Friendship; he was then agent at Stony Brook Glen and Arkport. In 1892, he became secretary to Supt. Blair at Angelica, and then station agent. He temporarily tried his hand in groceries, in 1896, but returned to the now Shawmut line as agent at Angelica, in 1901. In 1906, he was appointed Superintendent of Telegraphs and Signals, and, in 1924, Real Estate and Claim Agent. At the moment of writing (1950) he is still active in politics, and in disposal of the real estate of the defunct Shawmut line.

At this point it will be very informative to look over the 1893 report of the state inspector for the Railroad Commissioners of New York (Vol. 1, pp. 263-6). It should be noted that this board reported the Lackawanna & Pittsburgh to be in excellent condition in 1883, then in a very poor state in 1890 under the Lackawanna & Southwestern; now there is some improvement.

The State Inspection Report on the C. N. Y. & W., for 1893, discloses, among other items, that fences along the right of way are fairly well maintained. The track is generally good, except that ballast is needed. The line is of 56-lb. steel rail. There are a number of decayed ties, and warning signs are in bad condition. "There has been great improvement since September, 1890, at which time the present company began operating. The road was greatly run down. Much work is needed yet to place it in fair condition."

Stub switches are still in use, and much ditching is needed. The bridges are generally in bad state of repair, and it is noted that the "Howe truss bridge over the N. Y. L. E. & W. (at Swain's) has become too old for absolute safety." Water barrels, for fire protection, are all empty on all trestles. Trains move across Stony Brook viaduct at 4 miles per hour or less. This structure is 240 feet high and about 750 feet long.

"Care should be taken to keep drinking water on hand (in depots) and agents should have badge of office and wear it."

On the narrow gauge division, Bolivar to Olean, 22 miles, the track is laid with 30- and 35-lb. rail, "much worn and kinky." The road is reported as being kept up temporarily, as it is planned to change it to standard gauge, next year. Ties are bad and ballast is lacking, and "adjustment of track is very poor."

"There are two wooden trusses near Olean that have been shored up recently and are barely safe now."

"The motive power is light, being 20 and 28 tons."

Stations are reported as needing paint and repairs, and the road seems to be enjoying good business.

Progress in rehabilitating the C. N. Y. & W. is reported by the *Allegany County Republican*. Dec. 16, 1892: There is much activity on the main line, 5,000 ties having been placed, 25,000 bought, trestles repaired, and four new locomotives purchased. Dec. 23, 1892: "The trains will be started about the first of January. "Chief Engineer, A. G. McComb has established his headquarters in the railroad office here, formerly occupied by Hammond.

"The four new Brooks locomotives bought were on this Thursday taken into the D. L. & W. shops at Buffalo to be painted and lettered. Huge amounts of old paper of all the predecessor roads were carried out and burned" (an act greatly regretted by your historian).

The C. N. Y. & W. was opened on March 20, 1893, after two and a half years of practical suspension. Nothing ran on the narrow gauge, which was to be widened in the spring (not done until nearly a decade later!) There were three round trips daily between Hornellsville and Wayland, two between Hornellsville and Nunda Jct. (over the R. N. Y. & P. from Swains) and one between Hornellsville and Angelica.

Apr. 7, 1893: "The engineers have finished a preliminary survey of the proposed standard gauge line south from Angelica to Olean. . . . the large trestle below Joncy will be utilized and the standard gauge roadbed beyond to a point on the Bellamy farm. From there to Belfast the former line will remain abandoned—the rails be taken up and the bridge across the river to be taken down.

"From the said point the line will be practically new to West Notch; crossing the river above Transit, and so on, south to Friendship and beyond. At West Notch the line will be changed to the easterly side and thence down to Richburg on a grade of 75 ft. to the mile instead of 134 as at present. This is very important, as the old line here was not practicable for standard gauge traffic . . . the old narrow gauge rails are to be ripped up and the new line built. . . . "

From the available evidence it must be concluded that the new management fully intended to rehabilitate the entire line, a task that was energetically started, but was prevented from doing so by the financial crisis that plagued the country in 1893. This idea finds support in an editorial appearing in the August 11th issue, excerpts from which follow. "A few weeks ago we made an announcement of extension of the road at that time planned—but which had soon thereafter to be abandoned for the year at least, because of the dangerous and calamitous financial storm which so suddenly broke upon the country; immediately stopping all new enterprises of large investment and stopping myriad wheels of industry—a financial storm, be it hoped, of not long duration.

"Meanwhile, however, under the prudent management of Mr. M. S. Blair—in whose personal care the enterprise has been since it was wrenched from the wrecking hands of George D. Chapman, of unsavory memory—the road has been placed in as good condition possible, with limited means.

"That part of the road which runs into Angelica . . . was saved . . . by the personal efforts of Mr. Frank S. Smith. And his only motive has been, to secure a railway service to this old home town of his youth . . . From the beginning, thousands of dollars have been paid by certain of the citizens of this town for their railroad. . . . " ($200,000 in fact).

October 13, 1893: Mr. W. F. Bronson, of Painted Post, contracted with Vice President Frank S. Smith to take up and ship the rails and other iron of our narrow gauge from Angelica to Bolivar . . . the work began here this morning . . . From Friendship south a locomotive can be used to advantage retreating on the line. It will take about three week to clear up from here to Belvidere.

"Mr. Bronson has done considerable work of this kind, including the taking up of the Rushford road (T. V. & C.) So goodbye to our narrow gauge—without tears: as a standard gauge line will surely be built south in the coming spring."

Dec. 8, 1893: "The work of ripping up the C. N. Y. & W. narrow gauge between Nile and Bolivar is finished. The nine miles of old iron is piled up in the Bolivar yards awaiting shipping directions. . . The entire line from Bolivar to Angelica was lumped off to W. H. Bronson, of Painted Post, for $18,000 . . . "

In the first annual report of the new road, dated June 20, 1893, after one year of operation, these items of interest may be noted. There were 99.03 miles of total track, 28.24 of which were so poor it wasn't operated. Lorenz split switches were used on the standard gauge portion, but stub switches still served on the 3-ft. section. Locomotives totaled 11, distributed as follows: 6-drivered—1 narrow, 2 std. gauge; 4-drivered—1 narrow and 7 std. gauge. There were two passenger trains each way daily. They carried 32,944 passengers, all local, and moved 40,242 tons of freight. The passenger mileage was 34,015 and freight, 22,749. As might be anticipated this ratio was unfavorable, and the year ended with a deficit of $2,541.76.

The following year $87,608.47 was spent in repairs. There was again a deficit, making the total $10,633.39. Francis R. Pemberton was now the treasurer.

The contemporary paper recorded interesting developments. June 8, 1894: "Track-master William Seager is now at work with 20 men, tearing up the standard gauge link between Angelica and Belfast, and the bridge across the Genesee near Belfast is also to be taken down. This work will be finished in a couple of weeks.

"This means of course that this branch line is abandoned forever. It has never been of any financial profit to our road, and it was long ago decided to take up the rails and abandon the link.

"A part of the rails are to be used in extending the Hornell link down Main Street.

"The recent flood washed out about a mile of the narrow gauge near Olean. Enough of these standard gauge rails are to be taken there to relay that mile with them and they are to be laid on full-length standard gauge ties . . . so that the road can easily widen out from narrow to standard gauge."

July 20, 1894: "For six weeks or so there has been a fine passenger coach run via the D. L. & W. and the Hornell stub of our road, between Hornellsville and New York City."

Owing to the financial panic, money was not forthcoming, and it is not unexpected to find a very poor report by the inspectors in 1895.

The inspector's report on the C. N. Y. & W. for 1895 is quite long and unusually detailed. It notes "considerable improvement since the last inspection, but many items still remain in the same neglected state."

Also, "unless this company makes its structures and tracks safe before the coming Spring, your inspector would recommend that it not be operated until such time as will insure its safe operation."

Inspection of the track showed it to be poorly maintained, having many rotten ties, angle bars were not spiked and track bolts were loose. The whole report indicates a dilapidated and neglected condition of almost every feature. The serious condition of Stony Brook viaduct is again called to attention of the Commission. "The Howe through truss bridge over the Erie Railroad . . . is positively unsafe and trains should not be allowed upon it." This appears to be the general state existing on most bridges and trestles.

The narrow gauge division receives the same discouraging report, with the suggestion "that this road be closed until new rail, sufficient ties, ballast, and safe structures are forthcoming."

"Immediately upon the receipt of the above report by the Board, the company was notified forthwith to place the road in safe condition, in default of which, proceedings would be taken to compel suspension of operations."

President Byrne's letter in reply is made part of the Commission's records. In this he "accepts" the report, but claims that immediate correction of the conditions is impossible.

"A second inspection was then proposed by the Board, to be made by Inspector Baxter, an engineer to be selected by the company, and by Charles F. Stowell, a recognized authority upon railroad track and bridge construction; the company to make such necessary repairs as might be agreed upon by the three engineers, to place the road in safe condition for operation during the winter, otherwise operations to be suspended. This proposition was accepted by the company and the inspection was begun on October 9th and completed October 11th."

As a result another comprehensive report of conditions and recommendations was made and, upon its being submitted to the company, was acknowledged by its President, who replied in part "We expect to overhaul the line as soon as the season opens in the Spring."

Apparently the previous (1895) report had some effect, because much improvement is noted in the 1897 inspection. The horseshoe trestle at Swain's was a third filled in (but the filling was not completed until 1902) and some smaller ones were all filled (see picture of No. 49).

The inspector's report for 1897 is quite as detailed and lengthy as that of 1895, and many improvements are noted therein; and it is evident that serious conditions noted in the 1895 report have been corrected, and recommendations made by the inspector have been acted upon by the company. There are, however, many faults found with the road's condition, and further suggestions are made for the improvement and safety of the property.

The final inspection, of 1899, reveals some progress, and reports conditions of tracks, bridges and buildings as being much improved over those of earlier reports. The points stressed are the need of new ties and the necessary replacement of the worn and bent rails in the main

track, as well as the inadequate forces of men for proper maintenance of the company's properties.

A copy of this report was sent to the company, with a letter making the recommendations of the inspectors the recommendations of this Board. The company informed the Board that the entire line of railroad was to be rebuilt. (Undoubtedly this referred to the coming consolidation that terminated in the formation of the Pittsburg, Shawmut and Northern R. R. Co. on Aug. 2nd.)

It was reported in the *Railroad Gazette* for May 12, 1899, that the stockholders had voted to increase the capital stock from $1,000,000 to $2,000,000, to provide for widening the narrow gauge division, filling trestles, relaying track with heavier rails, and buying additional equipment. It was also stated that several short lines had been purchased recently, to be consolidated with the permission of the State Railroad Commission. In the July 2nd issue it was stated that C. N. Y. & W. had applied to this commission for permission to extend its road 60 miles north to Macedon, to a connection with the New York Central and Hudson River. In so doing it would have to cross the Erie, L. V., D. L. & W., and the Northern Central (now P. R. R.). This proposed extension was to be realized by a consolidation with The Central New York & Northern, which was incorporated for this purpose on April 20, 1899 by Henry V. Pratt (see following section). Permission to consolidate was granted, the necessary certificates being filed on Aug. 1, 1899; the new company was to have a capitalization of $3,500,000. Permission to widen the narrow gauge portions was granted the P. S. & N. on Aug. 15th.

The last officers were as follows: Pres., John Byrne; vice-president and general counsel, Frank Sullivan Smith; Sec., Lewis F. Wilson; Treas., Francis R. Pemberton; Aud., Henry S. Hastings; Chief Engineer, William Barclay Parsons; General Supt., M. S. Blair; General Frt. & Pass. Agt., Chas. H. Hammond.

During the last complete year, the C. N. Y. & W. employed 107 persons, including the officials, paying them $53,886.61. Passenger trains carried 106,991 people and ran 67,458 miles, earning $29,003; 74,278 tons of freight were carried. The total earnings were $42,636, with other income of $2,295. The deficit for the year was $6,071, which made the total deficit $34,054. There were still listed 11 locomotives, 9 of which were leased, and 102 cars (10 passenger; 3 baggage, mail, express; 22 box; 42 flat; 21 coal; 3 stock; 1 caboose).

The accompanying Employees' Timetable for 1899 covers only the standard gauge portion of the road. It shows a reasonably frequent passenger train service. It includes the Swain's branch to Nunda Jct. (connection to Rochester) and serves to locate the elusive Ross Corners which figures prominently in the construction of the Rochester, New York and Pennsylvania and predecessor railroads (see Bull. No. 64, pp. 32-34).

Locomotives of the Central New York and Western

Since no records of C. N. Y. & W. locomotives have been found, a roster must be a matter of inference from the isolated facts available. A judicious consideration of them has made it possible to draw very plausible conclusions, and draw up a roster.

It is known from the Shawmut roster (Bull. No. 61) that certain old engines were renumbered, into the P. S. & N. series. The eight of standard gauge, inherited from the C. N. Y. & W., were renumbered 8, 9, 10, 11, 12, 13, 14, and 15. From the various reports of the state commissioners and *Poor's Manuals,* it is evident that the C. N. Y. & W. had eleven locomotives, of which two were narrow gauge. From the sales records of the American Locomotive Co. four new engines were sold to the C. N. Y. & W.; these are accounted for by Nos. 1, 2, 3, and 6, as revealed in the Shawmut roster. From the latter it is also noted that P. S. & N. No. 8 was No. 32 of the Lackawanna and Pittsburgh; No. 9 was No. 34 of the Rochester, Hornellsville and Lackawanna; No. 14 was No. 23 of the latter, while No. 15 was No. 21 of the L. & P. These four, plus the four new ones, plus No. 43, make the total of nine standard gauge engines, as stated in the records. They were leased, not owned.

When the Lackawanna and Southwestern was sold, the part formerly Lackawanna and Pittsburgh went to John Byrne, while Frank Sullivan Smith got possession of the Rochester, Hornellsville and Lackawanna. Presumably, any engines on hand went with the respective roads; thus, the four narrow gauge engines (4, 5, 6, 7) and standard gauge Nos. 21 and 32 of the L. & P. would be found with Byrne, while Smith would have Nos. 23, 34, and 43 (all standard). Probably the engines except No. 43 were owned jointly, and leased by their owners. In the 1893 inspection report it was noted that there were but two 3-ft. engines, one having four, and one having six drivers, and that the C. N. Y. & W. owned only two engines. It seems most likely that these two would be the ones owned, since they were the oldest. They were undoubtedly Nos. 4 and 5, both of which appeared on the succeeding Shawmut.

According to the Brooks records, Nos. 1, 2, 5, and 6 (Construction Nos. 1563, 1564, 1655, 1656; order B-344) were built for the Montgomery, Tuscaloosa and Memphis, as Nos. 25-28, but not delivered, being changed to Central New York and Western on January 14, 1893.

It was stated (Bull. No. 62, p. 83) at one time that there were four more engines on the Lackawanna and Pittsburgh, and on the Rochester, Hornellsville and Lackawanna, Nos. 8-11 and 12-15 respectively. This has proved to be incorrect. Mr. Best was, fortunately, able to inspect the original ledger of the Cooke Works; the information originally supplied to our society had been copied from a transcription and had ditto marks, which led to the confusion. The Oregon Pacific R. R. had ordered 11 locomotives from Cooke, which had shop numbers 1718-1720, 1722-1725, and 1728-1731 inclusive. Their road numbers were 5-15 inclusive. All were delivered to that road and none of them ever operated on any other road previous to Oregon delivery. In between the series the Lackawanna and Pittsburgh ordered one engine, No. 32, constr. No. 1721,

and the Rochester, Hornellsville, and Lackawanna ordered two, Nos. 21 and 34, constr. Nos. 1727 and 1726.

I have been unable to clear up the puzzling fact that the C. N. Y. & W. assigned the numbers 1, 2, 5, and 6 to their engines, omitting 3 and 4. There is no evidence that any of the old engines were renumbered, as can be seen from the photograph of C. N. Y. & W. No. 32. Thus, there would be two engines numbered 5, one standard and one narrow gauge, and no number 3. In fact, the only No. 3 of the entire series of predecessor roads was the 3-footer of the Allegany Central about which nothing is known for certainty except that it was old even then.

Locomotives of the C. N. Y. & W.

CNY&W No.	Formerly	PS&N No.	Builder	C/N	Date	Type	Cyls.	DD	Scrapped
1	MT&M 25	13	Brooks	1563	9-1889	4-4-0	17x24	62	12-31-[illegible]
2	MT&M 26	10	Brooks	1564	9-1889	4-4-0	17x24	62	12-31-[illegible]
4	L&SW 4*	4	Brooks		?	4-4-0			
5	MT&M 27	11	Brooks	1655	4-1890	4-4-0	17x24	62	11-25-[illegible]
5	L&SW 5*	5	Baldwin	5975	12-1881	2-6-0	14x20	45	See AC [illegible]
6	MT&M 28	12	Brooks	1656	4-1890	4-4-0	17x24	62	12-31-[illegible]
21	L&P 21	15	Cooke	1715	1886	4-6-0	18x24	52½	5-27-[illegible]
23	RH&L 23	14	Cooke	1727	1886	4-6-0	18x24	55½	5-1-[illegible]
32	L&P 32	8	Cooke	1721	1886	4-4-0	16x24	63	12-31-[illegible]
34	RH&L 34	9	Cooke	1726	1886	4-4-0	16x24	63	12-31-[illegible]
43	See L&P roster notes					4-4-0			1899?

*3 ft. gauge.

It should be noted that M.T. & M. No. 26 became C.N.Y. & W. No. 2, not No. 1, as has been sometimes stated. The domes were alike on Nos. 21 and 32 and on Nos. 23 and 34, being rounded on the latter.

The Strong Locomotives

By Paul T. Warner

This article is based chiefly on information presented in the magazine *Railroad Gazette* (now *Railway Age*) during the years 1885-1900; the 1886 edition of *Recent Locomotives,* published by *Railroad Gazette;* and a series of articles on the Strong locomotives by F. W. Brewer, which appeared in the magazine *The Locomotive* (London) in 1921. The author is also indebted to W. A. Lucas, C. T. Andrews, S. R. Wood, F. S. Graham, and the late C. B. Chaney, for information and photographs.

