around the Magic Kingdom in Florida, has four operational Baldwin locomotives: a 1916 Class 8-C 4-4-0 No. 4 (The *Roy O. Disney*), twin locomotives Nos. 1 and 3, both 1925 Class 10-D 4-6-0

**UdeY loco bought by Disney for use in park.**



designs (The *Walter E. Disney* and the *Roger E. Broggie*, respectively) and a 1928 Class 8-D 2-6-0 No. 2 (The *Lilly Belle*). They all originally worked on the Ferrocarriles Unidos de Yucatán (UdeY), a 3 ft (914 mm) railroad that operated in the state of Yucatán in Mexico. In the late 1960s, they were all purchased by Disney imagineers Roger E. Broggie and Earl Vilmer for \$8,000 each and restored to operating condition, while significantly altered from their original appearance to resemble steam locomotives from the 1880s. Three other operational Disney-owned Baldwin locomotives operate on the Disneyland Railroad, where they run

around Disneyland Park in California alongside two additional locomotives built by WED Enterprises.

Baldwin also built many boilers and stationary steam engines for heating and powering buildings and industry.

### Street Railways & Tramway Steam Motors

As well as railway locomotives, Baldwin built street tramway steam motors in large numbers for operators in the United States and worldwide. There were three



**Steam Tram Motor No. 1A, built in 1879.**

basic models, with 9-inch, 11-inch and 13-inch motors, the sizes being determined by the cylinder size rather than the boiler capacity. These were largely superseded by electric tramcars, but some were built and operated well into the 20th century for systems that were never electrified. There were well over 100 built for the New South Wales Government Tramways in Sydney Australia from 1879 to 1910. Mostly 11" and 0-4-0 in configuration.

Two operational NSWGT surviving steam motors: Baldwin 11676 of 1891 NSWGT No. 103 Valley Heights Locomotive Depot Heritage Museum, New



**Takapuna Tramways and Ferry Company train.**

South Wales, Australia. Baldwin 11665 of 1891 NSWGT No. 100 Museum of Transport and Technology, Auckland, NZ. No.100 was latterly used in Wanganui, New Zealand 1910–1950.

Other Baldwin steam motor operators included: The Takapuna Tramways and Ferry Company, Auckland, New Zealand 1910–1927. Route was from Bayswater to Milford via Takapuna and Lake Pupuke. No surviving locomotives.

### Electric Locomotives

From the early years of the 20th century Baldwin had a relationship with the Westinghouse Electric Company to build electric locomotives for the American market. The electric locomotive was increasingly popular; electrification was expensive, but for high traffic levels or mountainous terrain it could pay for itself, and in addition some cities like New York, were banning the steam locomotive because of its pollution and the propensity for accidents in smoke-choked terminals. Baldwin built or subcontracted out the bodywork and running gear, and Westinghouse built the electrical gear. Baldwin built the famed EP-1 (1906), EF-1 (1912) and EP-2 (1923) box cab electric locomotives for the New York, New Haven and Hartford



**35 Baldwin/Westinghouse EP-1 locomotives were supplied from 1905 to 1907.**

Railroad. Baldwin also delivered the EP-3 box cab electric locomotives to the Milwaukee Road for use on their line between Harlowton, Montana, and Avery, Idaho.

Baldwin built several electric locomotive types for the Pennsylvania Railroad as well including the P5A, R1 and the famed GG1. Baldwin built the first GG1 prototype electric locomotive for use on the Pennsylvania Railroad's electrified line, which was

**Continued on Page 7 - Baldwin**

completed in 1935 between New York and Washington, D.C.

### Steam Turbine Locomotives

In the waning years of steam Baldwin also undertook several attempts at alternative technologies to diesel power. In 1944 Baldwin outshopped an S2 class 6-8-6 steam turbine locomotive for the Pennsylvania Railroad.

Between 1947 and 1948 Baldwin built three coal-fired steam turbine-electric locomotives of a unique design, for passenger service on the Chesapeake and Ohio Railway (C&O), who numbered them 500 to 502 and classified them M-1. The 6,000 horsepower units, which were equipped with Westinghouse electrical systems and had a 2-C1+2-C1-B wheel arrangement, were 106 feet long, making them the longest locomotives ever built for passenger service. The cab was mounted in the center, with a coal bunker ahead of it and a backwards-mounted boiler behind it, the tender only carrying water. These locomotives were intended for a route from Washington, D.C., to Cincinnati, but could never travel the whole route without some sort of fail-



Built by the Baldwin for the Chesapeake and Ohio Railway in 1947–1948 for service on the *Chessie* streamliner.

ure. Coal dust and water frequently got into the traction motors. These problems could have been fixed given time, but it was obvious that these locomotives would always be expensive to maintain, and all three were scrapped in 1950.

In May 1954 Baldwin built a 4,500 horsepower steam turbine-electric locomotive for freight service on the Norfolk and Western Railway (N&W), nicknamed the "Jawn Henry" after the legend of John Henry, a steel-driver on a track crew who famously raced against a steam drill and won, only to die immediately afterwards. The unit was similar in appearance to the

C&O turbines but very different mechanically; it had a C+C-C+C wheel arrangement, and an improved water tube boiler which was fitted with automatic controls. Unfortunately, the boiler controls were sometimes problematic, and, as with the C&O turbines, coal dust and water got into the motors. "Jawn Henry" was retired from the N&W roster on January 4, 1958.

### Diesel Electric Locomotives



The DR-4-4-15s' whose 2-D+D-2 wheel arrangement earned the model the nickname "Centipede."

Though fairly successful in the marketplace, Baldwin diesels did not do so well as others. Thanks to their robust Westinghouse electrical gear, they were excellent haulers, but the diesel prime movers were less reliable than comparable EMD and Alco products. The company remained fond of steam power and was slow to make the jump to building reliable diesel road locomotives. By the late 1940s, Baldwin's main diesel competitors – Alco, EMD and Fairbanks-Morse – had each set-



The Baldwin DR-4-4-15, was built to the specifications of the Pennsylvania Railroad designer R. Lowey.

tled on four or five standard locomotive models, which were suitable for assembly-line construction. Baldwin, meanwhile, was the sole manufacturer to continue the steam-era practice of offering bespoke locomotive de-

signs at the request of individual railroads. This resulted in a large number of diesel models, most of which had a small number of units (aside from switchers, only a few models had more than 50 examples). This put Baldwin at a competitive disadvantage since it was unable to benefit from economies of scale, consistent quality control, or the evolution of each model, which its competitors enjoyed. Even the construction could vary between units of the same model, especially if they were not built in sequence. The last Baldwin-Lima-Hamilton diesels were delivered in 1956.

was equipped for passenger train heating with a steam generator that utilized the waste exhaust heat of the right hand turbine, and was geared for 100 miles per hour. While it was demonstrated successfully in both freight and passenger service on the PRR, MKT, and CNW, no production orders followed, and it was scrapped in 1953.

**Baldwin-Westinghouse #4000, an experimental 4000hp gas turbine electric locomotive. Built in 1950.**



**Gas Turbine Electric Locomotives**

In April 1950, Baldwin-Westinghouse completed an experimental 4,000 hp gas turbine locomotive, numbered 4000, known as the "Blue Goose", with a B-B-B-B wheel arrangement. The locomotive used two 2,000 hp turbine engines fueled by Bunker C fuel oil,



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