The period 1880-1900 marked some unusually interesting steps in the development of the steam locomotive. Among these were the introduction of several new wheel arrangements, some of them embodying the use of trailing wheels to meet the boiler requirements; the extensive use of compound locomotives having various cylinder arrangements; an increase in steam pressures, averaging 25 to 30 per cent from the beginning to the end of the period; the general abandonment of elaborate brass trimmings and decorative paint work, together with moulded designs of sandboxes and dome casings; and the appearance of various "freak" locomotives, such as the Raub, Fontaine, Holman and others. Practically all of these were shortlived and exerted no influence on future locomotive designs.

Among the "freaks," in the estimation of many persons, were the "Strong" locomotives, designed by George S. Strong, a Mechanical Engineer of Philadelphia, Pa., who had various original and rather radical ideas regarding locomotive construction. While only a few of these locomotives were built, and they had comparatively short lives, they showed the result of prolonged and careful study in an effort to increase locomotive efficiency, and capacity per pound of weight. But it was the old story of producing engines which were more difficult and expensive to maintain than standard types; which were strange to the men who had to run them, and which, probably, did not receive the attention and consideration that a new design should receive if its best features are to be demonstrated.

Strong was an ingenious designer and a prolific inventor, as is proved by the fact that about 60 patents were granted him during the years 1880-1898 inclusive, the majority of them applicable to steam locomotives. His patents applied chiefly to the means for producing steam (the boiler) and the means for distributing it in the cylinders (the valves and valve gear). In actual practice the second was apparently tried first, as the Strong cylinders, valves and valve gear were applied to Lehigh Valley locomotive number 383, before the first Strong boiler was built. The 383 was of the 4-4-0 type, built at the Wilkes-Barre shops of the Railroad Company in 1884. She had 19x24-inch cylinders and drivers 66 inches in diameter, and weighed 99,520 pounds with 74,640 pounds on drivers. Built before names were finally abandoned on the Lehigh Valley, the 383 was named "Elisha Hancock." She was a hard-coal burner, and had a long firebox placed above the frames, with a grate area of 37 square feet. Apparently the locomotive was

originally built with Strong's cylinders and valve gear, although the writer is not absolutely certain on that point. Apart from the cylinders and valve gear, the 383 was very typical of the heavy 4-4-0's used on the road at that time.

In designing his cylinders and valve gear, Strong's objective was to obtain maximum port openings at all points of cut-off, and to provide the freest possible exhaust and so reduce back pressure. He used valves of the so-called "grid-iron" type, which worked over a multiplicity of port openings, providing a maximum port area, at each end of a 19-inch cylinder, of 50 square inches, or at least twice that provided in a slide valve cylinder of the same dimensions. At each end of the cylinder were an admission valve and an exhaust valve, placed side by side in a vertical position, between the cylinder barrel and the engine frame. The valves worked in seats of circular form, which were placed vertically and were fitted into holes bored in the passages leading from the saddle to the cylinder. The valves were operated by overhead rockers, and worked in grooves which were formed in the seats. Each valve moved over ten ports, which were fully opened with a valve movement of only 1-1/16 inches. The movement of the steam valve was of course varied to suit the cut-off desired, but the exhaust valve had a constant movement for all points of cut-off, so that full exhaust port openings were always available and the choking of the exhaust passages at short cut-offs—a necessary evil with the usual slide valve and link motion—was eliminated. By using separate steam and exhaust valves, and a suitably designed valve motion, the cut-off could be varied between the limits of 4 and 20 inches, with a piston stroke of 24 inches. The steam passages were short, and the clearance was smaller than in a cylinder of the conventional type.

Engine 383 was fitted with a valve gear of the radial type, driven off the connecting rod, which has been described as a modified form of Hackworth gear, formerly extensively used in marine service. The direction of movement of the locomotive, and the point of cut-off, were determined by the position of quadrant blocks sliding on curved guides or sectors. There were separate quadrant blocks for the steam and exhaust valves. In operation, the exhaust quadrant blocks were moved only when it was necessary to reverse the locomotive, and the maximum exhaust port opening was provided at all times. The result was a reduction in back pressure, and the possibility of using shorter cut-offs than were practicable with the slide valve and link motion. According to tests carried out on the Lehigh Valley Railroad, engine 383 showed a saving of 15 per cent in water per horsepower-hour as compared to standard locomotives of generally similar design.

Due to the encouraging results achieved with engine 383, the Lehigh Valley decided to go one step further, and build an engine in accordance with Strong's designs throughout. The locomotive so constructed was the "Duplex," road number 444, which was built at the Wilkes-Barre Shops in 1885-1886. We quote as follows from a description of this locomotive, which was published in the 1886 edition of *Recent Locomotives:*—

> "The engine is specially designed with a view to exert at high speed a tractive power exceeding that of any existing engine. It is also the intention of the designer that the engine shall emit no sparks or smoke, and that the combustion shall be so perfect that the maximum possible duty shall be developed from each pound of coal burnt. Economy is to be further promoted by the special form of valve gear adopted, which is calculated to give a very high average pressure in the cylinders with an early cut-off. An engine with similar valve gear commenced running on the Lehigh Valley in 1885, and has given very encouraging results in this direction." (This was a reference to engine 383).

The drawings published in the *Railroad Gazette* show a locomotive with a valve gear similar to that used on the 383, and which has been briefly described. At the last moment, however, Strong redesigned the motion for engine 444, and operated the gear for each cylinder from a single eccentric placed on the main driving axle. The eccentric had a single strap with two blades, one of which operated the admission valves and the other the exhaust valves. The curved guides for the quadrant blocks were placed horizontally instead of vertically, as in the previous arrangement, and the direction in which the locomotive ran, as well as the point of cut-off, was determined by the position of the quadrant blocks on the guides. In its essential features, this type of motion reappeared nearly 30 years later in the so-called "Southern" gear, which was patented and applied to a large number of locomotives built during the period of World War I. One of the claims made for the Southern gear was that the "links" (referring to the guides for the quadrant blocks) were stationary. This was of course misleading, as the Southern gear used no "links" in the usually-accepted sense of the word. It should also be noted that the Southern gear was driven from a return crank on the main pin, instead of from an eccentric as employed by Strong. This, however, in no way changed the operating principle of the device.

A most notable feature of engine 444 was the boiler, which represented Strong's improvements over the conventional type of locomotive boiler, with its stay-bolted firebox and other objectionable features. The Strong boiler was fitted with two of Fox's cylindrical corrugated furnaces, which were similar to those used in marine boilers of the "Scotch" type. These furnaces were placed side by side, and were 9 feet 3 inches long, with a minimum internal diameter of 38¼ inches and a maximum internal diameter of 42 inches. The thickness of the material was ⅜-inch.* At their forward ends the furnaces discharged into a combustion chamber, consisting of a section of corrugated flue which was united to the furnaces by a junction piece. This piece was formed of three plates which were shaped in a hydraulic press and then welded together. From the firedoors to the back tube sheet, at the

* In 1886, there were over 10,000 such furnaces in use, carrying pressures up to 180 pounds; a total of 1656 having been ordered in 1885, for steamers with triple and quadruple expansion engines.

forward end of the combustion chamber, the distance was about 17½ feet, and the total length of the boiler, including the smokebox, was approximately 33 feet. The combustion chamber and the smokebox were connected in the conventional manner, by 306 tubes, each 1¾″ diameter and 11′-5″ long.

This was a rather difficult boiler to build, especially because of the peculiar shape and construction of the junction piece which formed part of the combustion chamber; and instead of building it at the Wilkes-Barre Shops, it was constructed by the Edge Moor Iron Company at Edge Moor, Delaware, near Wilmington. Ample firebox volume, so essential in boilers forced like those of locomotives, was in the case of the Strong boiler, provided by the combustion chamber. Apparently the boiler steamed freely, and by firing the two furnaces alternately, and always having a bright fire in one of them, bituminous coal could be burned with very little smoke. Due to the corrugations, the furnaces could easily expand and contract; and it was claimed that any scale that might have formed on them, would crack and fall off in the process. Strong claimed that in the event of the water getting low, the top of a corrugated cylindrical furnace might sag, but it would not rupture and tear, as would the crown sheet of a conventional firebox.

The boiler of engine 444 was of such length that it could not be carried on a 4-6-0 wheel arrangement, and hence a rear truck was added and the result was undoubtedly the first true Pacific type locomotive. The rear truck was fitted with a radius bar, and was equalized with the drivers. It is rather difficult to trace out all the details of the spring rigging from the drawing published in the *Railroad Gazette*, but apparently the locomotive was cross-equalized in front by a transverse spring placed ahead of the first driving axle. The longitudinal driving springs were placed between the axles, and were connected by means of "dolphin beams" resting on the tops of the driving boxes.

The locomotive was distinctive in appearance, as the cab was placed forward of the firebox; so that it belonged to that large group of locomotives known on the anthracite roads as "camel-backs" or "Mother Hubbards." The principal dimensions were as follows:—

Cylinders		20″x24″
Drivers, diam.		62″
Boiler, diam.		58″
Steam pressure		160 lbs.
Tubes, number		306
Tubes, diam.		1-¾″
Tubes, length		11′-5″
Grate area	62 sq. ft.	
Heating surface—		
Tubes	1600 sq. ft.	
Fireboxes	155 sq. ft.	
Comb. Chamber	93 sq. ft.	
Total	1848 sq. ft.	
Weight on drivers		90,000 lbs.
Weight total engine		138,000 lbs.
Tractive force		21,100 lbs.
Tank Capacity		3000 gals.

As shown by the drawings published in *Recent Locomotives,* the rear drivers of engine 444 had plain tires without flanges. On a total wheel base of 30′ 2″, the rigid driving wheel base was only 5′ 7″.* This arrangement was doubtless used to enable the locomotive to easily traverse the many sharp curves on the Lehigh Valley's main line. Alexander Mitchell, Master Mechanic at Wilkes-Barre, had made a special study of the use of flanged and plain tires on large locomotives, and had rebuilt the old Norris Decapod (the "Bee," No. 82), as a 2-8-2, with plain tires on the rear drivers. He was granted a patent covering such an arrangement.

Engine 444 was tested, not only on the Lehigh Valley, but on several other roads, and an examination of the files of the *Railroad Gazette* reveals various references to such tests. On May 20, 1887, hauling an east-bound Lehigh Valley train, the engine left Wilkes-Barre with eight cars, including the Pennsylvania Railroad's dynamometer car, and ran the 12 miles from Sugar Notch to Fairview, on an ascending grade of 96 feet to the mile, in 24½ minutes, including one slow-down. Bituminous coal was used as fuel, and the combustion was almost smokeless. The pressure carried was 155 pounds. On another run in the opposite direction, the 10½ miles from White Haven to Glen Summit, where the ascending grade reaches 68 feet per mile, were made in 19½ minutes with nine cars.

In June, 1887, the locomotive ran from New York to Chicago over the Pennsylvania, and from there to St. Paul over the Milwaukee Road. It was then tested on the Northern Pacific, under the supervision of E. D. Leavitt, Jr. With a train of 12 cars weighing 370 tons, the engine ran 10.8 miles in 11 minutes, carrying a steam pressure of 160 pounds. Cards taken at 60 miles an hour showed from 1369 to 1810 indicated horsepower; an amount, according to the Leavitt report, "which has never been equaled, and perhaps it would be proper to say, approached by any other locomotive." This represented one horsepower for each 76 pounds of locomotive weight, and was—if the figures are correct—a truly remarkable performance for an engine using saturated steam at 160 pounds' pressure.

Apparently the 444 existed in her original condition until the later 1890's, when she was rebuilt at Wilkes-Barre as a 4-6-0 with a conventional boiler. On November 11, 1898, she was helping east-bound train No. 6 up Wilkes-Barre Mountain, when that train collided head-on with west-bound train No. 5, which had become uncontrollable on the downgrade. That marked the final finish of the 444.

In the meantime, another Strong locomotive had appeared and had been making history. This was the "A. G. Darwin," number 1, built by the Hinkley Locomotive Works of Boston, to the order of the Strong Locomotive Company. It carried the Hinkley construction number 1738. This engine was of the 4-4-2 type, and was really the first genuine "Atlantic" type, because, as in the case of Lehigh Valley engine 444, the rear truck was added on account of the length and weight of the boiler. The principal dimensions of the "Darwin" were as follows:—

* The wheel base of the front truck was 6′ 6″.

Cylinders	19″x24″
Drivers, diam.	68″
Steam pressure	175 lbs.
Grate area	50 sq. ft.
Total heating surface	1650 sq. ft.
Weight on drivers	72,000 lbs.
Weight on front truck	34,000 lbs.
Weight on back truck	30,000 lbs.
Weight total engine	136,000 lbs.
Tractive force	18,950 lbs.

As far as cylinders, valves, valve gear and boiler were concerned, the "Darwin" was closely similar to engine 444, with certain dimensions changed to suit a smaller locomotive. The main rods were connected to the first pair of drivers. At the time the engine was built, Strong made the following statement regarding the design of the running gear:—

> "This locomotive, as a type, differs somewhat from the ordinary practice as regards its running gear: and the arrangement, made necessary primarily by reason of the shape of the boiler, possesses advantages that are worthy of consideration, as it meets the much discussed problem of how to make a boiler large enough to do the work and still be able to carry it, and while doing this it meets two or three other very desirable requirements. It makes it possible to make a locomotive that, while large enough, is very easy on the track and bridges, and while easy on these it must necessarily be easy on itself and on the man who runs it. It is equalized from in front of the leading driver back to and across the trailing and pony truck, and back to the same point forward of the driver on the other side, so that when it strikes any unevenness in the track the shock must go through all these before it reaches the engine, and is lost, so that one does not feel any jar or jolt on the engine. The fulcrum on the lever that equalizes the trailing truck can be shifted to put any required weight on the drivers, while the surplus is carried on the truck, and such an amount is put on the drivers as the road and bridges will safely carry. As the trucks are both swing bolsters, the engine curves very nicely, passing a curve without any of that lurching of the front end so noticeable on ordinary locomotives, and as the wheels come almost directly under the centre of gravity, as well as almost midway between the front and back trucks, the engine is free from that rising or surging of the front end, so common in the American type of locomotive."

The total wheel base of the locomotive was 29 feet, and the driving (rigid) wheel base was 7 feet. The front truck also had a wheel base of 7 feet. Illustrations of the locomotive show the driving wheels as apparently having no counterbalance weights, and the statement has been made that the reciprocating and revolving weights were not balanced. This, of course, could not have been true; and it is safe to assume that the wheels had hollow rims—and probably spokes—which were filled with lead opposite the crank pins. The guides were of the Dean, or box type, with a wide shoe on top and inwardly-projecting lips under the crosshead to take the thrust when backing up.

According to the drawings of the boiler of Lehigh Valley engine 444, as published in the *Railroad Gazette*, the various sections of the firebox and combustion chamber were united by telescopic joints. In the case of the "Darwin," however, the connections between the two furnaces and the junction piece, and between the latter and the single flue of the combustion chamber, were made by flanging the plates outward and butting them together, using copper gaskets to insure tight joints. By this connection the rivet heads were on the water side, and the rivets were not exposed to the direct action of the fire. The corrugated furnaces were made at the Continental Iron Works, New York, and the boiler was built by the Logan Iron Works on Long Island.*

The tender of the "Darwin" was rather unusual, in that it had a four-wheel truck under the front end and a six-wheel truck at the rear. It was provided with a hood, which telescoped into a shield mounted on the rear end of the boiler, thus providing good protection for the fireman.

Closely following the "Darwin" was a similar locomotive, built by the Schenectady Locomotive Works for the Atchison, Topeka & Santa Fe Railway—road number 738 and builder's construction number 2405. It was completed in September, 1889. Apparently the cylinders of this locomotive were 18 inches in diameter, or one inch less than those of the "Darwin;" but a study of the photographs of both engines leads to the conclusion that in other respects they were practically duplicates. The Santa Fe locomotive did not last long in its original condition, for a note in the *Railroad Gazette* of February 5, 1892, states that it was being rebuilt in the Company's shops at Topeka as a standard 4-4-0 type.

The "Darwin" had a longer career, and for several years was used experimentally on a number of railroads. The late Charles B. Chaney once told the writer that his friend Martin Lee, a wellknown engineman on the Pennsylvania Railroad, had run the "Darwin" when it was in experimental service on that line; and there are records of a successful New York-to-Buffalo run on the Erie, when the locomotive reached a speed of 72 miles an hour, with a train weighing in excess of 200 tons, exclusive of engine and tender. The run was made on April 1, 1889, at an average speed, allowing for stops, of 39.5 miles an hour. It was necessary to take coal five times, and that resulted in considerable delay; but the time so lost was invariably made up. A light rain was falling and the rail was slippery. The return trip was made on the following day, with a somewhat heavier train which reached a maximum of 11 cars over part of the run.

In experimental service on the Cincinnati, Hamilton & Dayton Railway, early in 1890, the locomotive apparently was very successful, steaming freely and emitting a minimum amount of smoke and cinders. According to reports, a maximum speed of a mile in 40 seconds (90 miles an hour) was recorded, using a stop watch.

It was doubtless due to the apparent success of the "Darwin" that the Strong Locomotive and Manufacturing Company was incorporated in Ohio early in 1890. It was reported in the Cincinnati papers that

* Brewer in *The Locomotive.*

this concern had purchased 1350 acres of land for $357,000, and that shops would be erected for building all types of locomotives. Just how this venture ended the writer does not know, but it is quite possible that the financial crash of 1893 put it on the rocks. Apparently the shops were never built.

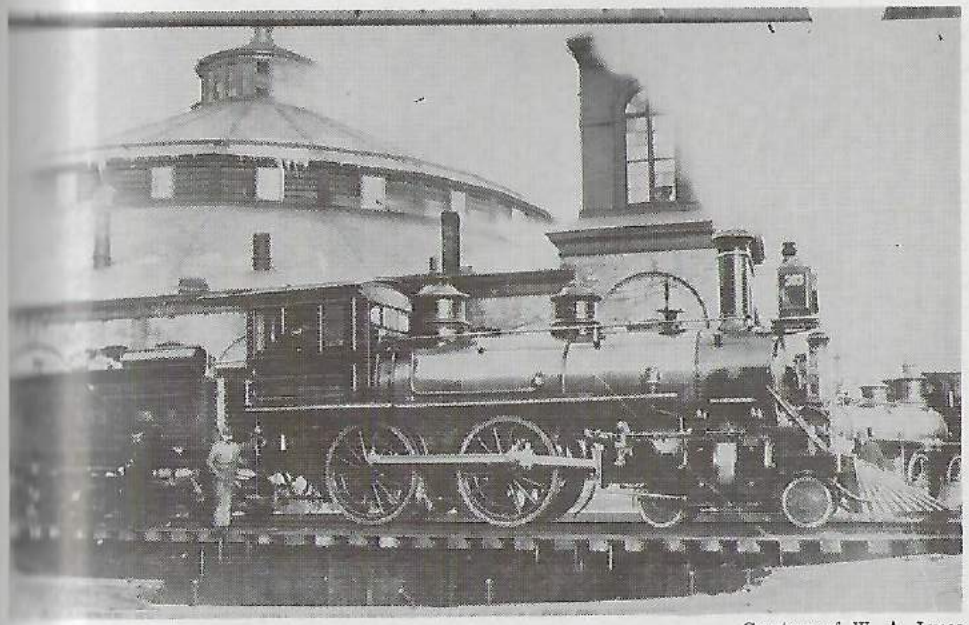
Strong next turned his attention to compounding; the Balanced Locomotive & Engineering Company was organized, with headquarters in New York, and the "A. G. Darwin," No. 1, was rebuilt as a balanced compound at the Maryland Steel Company's plant at Sparrow's Point (Baltimore). An article giving some preliminary data on this engine was published in the *Railroad Gazette* of June 14, 1895, in which it is stated that "the steam is to be superheated before entering the high-pressure cylinders, and is to be reheated between the high and low-pressure cylinders by the Strong multitubular reheaters. It is expected to get a locomotive that will run for 18 pounds of water per horsepower-hour."

Brewer, in his article in *The Locomotive*, gives the dimensions of the rebuilt compound as follows:—

Cylinders, high-pressure	16″x24″
Cylinders, low-pressure	23″x24″
Driving Wheels, Diam.	68″
Boiler, diam (inside)	58″
Tubes	205, 2¼″ diam. 10, 3¼″ diam.
Tubes, length	10′ 3″
Grate area	50 sq. ft.
Total heating surface	1650 sq. ft.
Steam pressure	170 lbs.*
Weight on drivers	87,600 lbs.
Weight total engine	143,400 lbs.

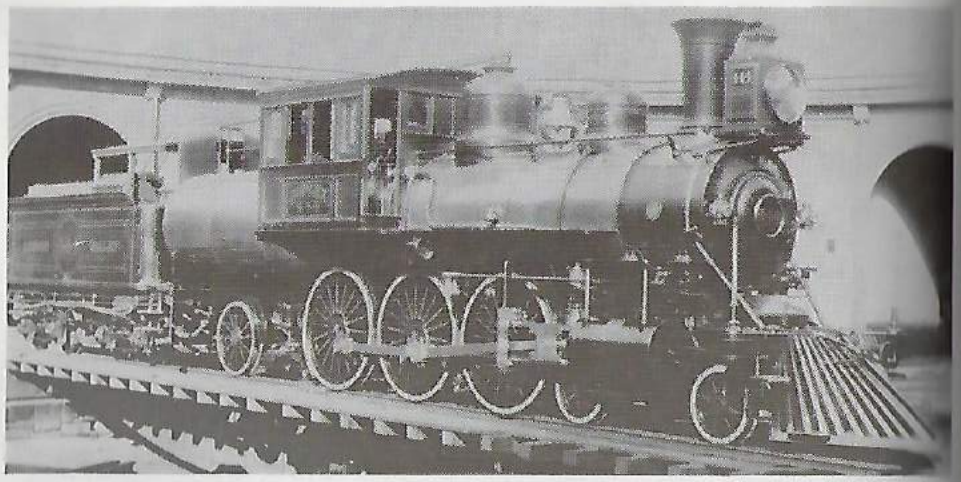
The locomotive, as rebuilt, was a four-cylinder balanced compound, and was apparently the first of that type to be built in this country. The high-pressure cylinders were inside, between the frames, and their pistons were connected to a crank axle on the first pair of drivers; while the low-pressure cylinders were outside, and their pistons were connected to the same pair of wheels in the usual manner. A modified form of Walschaerts gear, worked from a return crank on the leading drivers, was employed. The same general type of gridiron valve, as originally applied to the locomotive, was used on the compound. There were three valves at each end of each pair of cylinders; one controlling the high-pressure admission, the second the high pressure exhaust and the low pressure admission, and the third the final exhaust from the low-pressure cylinder. Apparently there was no way of passing the steam through a reheater between the cylinders, as mentioned in the *Railroad Gazette* article; but it is quite possible that a superheater was placed in the ten large boiler tubes. The high and low-pressure cranks, on each side of the locomotive, were 180 degrees apart, and as the pistons were equal in weight, the reciprocating parts were balanced. The high-

* The article in the *Railroad Gazette*, previously referred to, gave the steam pressure as 185 lbs.



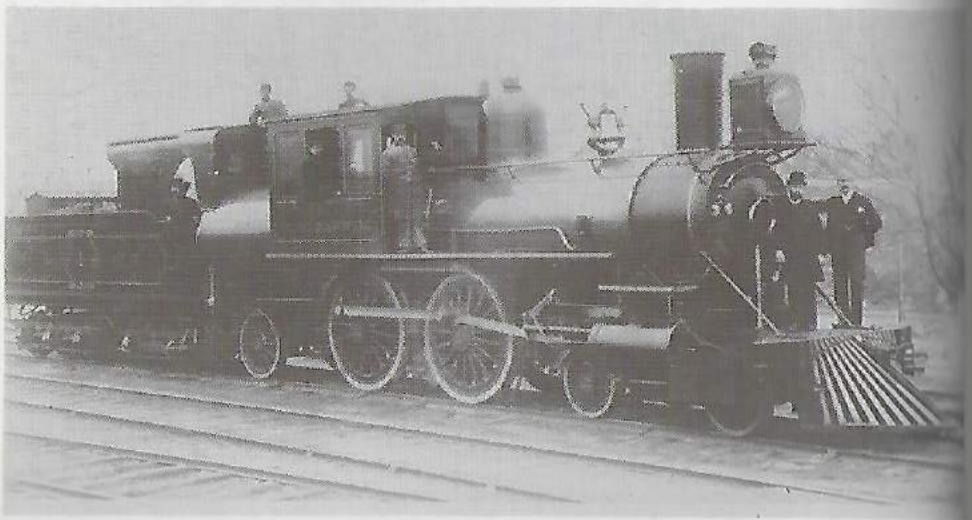
Courtesy of W. A. Lucas
From Smith Collection

L. V. 383 equipped with Strong's valves and valve gear.



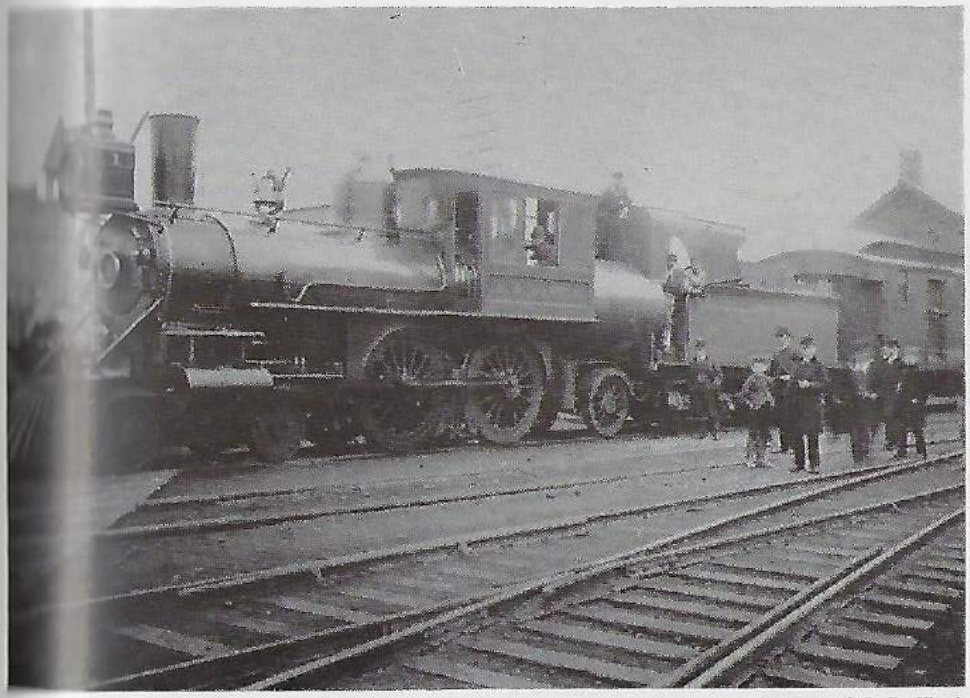
Courtesy of C. T. Andre

Lehigh Valley R. R. #444. Built Wilkesbarre 10-86. Rebuilt to a 4-6-0? Destroyed in a wreck 11-11-9
Boiler put on engine 544 Wilkesbarre 9-99. 544 renumbered 1302 in 1905. Scrapped 11-1923.



Courtesy of S. R. Wood

Strong Locomotive Co. #1 "A. G. Darwin." Hinkley #1708, 1887. 19x24-68. Steam 175#. Total wt.
135,800#. wt. on drivers 73,920#. Heating surface 1650 sq. ft. Grate area 50 sq. ft.



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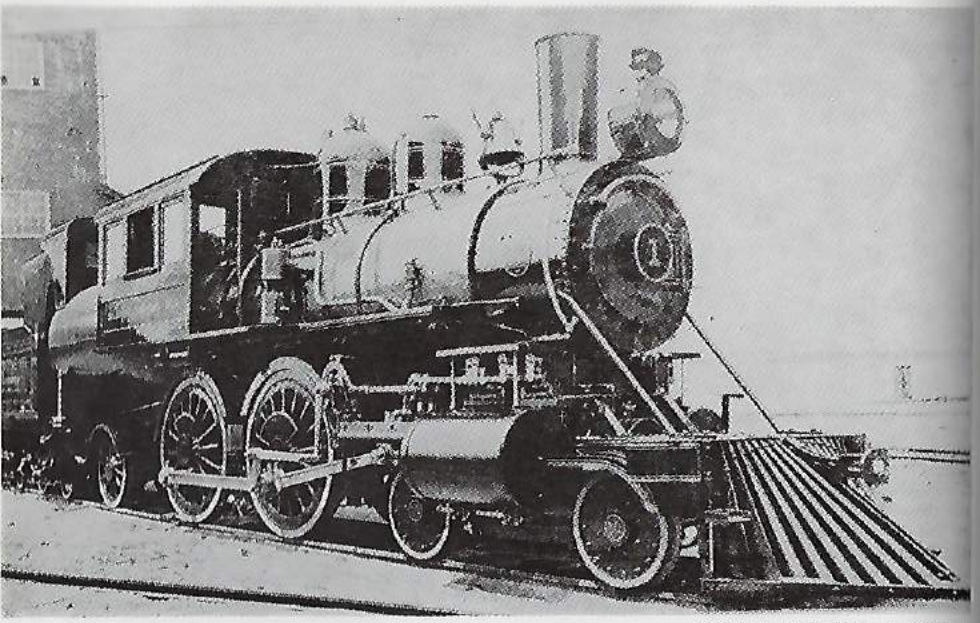
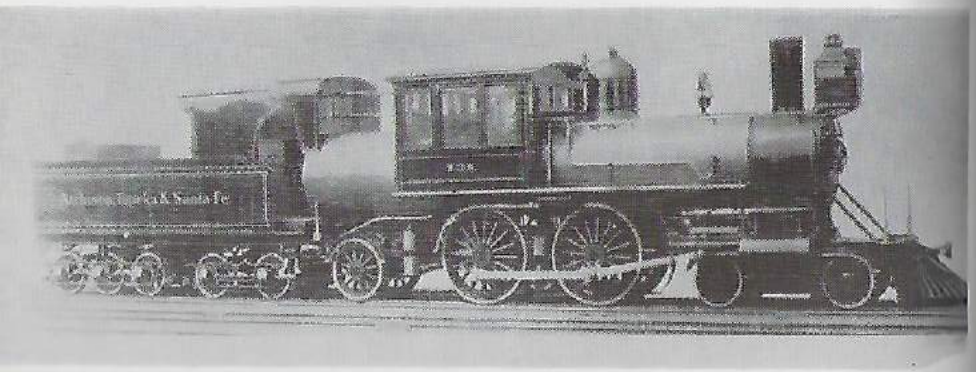


Courtesy of F. Stewart Graham
Copied from Locomotive Engineering

Strong's Balanced Compound.



Courtesy of S. R. Wood

A. T. & S. F. #738. Schenectady #2405, 1887. Built under Strong patents. Renumbered 238 and 40. Rebuilt prior to 1900 to conventional 4-4-0 type. Scrapped at Topeka, Kans., 9-16-25.

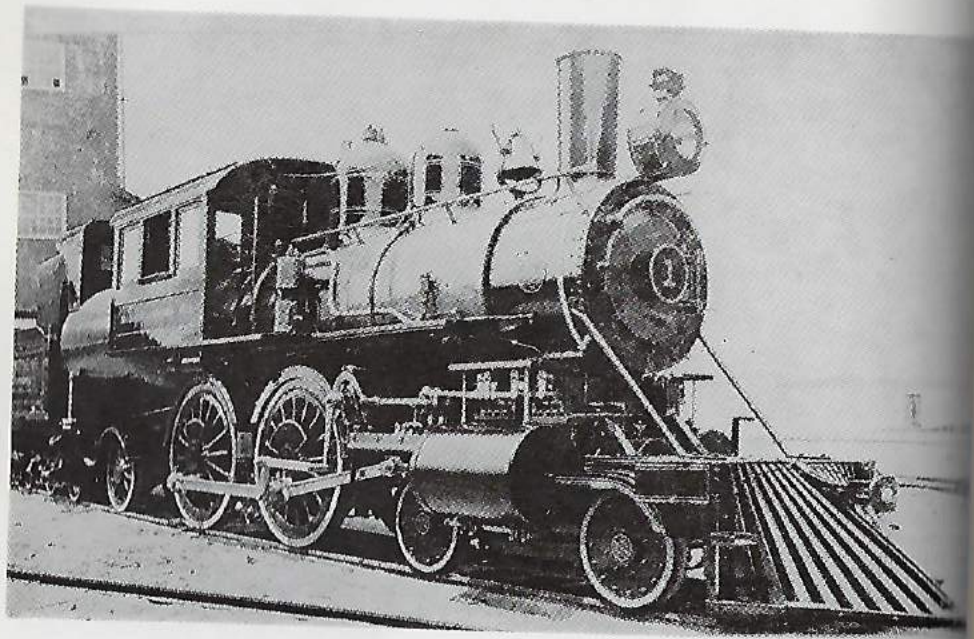
pressure revolving parts were balanced by extensions on the crank cheeks, and the low-pressure by counterweights placed in the wheels, close to the hubs.

This locomotive was given a series of tests on the stationary testing plant at Purdue University. Based on information in the *Railroad Gazette,* these tests apparently took place in June, 1897; and their chief object was to determine the extent to which disturbing forces had been reduced by the four-cylinder balanced design. The tests were made by placing small copper wires under the supporting wheels, upon which variations in pressure were recorded while the engine was being run at different speeds. The results were apparently satisfactory, as the locomotive ran with very little vibration and there was practically no dynamic augment. The *Railroad Gazette,* however, commenting editorially on the tests, recommended reducing the weights of the reciprocating parts on two-cylinder locomotives, rather than using the more complicated four-cylinder design. Strong, of course, argued in favor of his engine, predicting that the locomotive of the future would be a four-cylinder balanced compound. During the first decade of the present century, it looked as though this prophecy might be fulfilled, as balanced compound locomotives were built in considerable numbers—especially by the Baldwin Locomotive Works. But with refinements in design, and the use of superheated steam and improved materials, the conventional two-cylinder type more than held its own, and the more complicated balanced designs passed out of the picture.

The writer has been unable to locate information regarding the performance of the Strong balanced compound in actual railroad service. He recollects, however, viewing it through the cracks and knot holes in a high board fence surrounding a junk yard in North Philadelphia, where the locomotive undoubtedly ended its days. The date is unfortunately uncertain, but he believes it was in the fall of 1900.

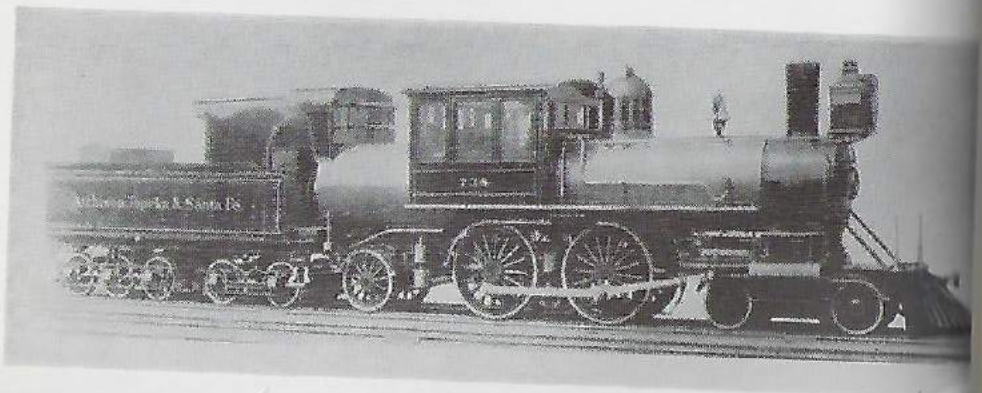
George S. Strong is credited with having prepared other locomotive designs, in addition to those that were actually built. The article by F. W. Brewer in *The Locomotive,* to which previous reference has been made, presents illustrations of a proposed 4-4-2 type with 84-inch drivers; a 2-6-2 type with 58-inch drivers; and a 2-10-2 type with 44-inch drivers. The late C. B. Chaney, in correspondence with the writer, also referred to 4-4-0 and 2-8-2 types, as developed by Strong. It would appear, however, that the only locomotives actually built to his designs throughout, were the Lehigh Valley "Duplex," number 444 (4-6-2), and the "A. G. Darwin" (4-4-2) and its counterpart, the 738, on the Sante Fe. The "Darwin" was later rebuilt as "Balanced Compound No. 1." There should also be mentioned the Lehigh Valley 4-4-0, number 383, which had a conventional boiler but was fitted with Strong's cylinders and valve motion. Records also indicate that the Santa Fe ordered a Strong locomotive of the 4-8-0 type from the Schenectady Locomotive Works, but the order was cancelled before the locomotive was completed.

The history of the Strong locomotives can be paralleled by that of other engines that have been built from time to time. The Baldwin locomotive number 60,000, a 4-10-2 type, three-cylinder compound carrying



Courtesy of F. Stewart Gra
Copied from Locomotive Engineer

Strong's Balanced Compound.



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a steam pressure of 350 pounds, may be cited in this connection. That locomotive, built in 1926, "tramped" the country from Coast to Coast. It was tested on the Pennsylvania's stationary plant at Altoona, and was also given road tests on various railroads. It established some remarkable records, and the engineer representing the builders, who travelled with it, expressed the opinion that the railroads would *have* to buy such locomotives, as they could not afford to do without them. But no one purchased the engine, and no more of that type were built.* Experimental locomotives such as those designed by Strong, and the Baldwin No. 60,000, are bound to develop weaknesses to which little publicity is given, but which prejudice railroad operating men against them. Thus, in the *Railroad Gazette* of January 13, 1888, there is brief reference to trouble with the Strong fireboxes, due to the fact that some of the joints had not been made properly. With patience and further study such defects might be overcome, but they are not forgotten and are held against the engines by the men who maintain and operate them. Complicated valves and valve motions may produce beautiful indicator cards, but that does not mean that the locomotives would be any more successful in getting trains over the road. A competent locomotive designer, who also understood the problems of maintenance and operation, once remarked to the writer that "the best valve gear is plenty of boiler." From a practical point of view there is much truth in that statement.

George S. Strong had the courage of his convictions, and while his designs may not have been suitable for meeting the motive power requirements of American railroads, they displayed ingenuity and had points of real merit. He used all of his resources in endeavoring to develop them, and is said to have died penniless. His work certainly deserves a place in the history of the American locomotive.

Editor's Note:

The Strong Locomotive Co., 239 Broadway, New York City, prepared a series of sketches showing the different types of locomotives covered by their designs and sent them to the different locomotive builders. Such a set is in the Baker Library and it shows six designs whose dimensions were as follows:

Type	Cylinders	Dia. of Dr.	B. P.	Boiler Dia.
4-4-2	20x24"	84"	175#	4'10"
4-4-2	19x24"	68"	175#	4'10"
4-6-2	20x24"	62"	160#	4'10"
2-6-2	20x24"	62"	175#	4'10"
2-8-2	22x24"	51"	175#	4'10"
2-10-2	22x24"	44"	175#	5' 4"

A search through various journals and biographies fails to bring forth anything about the life of this interesting inventor.

* The locomotive was presented to the Museum of The Franklin Institute, Philadelphia, where it is on permanent exhibition.

Motive Power of the C. B. & Q. R. R., as of May 1, 1858

By A. W. Newton

While not construction, the equipping of the railroad for operation is a part of the general construction program. Motive power, a necessity, must be provided and at once, so that an orderly construction program may be carried out. Even before the Chicago and Aurora Company had been organized, Mr. John W. Brooks, at that time Superintendent of Mr. Forbes' Michigan Central Railroad, and already active in promoting that "comprehensive scheme of railroads for the State of Illinois," had tendered, for sale to the road, the Locomotive "Rocket," a 4-4-0 type, weighing 19 tons, then owned by the Michigan Central Railroad. Purchase was made by the Chicago and Aurora in July 1852, and records show that it remained in service until sometime in the fiscal year ending April 30, 1859, when its identity disappeared from the annual engine roster. This was the *first locomotive purchased by the Chicago and Aurora,* and it, with the two locomotives acquired from the Aurora Branch Railroad February, 1852, constituted its total power in July, 1852. In the Annual Report of the C. B. & Q. R. R. for year ending April 30, 1858, there appears the first "Engine List" giving locomotive names or numbers and the dates built. This list shows 58 units.

With this as a basis, and from other company records as well as those of manufacturers, the Railway and Locomotive Historical Society of Boston, Mass., after a long period of investigation, published two bulletins, No. 24, March, 1931, and Part 2, June 1937, on the "Locomotives of the Chicago, Burlington & Quincy Railroad, 1855-1904." This is the most complete history of the Burlington engines that has been attempted, but it falls short of establishing the ownership of individual units acquired by the different roads that, through renaming or consolidation became the C.B.&Q. Company.

From the Annual Reports, it has been possible to establish the number of units owned by each road, although individual units have not been allocated.

The Aurora Branch Railroad at the time its name was changed, June 22, 1852, had but two locomotives; the "Whittlesey," later traded to the Galena and Chicago Union Railroad (1853) for the "Winnebago," which later was known as the "No. One" and so styled in "engine list" of May 1, 1858.

The Chicago and Aurora Railroad on June 22, 1852, acquired these two locomotives and later, July, 1852, acquired the "Rocket" from the Michigan Central Railroad. Starting with these three engines, this road had at the time of its becoming the C. B. & Q. R. R. February 21, 1855, a total of 15 units. Of these, twelve have been identified from company records and research of the Railway and

Locomotive Historical Society as follows: "No. One," "Pigeon," "Rocket," "Erastus Corning," "Little Indian," "Batavia," "Aurora," "No. 57," "No. 58," "Troubador," "Tempest" and "Whirlwind"; all shown in engine list of May 1, 1858.

At the time of the consolidation of the Central Military Tract Railroad, July 9, 1856, with the C.B.&Q. Railroad, that road had a total of 19 locomotives, accumulated between 1853 and 1855. Of these 19 units, only 7 have been identified by names appearing in "engine list" of May 1, 1858. The Railway and Locomotive Historical Society says these are the "Antelope," "Reindeer," "Panther," "Roebuck," "Cossack," "Arab" and "Corsair."

The principal reason for inability to identify ownership of locomotives lies in the fact that two railroads, the Chicago and Aurora and the Central Military Tract, were purchasing equipment at the same time, and from the same manufacturers. This was particularly so during the year 1853, when fourteen locomotives were built by the Amoskeag Mfg. Co. of Manchester, N. H., an undisclosed number going to each of these companies.

Finally the C.B.& Q. R.R. Co., successor to the Chicago and Aurora Railroad Company, February 21, 1855, started with the 15 units obtained from the Chicago and Aurora, and July 9, 1856, when it absorbed the Central Military Tract Railroad, increased its motive power by the 19 units owned by that road.

In the meantime, between February 21, 1855, and July 9, 1856, the C.B.&Q. had been adding to its power. In 1855, immediately after its organization, an order was placed with the Amoskeag Mfg. Co. for 3 four-wheel and 3 six-wheel locomotives. From the engine list of May 1, 1858, and the descriptions contained therein, these locomotives are identified as the "Lion," "Tiger," "Samson," "Stag Hound," "Fox Hound" and "Grey Hound."

The original contract for these locomotives is in the Burlington archives, and it contains an interesting provision, which is that the payment for these locomotives was *personally* guaranteed by Mr. John M. Forbes, indicating that the railroad had not yet established its reputation for unlimited credit.

In addition to these six engines, the Historical Society found that seventeen locomotives built by the Manchester Locomotive Works were bought by the C.B.&Q. R. R. Co. They were, with dates built:

Tarter	1855	No. 54	1856
Talisman	1855	No. 55	1856
North Wind	1855	No. 51	1857
West Wind	1855	No. 50	1857
Grey Eagle	1855	No. 49	1857
Golden Eagle	1855	No. 48	1857
Wataga	1855	No. 47	1857
No. 52	1857	No. 56	1856
No. 53	1857		

Thus, there are 42 of the 58 locomotives named in the engine list of May 1, 1858 accounted for as to first ownership. While no records have been found to show what road first owned the remaining

16 units, certain facts are shown in the original report that seem to indicate their ownership. In the first place, the practice of naming locomotives, then in general vogue, gives a helpful clue, particularly when names bearing certain similarities were assigned.

As an example, in 1853, four engines, the "Whirlwind," "Hurricane," "Tornado," and "Tempest" were built by the Amoskeag Mfg. Co., all of similar type and having specifications more or less alike. Two of these the Historical Society found to have been built on order from the Chicago and Aurora Railroad, and it is reasonable to assume that the remaining two were also built for that road.

These two with the twelve already identified as acquired by that road, would leave but *one* to be accounted for. In 1853 three Amoskeag Mfg. Co. engines, "Batavia," "Excelsior," and "Little Indian" were delivered. Two, "Batavia" and "Little Indian" are known to be Chicago and Aurora engines. These three were all built to the same specifications, viz: four drivers 54″ diameter, outside connected, and 15″x22″ cylinders. All were woodburners, but prior to May 1, 1858, the "Little Indian" had been converted to coal burner. Because of all these facts it may be concluded that the "Excelsior" was also a Chicago and Aurora Engine, thus making up the full complement of 15 units that were transferred to the C.B.&Q. R. R. February 21, 1855, when the C. & A. R. R. became the C.B.&Q. R.R.

By this process of elimination, the total of 16 units not allocated is reduced to 13 units, which were acquired by the C.M.T.R.R. and the C. B. & Q. R. R.

Of the 19 engines acquired by the C. M. T. R. R. 7 have been identified, leaving the remaining 12 to be allocated from the 13 unassigned units. These are the "Garden City (1854); "Stranger" (1854) built by the Chicago Loco. Wks.; "Brown Bear" (1855); "White Bear" (1855); "Black Bear" (1855); "Titan" (1854); "Challenge" (1853); "Invincible" (1853) built by the Amoskeag Mfg. Co.; the "No. 59" (1855) and "No. 60" (1855) built by the Detroit Loco. Wks.; and the "Daylight" (1854), "Moonlight" (1856) and "Starlight" (1857) built by the New Jersey Loco. Wks.

Of these 13 unassigned units, 12 must be allocated to the C. M. T. R. R. to make up its full complement of 19 locomotives, which it had at the time of its consolidation with the C. B. & Q. R. R. July 9, 1856.

The problem is to identify the remaining one unit acquired by the C. B. & Q. R. R.

The "Starlight" (1857) seems to be the answer, for both the C. & A. R. R. and C. M. T. R. R. had passed out of existence, the former February 21, 1855, and the latter, July 9, 1856.

The remaining 12 units, after eliminating the "Starlight" from the list of unassigned units above named, must be allocated to the C. M. T. R. R. to round out its complement of 19 engines.

From confirmed data together with general facts contained in the list of 1858, it is believed that the allocation of units in the accompanying statement is correct, or, as nearly so as can be ascertained.

Chicago, Burlington & Quincy R. R. Co.
Locomotive Roster 1858-1864

1	No. One	Amoskeag	#29	1851	4-4-0	14x20″	48″	38000 (AB)
2	Rocket	Stephenson	144	1835		Rebuilt in 1846 by		
		Hinkley & Drury			4-4-0	15x18″	60″	38000 (C&A)
3	Pigeon	Baldwin	93	1837	4-2-0	13x16″	60″	28000 (AB)
	Rambler—renamed			1864				
4	Aurora	Amoskeag	99	1853	4-4-0	15x22″	56″	50000 (C&A)
5	Batavia	Amoskeag	98	1853	4-4-0	15x22″	56″	48000 (C&A)
6	Excelsior	Amoskeag	—	1853	4-4-0	15x22″	56″	48000
7	Little Indian	Amoskeag	100	1853	4-4-0	15x22″	56″	50000 (C&A)
8	E. Corning	Schenectady	11	1852	4-4-0	14½x22″	60″	44000 (C&A)
9	See Note							
10	Talisman	Manchester	6	1855	4-4-0	15x20″	60″	54000 (CB&Q)
11	Wataga	Manchester	24	1855	4-4-0	15x22″	54″	56000 (CB&Q)
12	Tornado	Amoskeag	—	1853	4-4-0	16x20″	60″	50000 (C&A)
13	Hurricane	Amoskeag	—	1853	4-4-0	16x20″	72″	50000 (C&A)
14	Starlight	New Jersey LW	—	1857	4-4-0	16x20″	58″	64000 (CB&Q)
15	Moonlight	New Jersey LW	—	1856	4-4-0	16x20″	56″	64000 (CB&Q)
16	Daylight	New Jersey LW	—	1854	4-6-0	16x20″	46″	56000 (CB&Q)
17-18		No data						(CB&Q)
19	Lion	Amoskeag	190	1855	4-6-0	16x20″	46″	56000 (CB&Q)
20	Tiger	Amoskeag	189	1855	4-6-0	16x20″	46″	56000 (CB&Q)
21	Samson	Amoskeag	191	1855	4-6-0	16x20″	46″	56000 (CB&Q)
22	Brown Bear	Amoskeag	192	1855	4-6-0	16x20″	46″	56000 (CMT)
23	White Bear	Amoskeag	194	1855	4-6-0	16x20″	46″	56000 (CMT)
24	Black Bear	Amoskeag	193	1855	4-6-0	16x20″	46″	56000 (CMT)
25	Stag Hound	Amoskeag	197	1855	4-4-0	16x20″	66″	56000 (CB&Q)
26	Fox Hound	Amoskeag	196	1855	4-4-0	16x20″	66″	56000 (CB&Q)
27	Grey Hound	Amoskeag	195	1855	4-4-0	16x20″	66″	56000 (CB&Q)
28	West Wind	Manchester	17	1855	4-4-0	16x20″	66″	56000 (CB&Q)
29	North Wind	Manchester	15	1855	4-4-0	16x20″	66″	56000 (CB&Q)
30	Grey Eagle	Manchester	18	1855	4-4-0	16x20″	66″	56000 (CB&Q)
31	Golden Eagle	Manchester	19	1855	4-4-0	16x20″	66″	56000 (CB&Q)
32	Roebuck	Amoskeag	87	1853	4-4-0	16x20″	66″	52000 (CMT)
33	Reindeer	Amoskeag	84	1853	4-4-0	16x20″	68″	52000 (CMT)
34	Antelope	Amoskeag	83	1853	4-4-0	16x20″	72″	52000 (CMT)
35	Panther	Amoskeag	85	1853	4-4-0	16x20″	72″	52000 (CMT)
36	Titan	Amoskeag	161	1854	4-6-0	16x20″	46″	54000 (CMT)
37	Whirlwind	Amoskeag	94	1853	4-4-0	16x22″	60″	50000 (C&A)
38	Tempest	Amoskeag	95	1853	4-4-0	16x22″	60″	50000 (C&A)
39	Invincible	Amoskeag	—	1853	4-4-0	16x22″	56″	58000 (CMT)
40	Challenge	Amoskeag	—	1853	4-4-0	16x22″	56″	58000 (CMT)
41	Garden City	Chicago LW	—	1854	4-4-0	15x22″	60″	52000 (CMT)
42	Stranger	Chicago LW	—	1854	4-4-0	15x22″	60″	52000 (CMT)
43-46	Not Named	Detroit LW	—	1857	4-4-0	16x24″	60″	—— (CB&Q)
47	Not Named	Manchester	42	1856	4-4-0	15x24″	57″	60000 (CB&Q)
48	Not Named	Manchester	41	1856	4-4-0	15x24″	57″	60000 (CB&Q)
49	Not Named	Manchester	40	1856	4-4-0	15x24″	57″	60000 (CB&Q)
50	Not Named	Manchester	39	1856	4-4-0	15x24″	57″	60000 (CB&Q)
51	Not Named	Manchester	38	1856	4-4-0	15x24″	57″	60000 (CB&Q)
52-55	Not Named	Manchester	34-37	1856	4-4-0	15x24″	60″	58000 (CB&Q)
56	Not Named	Manchester	43	1856	4-4-0	15x24″	60″	58000 (CB&Q)
57	Not Named	Rogers	559	1855	4-4-0	14½x22″	60″	52000 (C&A)
58	Not Named	Rogers	561	1855	4-4-0	15x22″	60″	52000 (C&A)
59-60	Not Named	Detroit LW	—	1855	4-6-0	16x20″	46″	56000 (CMT)
61	Knox	Schenectady	92	1855	4-6-0	No data		(NC)
62	Hancock	Schenectady	109	1855	4-6-0	No data		(NC)
63	McDonough	Schenectady	119	1855	4-4-0	No data		(NC)

64	Adams	Schenectady	122	1855	4-4-0	No data		(NC)
65	Fulton	Schenectady	123	1855	4-4-0	No data		(NC)
66	John Wood	Manchester	29	1856	4-4-0	15x24″	60″	—— (NC)
67	Gen'l Taylor	Manchester	28	1856	4-4-0	15x24″	60″	—— (NC)
68	Augusta	Rogers	641	1856	4-4-0	15x22″	60″	—— (NC)
69	Quincy	Rogers	595	1855	4-4-0	14½x22″	66″	—— (NC)
70	Macomb	Rogers	596	1855	4-4-0	14½x22″	66″	—— (NC)
71	Peoria	Hinkley	444	1853	4-4-0	13x20″	60″	—— (P&O)
72	Burlington	Hinkley	445	1853	4-4-0	13x20″	60″	—— (P&O)
73	A. C. Harding	Hinkley	609	1856	4-4-0	15x22″	60″	—— (P&O)
74	Capt. Moss	Hinkley	583	1856	4-4-0	15x22″	60″	—— (P&O)
75	Elmwood	Hinkley	—	1856	4-4-0	No data		(P&O)
76	N. B. Curtiss	Hinkley	612	1856	4-4-0	15x22″	60″	—— (P&O)
77	G. S. Kettell	Manchester	26	1856	4-4-0	15x22″	60″	—— (P&O)
78	Prairie	Hinkley	582	1856	4-4-0	15x22″	60″	—— (P&O)
79	C. S. Clark	Lancaster LW	—	1856	4-4-0	No data		(P&O)
80	Wm. Kellogg	Lancaster LW	—	1856	4-4-0	No data		(P&O)
81	Not Named	Rogers	1057	1863	0-4-0	13½x22″	42″	—— (CB&Q)
82	Not Named	Rogers	1059	1863	0-4-0	13½x22″	42″	—— (CB&Q)
83-84	Not Named	Rogers	1063-1064	1863	4-4-0	16x24″	58″	—— (CB&Q)
85-88	Not Named	Rogers	1099-1102	1863	4-4-0	16x24″	58″	—— (CB&Q)
89-90	Not Named	Mason	139-140	1863	4-4-0	16x24″	60″	—— (CB&Q)
91-92	Not Named	Mason	142-143	1863	4-4-0	16x24″	60″	—— (CB&Q)
93	Not Named	Rogers	1110	1863	4-4-0T	10½x18″	54″	—— (CB&Q)
94	Not Named	Rogers	1113	1863	4-4-0T	10½x18″	54″	—— (CB&Q)
95	Not Named	Rogers	1120	1863	4-4-0	15x22″	54″	—— (CB&Q)
96	Not Named	Rogers	1122	1864	4-4-0	15x22″	54″	—— (CB&Q)
97	Not Named	Rogers	1208	1864	4-4-0	15x22″	54″	—— (CB&Q)
98	Not Named	Rogers	1213	1864	4-4-0	15x22″	54″	—— (CB&Q)
99	Not Named	Rogers	1219	1864	4-4-0	15x22″	54″	—— (CB&Q)
100	Not Named	Rogers	1223	1864	4-4-0	15x22″	54″	—— (CB&Q)
101	Mercer	Rogers	606	1855	4-4-0	15x22″	66″	—— (NC)
102	Warren	Rogers	601	1855	4-4-0	15x22″	66″	—— (NC)
103	Plymouth	Rogers	609	1855	4-4-0	15x22″	66″	—— (NC)
**	Troubador	Manchester	3	1855	4-4-0	15x20″	68″	54000 (C&A)
**	Cossack	Manchester	1	1855	4-4-0	15x20″	60″	52000 (CMT)
**	Tartar	Manchester	5	1855	4-4-0	15x20″	60″	52000 (CB&Q)
**	Arab	Manchester	4	1855	4-4-0	15x20″	60″	52000 (CMT)
**	Corsair	Manchester	2	1855	4-4-0	15x20″	60″	52000 (CMT)

** These engines, together with the No. 57 were leased to the Grand Trunk R. R. in 1860. The No. 57 was returned while the remaining five were sold to the G. T. R.

The No. One was originally named "Whittelsey" (1850), then "Winnebago" (1853). The former was traded to the Galena & Chicago Union for the latter in 1853 and, prior to 1858 was changed to "No. One."

The "Rocket" was originally built for the Boston & Worcester R. R. and sold to the Michigan Central in 1846. Before being shipped west, it was probably rebuilt at the Hinkley Works to a 4-4-0 type locomotive. In August, 1852, the Michigan Central sold the locomotive to the Chicago & Aurora R. R.

The No. 9 is still somewhat of a mystery. On the night of December 25th, 1863, the Aurora Machine Shops were destroyed by fire and the account in the Chicago Times of December 20th states that "a locomotive boiler belonging to the *Lonsdale*, which was being rigged into a new machine" was damaged by this fire. Further confirmation appears in the book of Repairs to Locomotives, Nos. 1-199, January 1864 to May 1876, contains the following concerning No. 9 (Lonsdale):

"May, 1865, repaired at Aurora. Entirely new except cylinders and part of boiler. Original engine burned in shop, December, 1863. Bishop & Company's engine truck wheels. Copper firebox."

In a letter written by F. H. Reynolds, formerly fireman of this engine, written Oct. 26, 1914, he referred to this engine as a worn out scrap heap in 1863 and, subsequent to its rebuilding, he ran this engine. It seems quite logical that it was an old locomotive. Taunton Locomotive Works No. 3, 8/1847 was built for the Providence & Worcester R. R. and named "Lonsdale," 14⅝x18" 60" drivers, inside connected. In 1855, the Taunton L. W. rebuilt two of their older locomotives, one of them named "Lonsdale" and they were both sold to western railroads and, we believe the "Lonsdale" went to the Peoria & Oquawka R. R. Certain it is that the C. B. & Q. had a locomotive of this name and this Taunton locomotive seems to fit this locomotive which fortunately has been photographed in its rebuilt condition.

The original ownership is shown in ( ):

AB—Aurora Branch R. R.
C&A—Chicago & Aurora R. R.
CB&Q—Chicago, Burlington & Quincy R. R.
CMT—Central Military Tract R.R.
NC—Northern Cross R. R.
P&O—Peoria & Oquawka R. R.

COPY COPY COPY

June 28, (1855)*

C. W. Baldwin, Esq.
Manchester, N. H.

Sir

The Engines you are making for Central Military Tract R. R. & for Chicago Burlington & Quincy R. R. (late Chicago & Aurora) may be named as follows

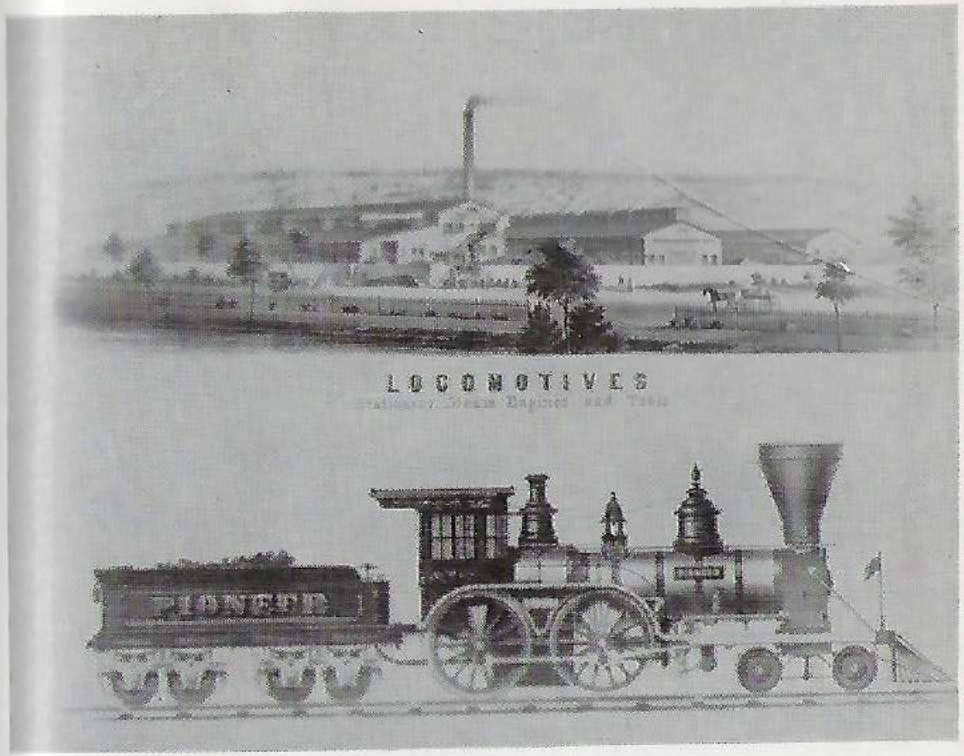
3 freight engines for Central Military Tract	Black Bear Brown Bear White Bear
3 freight engines for Ch. Burlington & Quincy	Atlantic Arctic Pacific
3 passenger engines for Ch. Burlington & Quincy	Grey Hound Fox Hound Stag Hound

Yours truly,

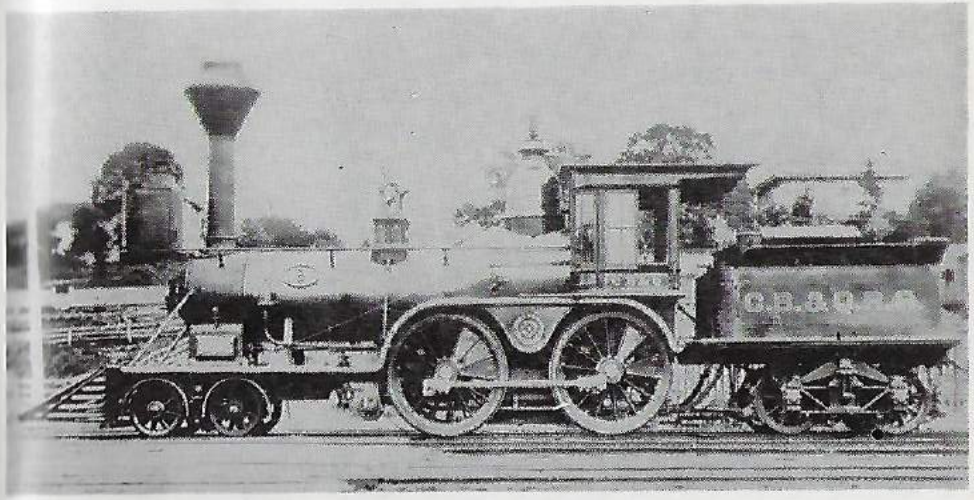
J. W. Brooks

— Burlington Archives in Newberry Library
Central Military Tract Railroad Company, J. W. Brooks, Letters. Feb. 8, 1854 to May 27, 1856. (iv. L.P.C.B.) p. 380

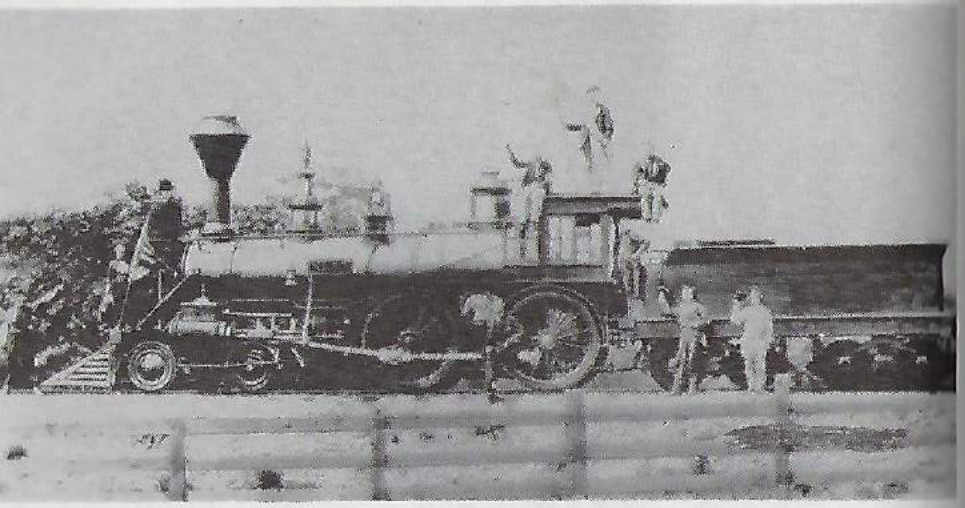
* Although no year is given on letter it can be assumed to be 1855 as next letter in book is July 7, *1855*.



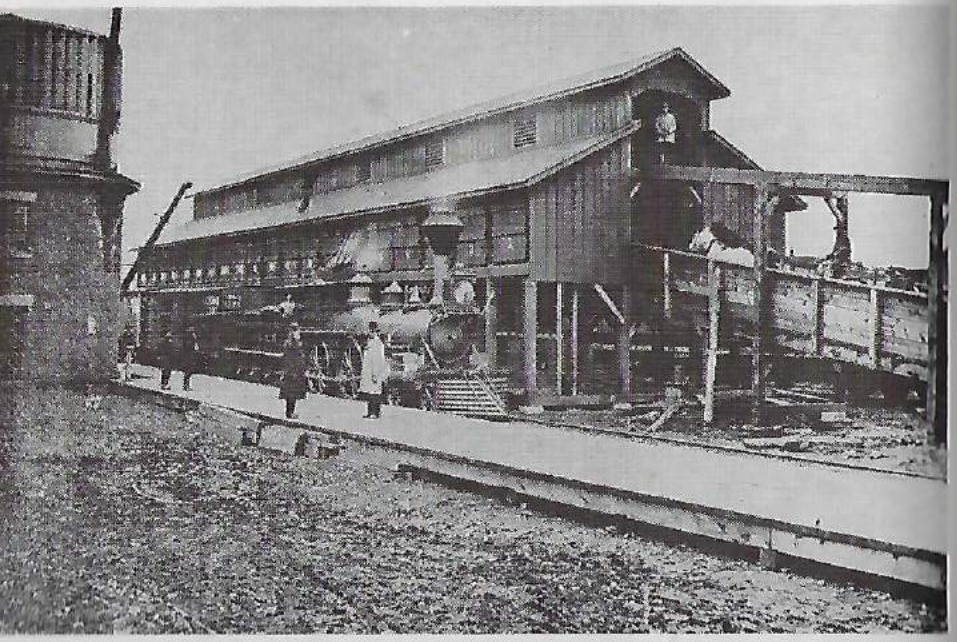
Central Military Tract "Cossack," Manchester 1855.



C. B. & Q. #9. See article for data.



C. B. & Q. #53, Manchester 1856.



Courtesy of D. W. Youngmeyer

aken at Aurora, Illinois in 1870—shortly after chute was erected in 1869. The locomotive #39—was riginally named the "Invincible" purchased by the Central Military Tract Railroad. The "High Hat" entleman is the "D. S."

MEMORANDUM

In the winter of 1849 I went to Springfield, having been elected to the Legislature from Kendall County.

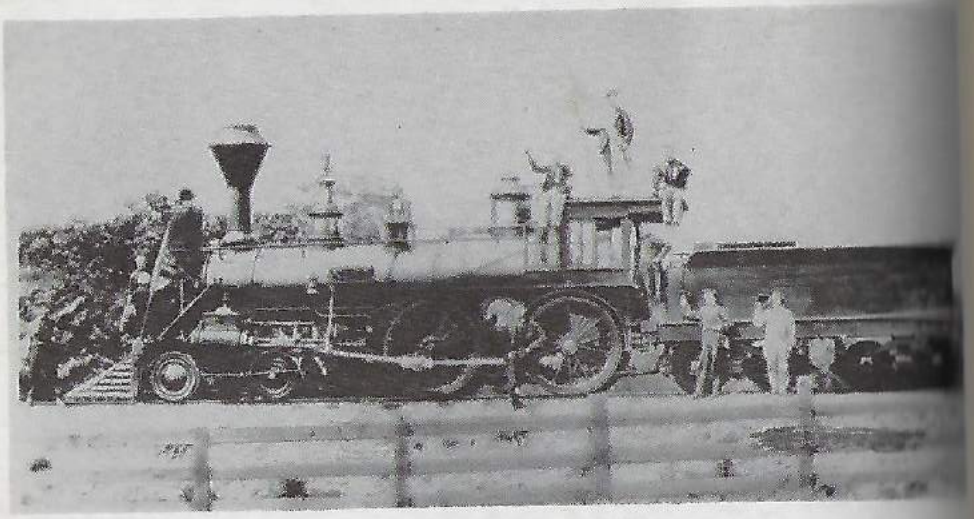
While in Springfield, I drew up a bill and introduced it into the Legislature. This bill was subsequently passed for a charter for a railroad from Aurora to connect with the Galena (now Northwestern) at or near Warrenville. When built the junction was made at what is now Turner Junction. This charter is the original of what now constitutes the Chicago, Burlington, and Quincy Railroad.

Sometime after, sufficient stock was subscribed to warrant the commencement of the work. The grading was finally completed from Aurora to Turner Junction and now came the tug of war: How to get the road equipped—it was finally decided to issue bonds. These bonds were guaranteed by the directors (of which I was one at the time).

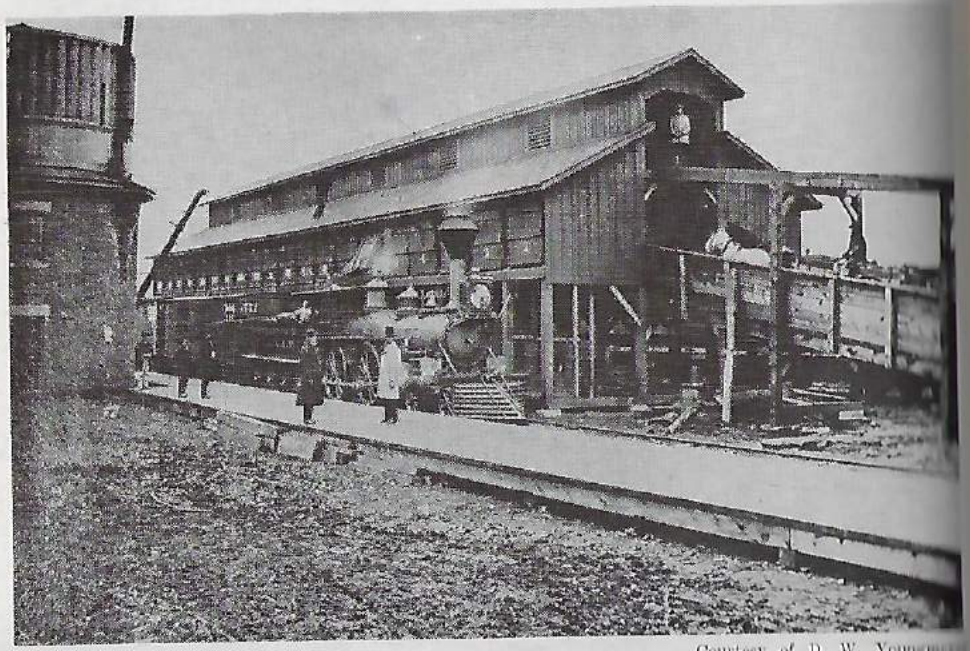
From their sale we succeeded in purchasing a quantity of second hand flat rails to iron the road from the Buffalo and Niagara Falls Road, this road being about to relay their road with the "T" rail just being then introduced.

We also purchased a second hand engine called the "Whittelsey" and also a second hand passenger car and a few freight cars. This inaugurated what is now the C. B. and Q. Railroad.

Copied from "Story of the Life of Lorenzo D. Brady"; written in 1877, and now in possession of Mrs. Olive Beaupré Miller, his grand daughter.



C. B. & Q. #53, Manchester 1856.



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Taken at Aurora, Illinois in 1870—shortly after chute was erected in 1869. The locomotive #39 was originally named the "Invincible" purchased by the Central Military Tract Railroad. The "High Hat" gentleman is the "D. S."

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French Locomotives for the Memphis, El Paso & Pacific R. R.

By Fred Jukes

During the early years of railroading in the United States, some one hundred locomotives came to us from Great Britain. This was quite natural as Britain was the birth-place of the locomotive and, at the time, the greatest manufacturing nation in the world. Of locomotives being ordered from France or other European countries for import to the United States we hear little or nothing until the advent of the de Glehn compound, bought by the Pennsylvania Railroad for experimental purposes.

The locomotive here illustrated was one of ten constructed by a French builder for an American road but which, through force of circumstances, never landed on our shores. This lot of engines was interesting on another count; they were completely European in design, if we overlook a few concessions to American practice, such as pilot, wood-burning stack, bell and cab. They came from the André Koechlin Works, of Mulhausen, Alsace, in 1870, at which time Alsace was French territory. The Koechlin Works later became part of the great French locomotive building firm, The Societe Alsacienne, with plants at Belfort, Mulhausen and Graffenstaden.

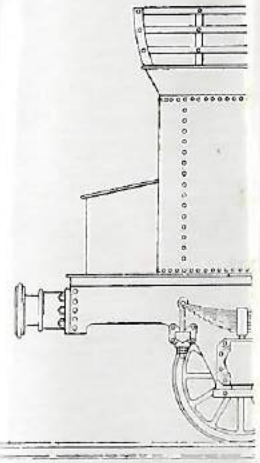
These Koechlin engines for the Memphis, El Paso & Pacific were of identical design, 0-6-0, with comparatively large boilers, and larger than ordinary drivers for an engine of that type, which was known as the "Stephenson Long Boiler." As usually fitted with small drivers, this type was long popular in continental Europe, but was soon discarded in Great Britain due to its unsteadiness in the higher range of speeds.

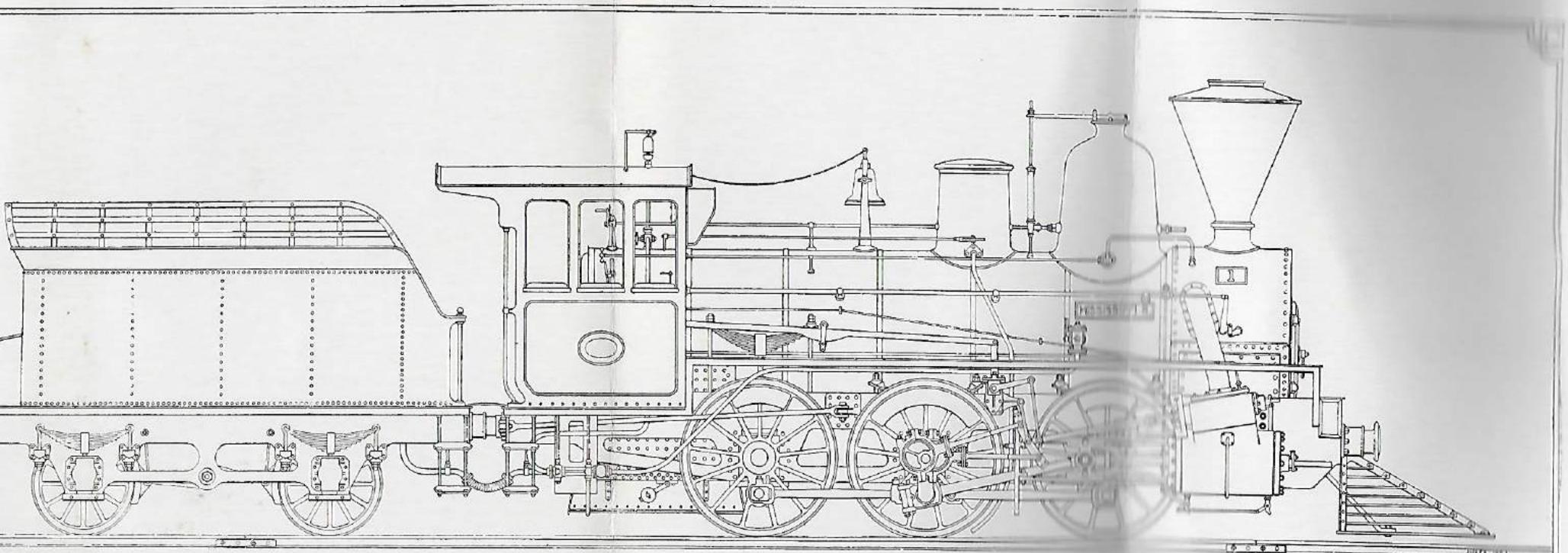
The M. E. & P. locomotives were both numbered and named, the latter after the larger streams in the area through which the road proposed building.

No.	Name	Works No.
1	Mississippi River	1253
2	White River	1254
3	Arkansas River	1255
4	Rio Salinas	1256
5	Washita River	1257
6	Red River	1258
7	Sulphur Fork	1259
8	Sabine River	1260
9	Trinity River	1261
10	Brazos River	1262

Dimensions	
Cylinders	18″x26″
Dia. Drivers	60″
Grate Area	17 sq. ft.
Heating S'face	1582 sq. ft.
Flues	14′ 9½″
Boiler Pressure	127# psi
Weight (engine)	40 tons
Tender (water)	1700 gals.

Tenders were of the type used by both the Midi and the Paris-Orleans Railways a hundred years ago. They were plate framed, high-sided and with racks to hold a plentiful supply of wood, and of rather small water capacity. The high racks were removed when the engines were eventually converted to burn coal.





0-6-0 LOCOMOTIVE
MEMPHIS EL PASO
& PACIFIC R.R.
1870

built by
André Koechlin & Co
Mulhausen Alsace.

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The locomotive here illustrated was one of ten constructed by a French builder for an American road but which, through force of circumstances, never landed on our shores. This lot of engines was interesting on another count; they were completely European in design, if we overlook a few concessions to American practice, such as pilot, wood-burning stack, bell and cab. They came from the André Koechlin Works of Mulhausen, Alsace, in 1870, at which time Alsace was French territory. The Koechlin Works later became part of the great French locomotive building firm, The Societe Alsacienne, with plants at Belfort, Mulhausen and Graffenstaden.

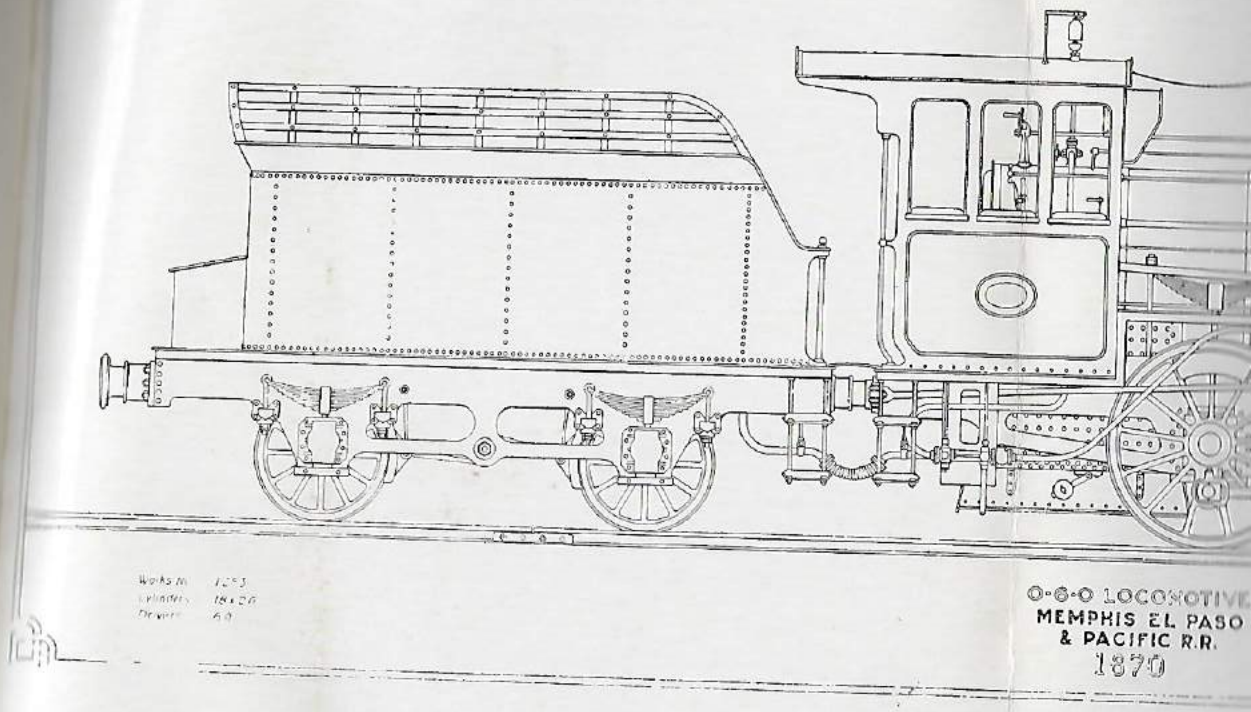
These Koechlin engines for the Memphis, El Paso & Pacific were of identical design, 0-6-0, with comparatively large boilers, and larger than ordinary drivers for an engine of that type, which was known as the "Stephenson Long Boiler." As usually fitted with small drivers, this type was long popular in continental Europe, but was soon discarded in Great Britain due to its unsteadiness in the higher range of speeds.

The M. E. & P. locomotives were both numbered and named, the latter after the larger streams in the area through which the road projected building.

No.	Name	Works No.
1	Mississippi River	1253
2	White River	1254
3	Arkansas River	1255
4	Rio Salinas	1256
5	Washita River	1257
6	Red River	1258
7	Sulphur Fork	1259
8	Sabine River	1260
9	Trinity River	1261
10	Brazos River	1262

Dimensions	
Cylinders	18″x26″
Dia. Drivers	60″
Grate Area	17 sq. ft.
Heating S'face	1582 sq. ft.
Flues	14′ 9½″
Boiler Pressure	127# psi
Weight (engine)	40 tons
Tender (water)	1700 gals.

The tenders were of the type used by both the Midi and the Paris-Orleans Railways a hundred years ago. They were plate framed, high-sided and with racks to hold a plentiful supply of wood, and of rather small water capacity. The high racks were removed when the engines were eventually converted to burn coal.



Aside from buffers and screw couplings, which were universal in Europe, these Koechlin machines incorporated a number of features strange to the American railroader of the '70s. Valve motion was of the Gooch type, quite popular as an outside gear on the continent, and occasionally seen in America. This, with its sloping valve-seat and constant lead, was of the direct type. Cylinder cocks were operated by a lever actuated by a rod through the hand-rail, as was the practice on the Pennsylvania during the '80s. The system of bell-cranks on the side of the front-end was evidently to operate a variable exhaust nozzle of the double flap pattern, while the small water pipe above the running-board and leading to the cylinder castings is for the Le Chatelier counter-pressure brake. Unusual to Americans, although quite common in Europe at that time, was the placing of the blower valve, and its long stem to the engineer's side of the cab.

The throttle rod led forward from the cab, through the high bell frame and sand-box, and turned in stuffing-boxes at the front and rear of the dome. This might well be called ancient practice, for on London's first railway, the London & Greenwich, engine No. 1 had, in 1835, been fitted with identically the same arrangement.

The huge dome and outside dry pipes were decidedly unusual in America, as were the plate frames, whose side members were in one piece, to which the cylinders were bolted. No driver brakes were fitted, nor were equalizers used.

The boilers were large for their day, but not as large as appears, due to the low placement of the front end door. Each engine carried a name plate below the dome and a small number plate just below the stack.

Perhaps the oddest feature about these engines was the method of coupling to the tank. On each side of the engine, at a point on the frame between the main- and back-drivers, the front end of a tension rod connects with a bracket, while its back end is attached to a floating cross-member at the rear end of the engine. This, in turn, carries the coupling link to the tender. These rods from the brackets to the floating cross-member are never under compression, any strains in backing or holding a train being borne by the spring buffers. The advantage in coupling the front end of the draft rigging so far forward on the engine frame is that it lessens flange wear and contributes to better riding. Because of the small amount of lateral motion, the tension rods can be placed fairly close to the rear drivers.

Why, when they were intended for service on an American line, these engines were fitted with buffers and screw couplings in place of the universally used Link & Pin is hard to understand, and what our old time railroad men might have said, had they seen these strangers on Texas soil, would have been worth listening to. Why they never had a chance to play with them is another part of the story.

Reports of their trial trips indicate that the engines were good steamers, that they had plenty of adhesion and were easy running on sharp curves, but, owing to excessive overhang, they were decidedly unsteady at high speeds.

In 1870 the first two, when completed, were placed aboard ship at Antwerp. This ship was to call at Bordeaux en route to America, but, before she arrived there, the Koechlin firm got word of the financial straits of the M. E. P. & P., and immediately wired Bordeaux to have them put ashore. The other eight, in various stages of construction, were sold to Spanish and Portuguese railroads, the last deliveries being made during the summer of 1870. Two, which had been sold to the Tarragona, Barcelona & France Ry., finally went to the Madrid, Zaragossa & Alicante, being numbered 447 and 448. They were scrapped in 1906. Three went to the Asturias Galicia Leon Company, later the Northern Ry. of Spain, and were numbered 1651, 1652 and 1653 by the latter road; lastly, two went to the Lerida Reus Tarragona Company, and then became Nos. 1391 and 1392 on the Northern, where some of them were still running in 1927. Of the other three we have no record; but none of the lot ever arrived in America.

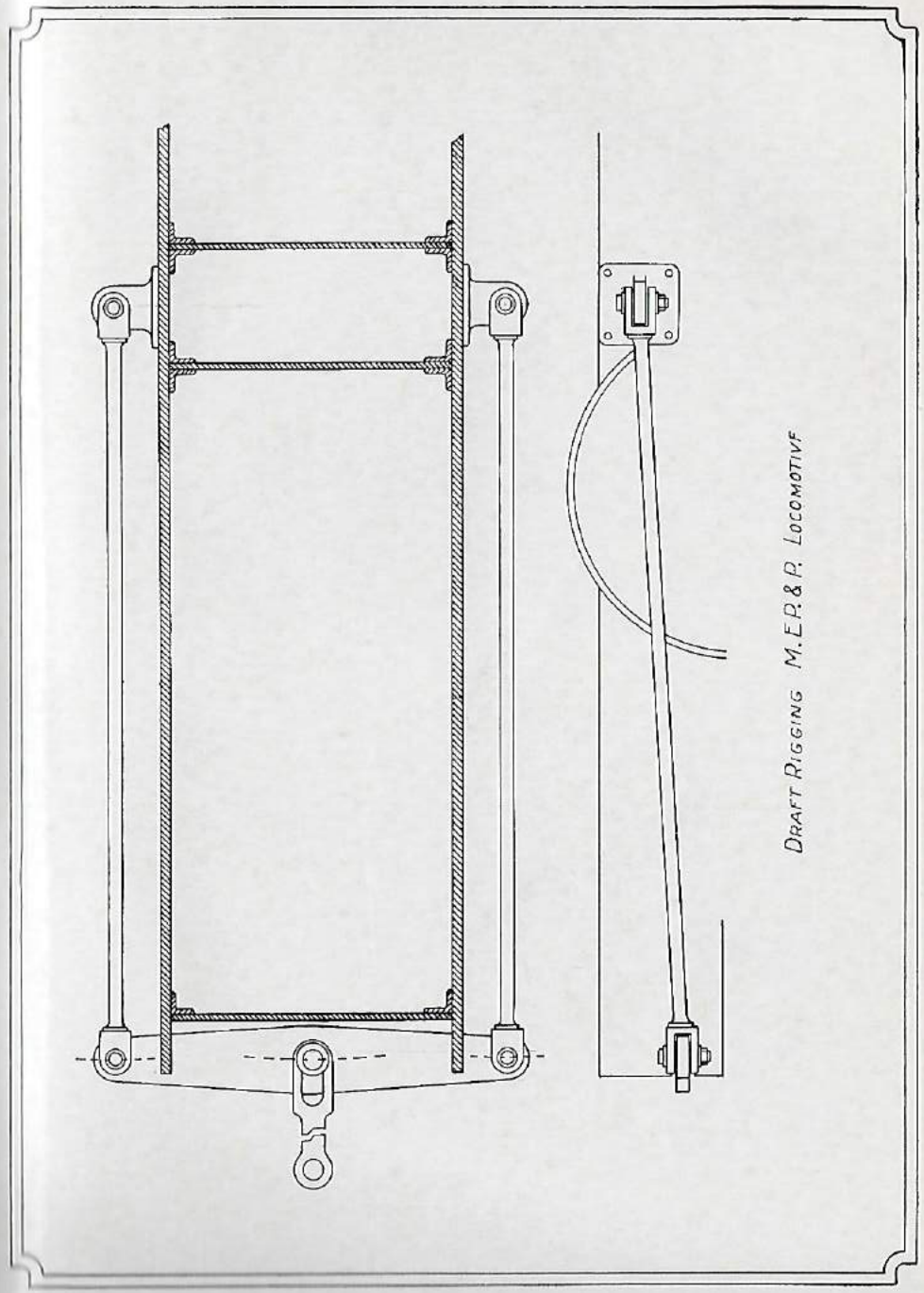
The M. E. P. & P. Railroad

The first charter of the Memphis, El Paso & Pacific was granted in 1853, and organization of the company, with its headquarters at Paris, Texas, was accomplished three years later.

In 1852 the Texas Western was chartered but, owing to legal and financial difficulties, was never built. Its charter was renewed and its name changed to the Southern Pacific. This company, which had no connection with the present S. P., built ten miles of track from Caddo Lake, near Shreveport, La., toward Marshall, Texas, and was to connect with the M. E. P. & P. This was in 1856.

According to Poor's, 1869-70, the Memphis, El Paso & Pacific was incorporated to build from the eastern boundary of Texas, upon the 32nd parallel, to the Pacific, at San Diego. The company also owned the franchise of the San Diego, Gila & Southern Pacific, which was to form the western portion of the through route. Like the St. Louis & San Francisco, which never got within a thousand miles of the beautiful city by the Golden Gate, the M. E. P. & P. never reached the Pacific; it never even saw Memphis or El Paso.

While the road started without the Federal land grants, which aided most of the other big western lines, the Texas legislature came through with promises of millions of acres. By 1861 some sixty miles had been graded and rail partly laid when the Civil War intervened and construction was stopped. In the meantime, the legislature, under the Reconstruction Program which so throttled the South after the war, declared the charter void, and a new charter was granted under the name of The Southern Transcontinental Railroad Company. Frémont had put the balance of his once-great fortune into this venture, which he envisioned as a through route from Norfolk, Va., via Memphis, to the Pacific, at San Diego, a dream which was later, but only in part, realized by the Texas & Pacific. This road (T. & P.) came into possession of the new charter after the M. E. P. & P. had suspended payments and was forced into receivership. Through an agreement with the representatives



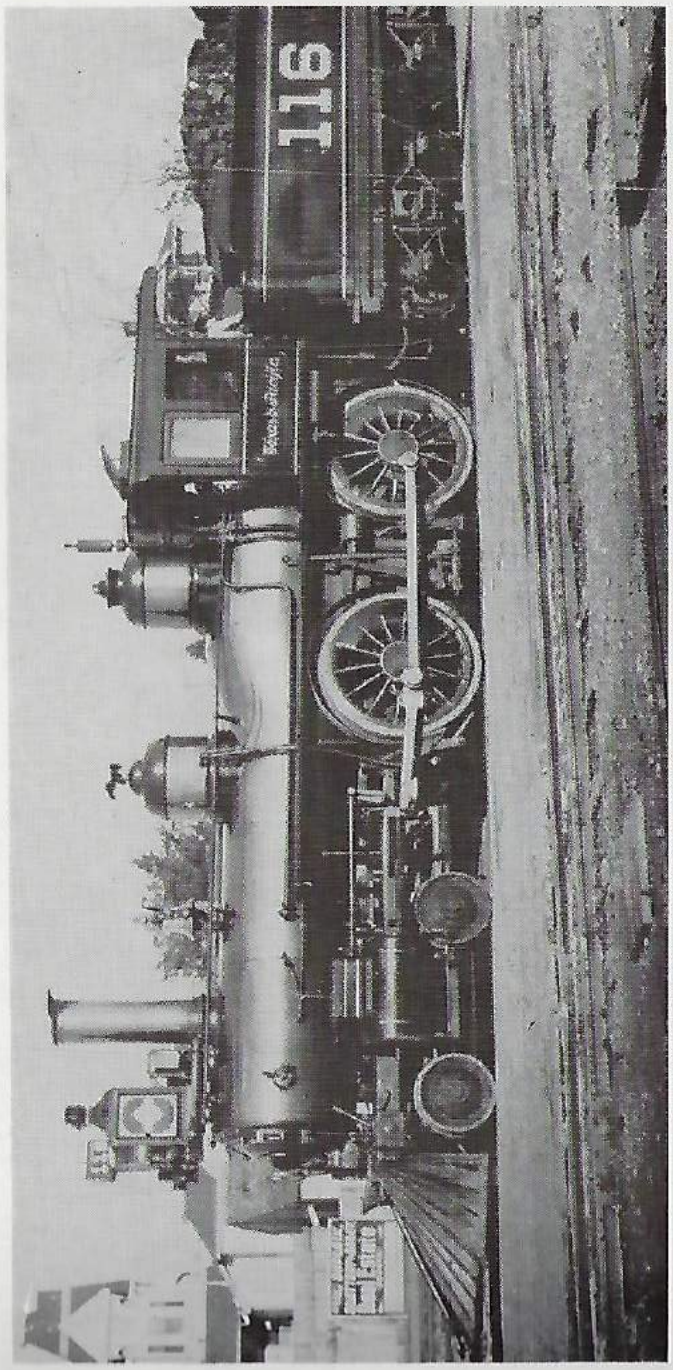


Photo by the Author

Texas & Pacific #116. At Shreveport, La., 1898. Built by the T. & P., at Marshall, Texas, Shops.

of the French bond-holders, title was finally transferred to the Texas & Pacific in 1876.

As for the M. E. P. & P. this defunct corporation survived until 1878, but only as an excuse for further litigation. In the meantime Frémont who, in his palmier days, had been instrumental in saving California for the Union, went down to financial oblivion.

The fact that the M. E. P. & P. bonds were so heavily sold in France explains why pressure was successfully applied to have at least some of the proceeds left in that country as payment for motive-power.

The accompanying photograph of Texas & Pacific No. 116 was taken by the author, at Shreveport, La., in 1898. The locomotive was designed by Supt. of Motive Power John Addis, and was built in the company's shops at Marshall, Texas. Addis died in 1901. No. 116 was the first Pyle-National-equipped engine seen by the author. Electric lights were also used in the cab, and under the running-boards to facilitate oiling around at night.

T. & P. passenger engines of that day were jacketed from cab to front-end with Russian iron and, with their raised numbers and lettering and neat proportions, were handsome little machines; and they were *always* clean. Old timers may remember the 116's deep-toned whistle, the louvre on her stack, the T. & P. eagle atop her sandbox, and the shining jackets on her dome and sandbox.

JOHN C. FREMONT

1813-1890

Frémont was far from being one of those who go through life on an even keel. The man who risked his all, on the plan of expanding the M. E. P. & P. into a transcontinental railroad, lived a life of drama, adventure and accomplishment that would make that of a knight of old seem mild and boresome.

Teacher, surveyor, engineer, explorer, rancher, millionaire, Major General and, finally, almost penniless. He was expelled from college for insubordination, eloped with a senator's daughter, and later became a senator himself. A Southerner by birth, one time Governor of Arizona and the first presidential candidate of the Republican Party (1856), he was beaten by Buchanan because of his stand against slavery.

This remarkable man, who was honored by having Wyoming's highest peak, a pass in the Colorado Rockies, and cities in Ohio and Nebraska named for him, and to whom high standards meant more than fortune, was not equipped to combat the rough-house tactics of the big railroad builders and wreckers of the day, who played their game with the public's money and sent road after road climbing to success or tumbling to bankruptcy. He spent his last years living on a small pension from the government of the country to whom he gave his best years.

(Sources. *Railroad Gazette, Poor's Manuals, Locomotive Magazine,* "Ox Teams to Eagles" (T&P), and *Life of Fremont,* by Nevins).

Of Builders' Plates and Construction Numbers

By F. Stewart Graham

(With thanks to C. E. F.)

One of the most positive, but still not infallible, means of identifying locomotives is through the plate bearing the builder's name, serial number and date of construction. These plates, variously called shop plates, builders' plates, badge plates, etc., were usually placed one on each side of the smokebox, centered front and back, and about midway between top and bottom. Occasionally, due to construction features, it was necessary to place them elsewhere, such as on the sides of the cylinders, or even on the sides of the tenders in the case of certain tank-type engines. Plates varied greatly in size and design. The final standard plate for steam locomotives used by the American Locomotive Company was about fourteen inches long by seven and one-half inches high. The final circular Baldwin plate was nine and one-quarter inches in diameter, although this was preceded by two other standards, one of the 1880's and 1890's being about eleven and one-half inches in diameter, and a later one, of the early 1900's, about 24 inches in diameter.

There were cases in recent years in which the Baldwin Company used an oval plate concurrently with their circular plate, as evidenced by a large number of them on B. & O. engines, a special design in this case to include the locomotive classification in addition to the usual badge plate data.

Shop plates, as commonly known since about the 1880's, were preceded by at least two other identifying insigne. One, and perhaps the earliest, was of large and elaborate design, often mounted between the pairs of driving wheels, and probably fastened to the frames. They were ornate and attractive; some showed shop number and date, while others showed only the builder's name and location. The second was placing of the builder's name on a plate fastened to the side of the steam chest. This practice was carried on even after the adoption of the so-called shop plates, and well into the present century. The Rogers cylinder plate of this type was especially handsome, having the name "Rogers" in brass or copper letters inlaid in a metal plate of contrasting color.

Mason and other builders had their names cast on the side of the cylinders, just below the steam chests, and for a number of years, the Hinkley shop numbers were cast on the cylinders, at about the same place.

Each of the many builders used a standard plate of their own design and, although this standard was occasionally changed, the mere design of a plate often served to identify the builder. The circular plate was the most popular, and was used at one time or another by Baldwin, Brooks, Cooke, Dickson, the Pennsylvania Railroad and others. It was also used by the American Locomotive Company for a short time after formation of that company in 1901.

The Rhode Island plate was oval, which shape was later adopted by the Pennsylvania R. R. Richmond, of the earlier builders, and Lima, of the later ones, used a diamond-shaped plate, while Pittsburgh, Rogers, and Schenectady used an oblong plate, that of Rogers being quite narrow. The Schenectady plate most nearly approached the design finally adopted by the American Company; and this design, in use for over forty years, was slightly altered about 1946. Locomotives of the H. K. Porter Company were readily recognized by their characteristic shield-shaped plate.

Pennsylvania R. R. plates, including those on engines built by locomotive companies, always showed classification and serial number, and, if the classification was changed, as was done many times, new plates were substituted for the old ones. Locomotive companies had to furnish plates conforming to the P. R. R. standard oval on all engines built for that road.

Engines of both the Baltimore & Ohio and Reading Companies were fitted with plates showing class figures. The former road's were oval, quite similar to those used by the P. R. R. The Reading plate was oblong, not unlike the standard ALCo plate, and showed class figures as well as builder's date. This special plate was discontinued by the Reading Company, when that Company abandoned the use of plates, and painted class figures on the cab sides.

An unusual variety of plate was developed as a result of the New York Central having a number of Consolidation type engines rebuilt to Mikados by the American Company. In this case, the original plates were replaced with new ones showing both the original plant and date AND the rebuilding plant and date.

Prior to 1901 many shop plates were made of cast iron, except the Baldwin plates, which were brass. The American Locomotive Company adopted the brass plate, for which cast iron was substituted during the years of the World Wars. Some times, especially in the case of locomotives built by the railroad companies, the badge plates showed the engine's classification, the class figures being more prominent than the other data.

Since most plates were placed on the smokeboxes, where they were subjected to intense heat and constant painting, the lettering soon filled up with paint and dirt, and, unless given some care, became barely legible. In the case of one style of plate used by the Brooks Works, the serial numbers were of such large size that they were nearly always easily read, and were usually legible even in small photographs.

A number of railroads made it a practice to remove all builders' plates at the earliest moment, either upon receipt of the engines from the builder, or at the first shopping. Without this source of identification, it became very difficult for an outsider to locate, trace or identify motive power. On the other hand, many roads were very

careful to retain plates and went to some trouble to do so, as witnessed by the case of certain engines on the Rutland. Here, when the plates were in the way of the application of outside steampipes through the smokebox sides, they were carefully removed and re-located further to the front. Quite by contrast is the case cited on the Union Pacific, at their Pocatello Shops, where a major program of replacing smokeboxes took place in the 1940's. The plates were saved from the old smokeboxes, but ANY pair were picked and fitted on the new smokebox of any engine that was ready for them, resulting in such incongruities as a 2-8-8-0, built in 1923, displaying ALCo-Brooks plates from a 1912 Mikado, and vice versa!

Still another practice which resulted in utter confusion in identifying locomotives through shop plates was the so-called "boiler swapping," as practiced on some railroads. For example, a locomotive is shopped for boiler repairs. The boiler for an identical engine is ready to be placed on the chassis, which is still undergoing repairs. The repaired boiler is placed upon the running gear of the engine just brought in and, presto, an engine is available for service, but shop numbers and road numbers, to say nothing of records, are irretrievably mixed up.

Errors in application of plates by the locomotive companies themselves are not unknown. At this writing, a diesel switcher on the Jersey Central, No. 1054, shows shop number 75027 on the right hand plate and 75053 on the left, and, to further complicate things, diesel No. 1055 shows 75027 on both plates. Builder's records show that the correct shop number for No. 1054 is 75026, and that 75053 covers Oliver Mining Company No. 933.

Records of the Brooks Company, and of the D. L. & W., indicate that shop numbers 3463-3469 were applied to D. L. & W. Nos. 1001-1007, respectively. There is photographic evidence that No. 3464 was on No. 1001, but it will never be known whether this was the result of carelessness in applying the plates or of boiler "swapping." The shop numbers on engines 1002-1003 are in doubt, as their plates were removed before the writer discovered the above discrepancy.

Even the records of the railroads themselves should be subjected to close scrutiny. Those of the Lackawanna M. P. Department always showed shop numbers of both engines, Nos. 855 and 981, as Schenectady No. 5800, whereas that number belonged on No. 855, and the correct construction number of No. 981 was 6122.

Shop or Construction Numbers

It would seem that the assignment of a serial number to a unit the size of a locomotive should be a simple process. It would also seem that such serial number would represent the sum total of such units produced by a builder to the time the serial number was applied. To the sorrow of the locomotive historian neither assumption is correct. However, for many of the earlier builders, especially those who constructed relatively few locomotives and who passed out of existence in the last century, their records, if extant, will go more or

Builder's Plates. Description at end of Article.

less unchallenged.

The serial number records of those companies that survived into the present century, particularly Baldwin and the companies merged into the American Locomotive Company, are the subject of much research, reference and use. As such they come under constant scrutiny and any irregularities are brought to light, usually investigated, and occasionally explained.

It is obvious that the various builders observed different practices in assigning shop or serial numbers. Some were assigned upon receipt of the order for the locomotives. In this case, cancellation of part or all of the order would result in numbers so assigned not being used. Here, the serial numbers did not indicate the true number of engines built by the company involved.

It was the practice of the Baldwin companies to place badge plates (hence assign shop numbers) on its locomotives as they left the finishing shop. Very seldom were numbers allotted in advance. There were virtues as well as faults in this method, for, while it practically assured the use of every number, and in chronological order, it seriously interfered with the correlation between serial numbers and road numbers of the engines, and destroyed any sequence of shop numbers in a given order. This practice was somewhat changed in later years, so that a group of locomotives in a given order received successive serial numbers.

Changes in the ownership of some of the locomotive companies resulted in the inauguration of a new set of serial numbers starting with number one, and, in some instances, it is doubtful that shop numbers were actually placed on the locomotive.

Formation of the American Locomotive Company, in 1901, resulted in reducing the number of major locomotive companies to two, later to become three upon the rejuvenation of the Lima Company. Up to the time of the merger of the eight locomotive building companies into the American Locomotive Company, these firms had built approximately the following numbers of locomotives under their independent operation.

Builder	Years Operated	Last C/N	Last Locomotive as an Independent Company
Brooks	1869-1918	4114	N.Y.C.& St.L. No. 128, 2-8-0, 19x28-62. 2/1902.
Cooke	1852-1926	2755	State Ry. of Chile No. 290, 4-6-0, 18x24. 2/1902.
Dickson*	1863-1909	1387	Fitzhugh Co. No number, 0-4-0, 9x14-29. 10/1902.
Manchester**	1856-1913	1793	W.Va.Short Line No. 106, 18x24-50. 8/1901.
Pittsburgh	1865-1919	2418	St.L.Memphis & S.E. No. 22, 4-6-0, 20x26-62. 5/1902.
Rhode Island	1866-1907	3376	A.T.& S.F. No. 849, 2-8-0, 16&28x32-57. 2/1902.
Richmond***	1886-1927	3318	V.S.& P. No. 312, 4-4-0, 18x24-68, 1901.
Schenectady	1848	6209	C.& N.W. No. 596, 4-6-0, 21x26-63, 1901.
		25370	

* The first locomotive built by Dickson was given shop number "0".

** Manchester figures do not include 231 built by the Amoskeag Company.

*** Richmond applied shop numbers to many non-locomotive units. They built approximately 1000 locomotives, their first one having been built in 1887, shop No. 1612.

The total number of locomotives built by these companies prior to the merger was somewhat less than 25,000 (allowing only 1000 for Richmond), but the new A. L. Co. started its series with that number.

In 1904, the American Company took over the Rogers Locomotive Works, and, in 1905, opened a new plant in Montreal, Canada. Up to this time, the Rogers Company had built 6272 locomotives, according to the last shop number applied by them as an independent company. However, at the time Rogers, Ketchum & Grosvenor Company underwent a re-organization, upon the death of Thomas Rogers, April 19th, 1856, a new series of shop numbers was started. But there were 19 engines built after his death, under the old R. K. & G. partnership, their final shop number being 686. The successor company, Rogers Locomotive & Machine Co., began this new series, but also continued the old series, for their number "1" also carried shop number 680, and Nos. 680 through 686 were used a second time. The dual series (the original R. K. & G. and the R. L. & M.) were continued until 1865, when *this* series was discontinued and the old R. K. & G. series continued, these numbers having been carried right along. The highest Rogers number, when A. L. Co. took over, was 6272, but actually there were seven numbers duplicated, making a true total of 6279 locomotives.

When the Rogers plant was merged, A. L. Co. first took credit for 6270 engines built by the Rogers companies and jumped their serial numbers, first from 31247 to 37518 (6270 numbers), and, shortly thereafter, left blank numbers 37587 to 37597 (11 numbers), or a total allowance of 6281 numbers for the 6279 engines presumed to have been built by Rogers. Hence, A. L. Co. Nos. 31248-37517 and 37587-37597 were never used. Rogers No. 6272 was applied to Mobile, Jackson & Kansas City No. 32, a 4-4-0, 18x24-69, March, 1905.

Few railroads applied serial numbers to locomotives built in their own shops, the P. R. R. being one of the notable exceptions. That company had two locomotive construction shops in Altoona, Pa., the first being the 12th Street Shops, where the first locomotive was built in 1866, and the last, shop number 2289, in February, 1904. In the meantime the Juniata Shops, also in Altoona, were opened in 1891, using a separate series of numbers starting with shop number 1. These numbers have continued on ever since; the last steam locomotive built was a class T-1, road No. 5524, built late in 1946, and bearing Juniata Shop No. 5584. Some time in the late 1930's, the plates were marked Altoona Works, instead of Juniata Shops, but the locomotives were actually built at Juniata, and there was no break in the series of shop numbers.

As noted in a preceding paragraph, there have been cases of a locomotive builder erroneously applying two different shop numbers to one locomotive, although, fortunately, such slips are extremely rare.

In a number of instances serial numbers were applied to other than locomotives. Of the 3318 numbers applied by the Richmond Works, roughly only 1000 were on locomotives. The American Locomotive Company (and its predecessor plants) and the Lima Company assigned shop numbers to snow plows, but neither company assigned their locomotive serial numbers to war material, such as tanks, gun mounts, etc. This was not the case with the Baldwin Company, whose war equipment was given numbers right in with those of the locomotives. Thus, ALCo. numbers very closely indicate the actual number of all locomotives built, i. e., steam, electric and diesel electric. As can be seen from the foregoing, this is not true of Baldwin numbers.

While the majority of the products of the Lima Company, prior to the introduction of the diesels, was the steam locomotive, they built two distinct types, viz., the Shay-geared type and the rod type, and that company's assignment of serial numbers is interesting. When Lima first started to build locomotives in 1879, shop numbers were applied to both the Shay-geared and the rod engines in sequence, in the same series. About 1902, it was decided to give each of the two types its own series of numbers, and, upon reaching number 725, the Shay engines were continued in the series, and a series for rod engines, starting at 1000, was inaugurated. However, the Shay engines reached No. 999 in 1905, and a new Shay series was started with No. 1500. Then the rod engines reached No. 1499, in 1915, and were next numbered in a series beginning with No. 5001. Thus a summary of the Lima numbers would appear about as follows:

Nos.	Years	Type Locomotive
1-725	1879-1902	Shay and rod locomotives.
726-999	1902-1905	Shay geared.
1000-1499	1904-1915	Rod locomotives.
1500-3354	1905-1945	Shay geared.
3355-4999		Vacant.
5000-9560	1915-1951	Rod and diesel electirc locomotives.

Introduction of the single-unit diesel electric "locomotive" presented no problem in assigning serial or shop numbers, other than to mix in this type of motive power with the steam and the comparatively few electric locomotives. The multi-unit diesel did present a new phase, for it required a separate shop number for each of the units making up what was referred to as "one" locomotive, so that a multi-unit diesel might have as many as four serial numbers.

The numbering system adopted by the Electro-Motive Corporation was complicated to the extent that three units A, B, and C were not assigned serial numbers in that sequence, but, rather, in the A-C order, with all of the B units numbered in a sequence following the highest C number in a given group. To the builder this system was probably satisfactory, even sensible, but to the uninitiated, and even to some railroad officials, it seemed that a much simpler and equally satisfactory system might have been devised.

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As noted in a preceding paragraph, there have been cases of a locomotive builder erroneously applying two different shop numbers to one locomotive, although, fortunately, such slips are extremely rare.

In a number of instances serial numbers were applied to other than locomotives. Of the 3318 numbers applied by the Richmond Works, roughly only 1000 were on locomotives. The American Locomotive Company (and its predecessor plants) and the Lima Company assigned shop numbers to snow plows, but neither company assigned their locomotive serial numbers to war material, such as tanks, gun mounts, etc. This was not the case with the Baldwin Company, whose war equipment was given numbers right in with those of the locomotives. Thus, ALCo. numbers very closely indicate the actual number of all locomotives built, i. e., steam, electric and diesel electric. As can be seen from the foregoing, this is not true of Baldwin numbers.

While the majority of the products of the Lima Company, prior to the introduction of the diesels, was the steam locomotive, they built two distinct types, viz., the Shay-geared type and the rod type, and that company's assignment of serial numbers is interesting. When Lima first started to build locomotives in 1879, shop numbers were applied to both the Shay-geared and the rod engines in sequence, in the same series. About 1902, it was decided to give each of the two types its own series of numbers, and, upon reaching number 725, the Shay engines were continued in the series, and a series for rod engines, starting at 1000, was inaugurated. However, the Shay engines reached No. 999 in 1905, and a new Shay series was started with No. 1500. Then the rod engines reached No. 1499, in 1915, and were next numbered in a series beginning with No. 5001. Thus a summary of the Lima numbers would appear about as follows:

Nos.	Years	Type Locomotive
1-725	1879-1902	Shay and rod locomotives.
726-999	1902-1905	Shay geared.
1000-1499	1904-1915	Rod locomotives.
1500-3354	1905-1945	Shay geared.
3355-4999		Vacant.
5000-9560	1915-1951	Rod and diesel electirc locomotives.

Introduction of the single-unit diesel electric "locomotive" presented no problem in assigning serial or shop numbers, other than to mix in this type of motive power with the steam and the comparatively few electric locomotives. The multi-unit diesel did present a new phase, for it required a separate shop number for each of the units making up what was referred to as "one" locomotive, so that a multi-unit diesel might have as many as four serial numbers.

The numbering system adopted by the Electro-Motive Corporation was complicated to the extent that three units A, B, and C were not assigned serial numbers in that sequence, but, rather, in the A-C order, with all of the B units numbered in a sequence following the highest C number in a given group. To the builder this system was probably satisfactory, even sensible, but to the uninitiated, and even to some railroad officials, it seemed that a much simpler and equally satisfactory system might have been devised.

Plates Illustrated

Plate No.	Description
1508	P. R. R. standard plate showing locomotive classification. From No. 3153.
26418	Early ALCO—Manchester plate from Rutland No. 45.
5406	Schenectady plate from Rutland No. 150.
13026	Medium size Baldwin plate, from No. 36, Chicago South Side Rapid Transit Co. Last owner, Grasse River R. R.
58005	Small Baldwin plate, from Washington, Brandywine & Pt. Lookout No. 5. Last owner, Hoosac Tunnel & Wilmington R. R.
40001	An ALCo built-rebuilt plate from N. Y. C. No. 1592.
53845	Standard ALCo plate, from Mac-A-Mac No. 2. Last owner, Grasse River R. R.
60159	Cast iron plate from Rutland No. 110. Note spelling of "Pittsburg*b*".

More About Vermont's Railroad War

Seizure of Troy & Boston R. R. locomotives by the Bennington & Rutland R. R., in 1867, was described in Bulletin No. 90, on pages 101 and 102, as taken from the columns of the *Bennington Banner*. Naturally, the entire incident was reported giving the Vermont point of view. The New York State version of the affair, as reported by the *Troy Daily Times*, of Friday, January 18th, 1867, has been submitted by member Joseph A. Smith, of Troy, N. Y., and, as might be expected, places the blame for the "war" on the Vermont road.

Following is the account, which appeared under the heading "Attachment Against the Rolling Stock—Claim Against the Company—A Summary Proceeding."

"For a long time past, it is well known to our citizens, a feeling of opposition to the Troy & Boston Railroad Company has manifested itself on the part of Mr. T. W. Park, a wealthy citizen of Bennington, and the principal owner of the Western Vermont Railroad. The Troy & Boston Co., for the purpose of securing connections with the East, ten years ago leased the Western Vermont road and have run it during all that time. Mr. Park, at the time of the execution of the lease, was in California, and upon his return purchased a controlling interest in the latter road. Last Winter he sought to secure a grant from the Legislature of New York, for a railroad from Bennington to Chatham, thence to connect with the Harlem Road, his object being to injure the City of Troy and especially the Troy & Boston Railroad. In this he was defeated by Trojan enterprise, and under this defeat, he has been smarting ever since. Previous to the expiration of the lease of the Western Vermont Road, the Troy & Boston Company applied to become the lessors for another term, and made an offer to Mr. Park, which was rejected. He then leased the road to ex-Governor Smith of Vermont.

"When the Troy & Boston folks took over the Western Vermont road, its condition was unfit for the safe and commodious transportation of passengers and freight. This road was put in good repair—an item of $40,000 being expended on bridges alone—and when it was turned over to Mr. Park, on Wednesday last, (the time of the expiration of the lease), it is said that the road was $100,000 better than when the lease was executed. Mr. Park claims that the road was not in as good condition as when the Troy & Boston Company assumed control of it, and brings suit for the recovery of $200,000 (Two hundred thousand dollars) damages.

"In Vermont, the statute allows the plaintiff to issue an execution, without prior notice, against the goods and property of defendant. As soon, therefore, as the lease expired, Mr. Park was prepared with his writ of attachment against all the rolling stock of the Troy & Boston Company in Vermont, and without informing the company that he had even a claim against it, he put in execution the summary arrangements made, which, if carried out, would have suspended the working of the road for an indefinite period. The object is plain to be seen—the secrecy

with which the proceedings were initiated proves that Mr. Park plans simply to embarrass the road—and the animus of the whole matter is not difficult to determine.

"The writ, as we have said, covered all the property of the Troy & Boston road in Vermont. On Wednesday evening, at the time when four locomotives, two trains of passenger cars, a freight train and a wood train were at North Bennington, the Sheriff of the county served the process and took possession of the property. Switches were turned, and the train bearing the United States Mails, was run off the track. The engines were the "I. V. Baker," "R. P. Hart," "John Paine," and "Wallingford." But the employees of the company were not disposed to surrender the property without an effort. The master mechanic, Foster Church, and the roadmaster, John L. Wellington, disposed of the Sheriff's agents who were left in charge of the property, and ran off the "Hart" and "Baker," the first with the passenger train attached to it. During this proceeding, something of a tussle ensued between the contending forces, but the road men came off victorious. Since then, Mr. Wellington has been arrested and held to bail in the sum of $30,000. One of the Sheriff's posse remained on the train and quite a struggle ensued between him and the fireman, Burr Cole. Burr finally disposed of him by throwing him off the engine at the state line. Thus this amount of property was saved to the company.

"After the seizure at North Bennington, the engine "Hiland Hall" was run to Rutland with a Sheriff's officer, to seize the "D. T. Vail" engine at Manchester, and the "Walloomsac" and a passenger train at Rutland. The engine at Manchester was seized, but a telegraph dispatch enabled the operators at Rutland to run off the train via the Rutland & Washington Railroad.

"At Pownal (Vt.), the train bound for Adams, with the "General Wool" engine, was seized, and passengers were conveyed to their destination by means of sleighs. About five o'clock yesterday morning, a special train was dispatched from Eagle Bridge to Pownal with instructions to recapture the "Wool" and the cars. When the train arrived at Pownal, it was found that the Sheriff, a prominent Bennington attorney, and the keeper of the engine were at breakfast, leaving the property unguarded. The engine and cars were at once seized by the agents of the road and run off to the state line.

"Mr. D. T. Vail, the president of the Troy & Boston road, and Mr. Daniel Robinson, Vice-president, are in New York, but have been informed by telegraph of the occurrences of Wednesday evening. Mr. Moseley, the Superintendent of the road, by the aid of such property as was run out of the Sheriff's hands, was enabled yesterday to maintain the connections of the road, with the exception of that portion between Hoosick Junction and the state line, where it is likely, for the present, nothing more than mail service will be performed. The whole matter will now be determined by the courts; and it is more than likely that instead of Mr. Park having a claim against the Troy & Boston road, the company will have a valid one against him."

On the following day, January 19th, 1867, the same newspaper printed the following item, under the heading of "The Troy & Boston Railroad Difficulty."

"There are no new developments in the matter of the difficulty between T. W. Park, of Bennington, and the Troy & Boston Railroad Company. It is claimed by the company that Mr. Park has got himself into a serious legal complication by his attachment of their property, as chattel mortgages upon rolling stock would protect it, even by Vermont courts, from seizure under a writ of attachment. The Company will not release the property now held by Mr. Park but "will let it rot on his hands" and sue the autocrat for damages. Mr. Park has got a good-sized lawsuit on his hands at this time.

"Wellington, the roadmaster, who opened the switch to enable the engineer to run off one of the attached trains is still in prison—his bail having been increased from $30,000 to $40,000. He will, however, be soon released; and it is said no action will hold against him, as he simply unlocked a switch, which had not been attached and was still the Company's property. If the engineer run (sic) off with the train, Wellington was not of course responsible for his action."

F. S. G.

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F. S. G.

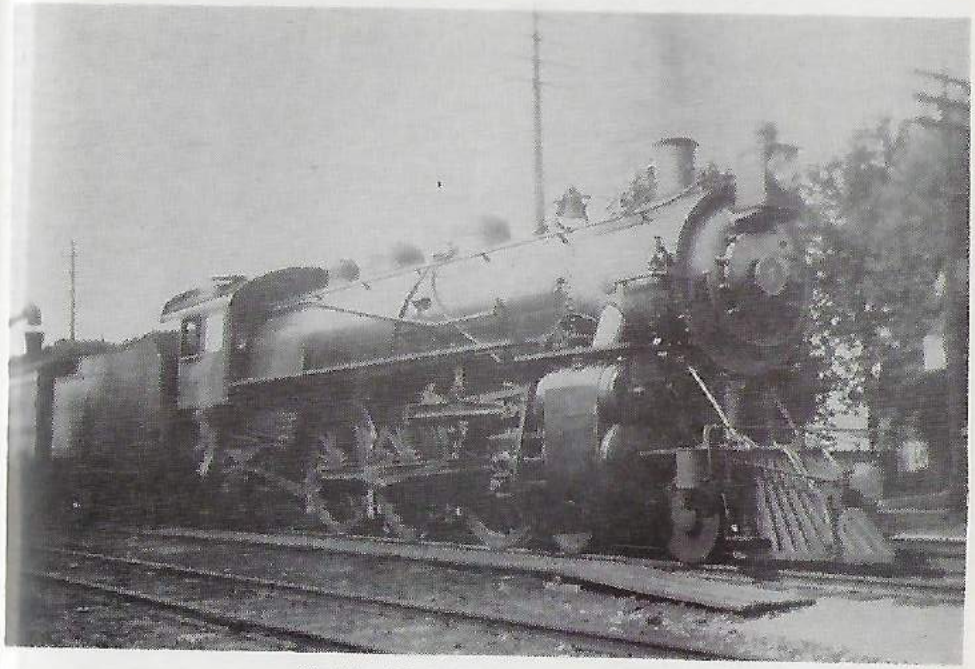
The Vandalia

By Charles E. Fisher

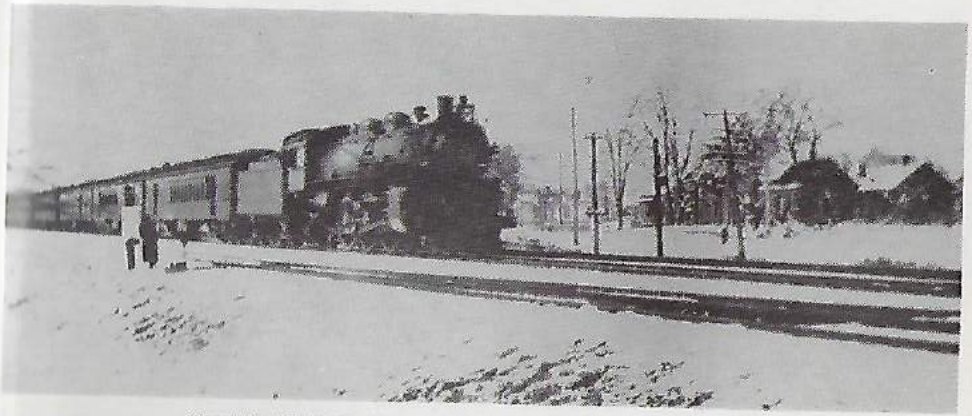
My first introduction to this interesting railroad was through Cy Warman's book—"The White Mail." Tommy Maguire, our hero, was the pump boy at Lick Skillet and, after many adventures, including saving the "White Mail" from a watery grave, he heads for Colorado where he rises to fame and fortune. Perhaps there was a kinship between the "White Mail" and the equally famous "Ghost Train" that ran between Boston and New York over the New York & New England and the New Haven Railroads. Whatever it was, this little railroad in southwestern Illinois and Indiana with its locomotives, has always been of interest to this author.

As early as 1847, the Terre Haute & Richmond R. R. was chartered to build between those two towns and the 73 miles between Terre Haute and Indianapolis were completed in 1852. At Terre Haute this line connected with the St. Louis, Alton & Terre Haute R. R. and at Indianapolis with the road to Galion, Ohio where connections were made with the Cleveland, Columbus & Cincinnati R. R. Subsequently the C. C. & C. and the roads to Indianapolis were consolidated into the Cleveland, Columbus, Cincinnati & Indianapolis R. R. and at Crestline, the Pittsburgh, Ft. Wayne & Chicago Ry., which was also a consolidation of several small railroads crossed the C. C. C. & I. R. R. Both of these railroads turned their St. Louis traffic over to the two railroads west of Indianapolis. The Indiana Central Ry. was organized to build from Indianapolis to Richmond and thence to the Indiana-Ohio state line. This 72 mile line was opened to New Paris, Ohio in 1853 and here they connected with the Dayton & Western R. R., but it was not until a connecting line was built from New Paris to the Columbus & Indianapolis R. R. in 1863, and the completion of the Pittsburgh & Steubenville R. R. in 1865 that this route assumed any importance. By 1867 there were these three competing routes for the St. Louis traffic through Indianapolis.

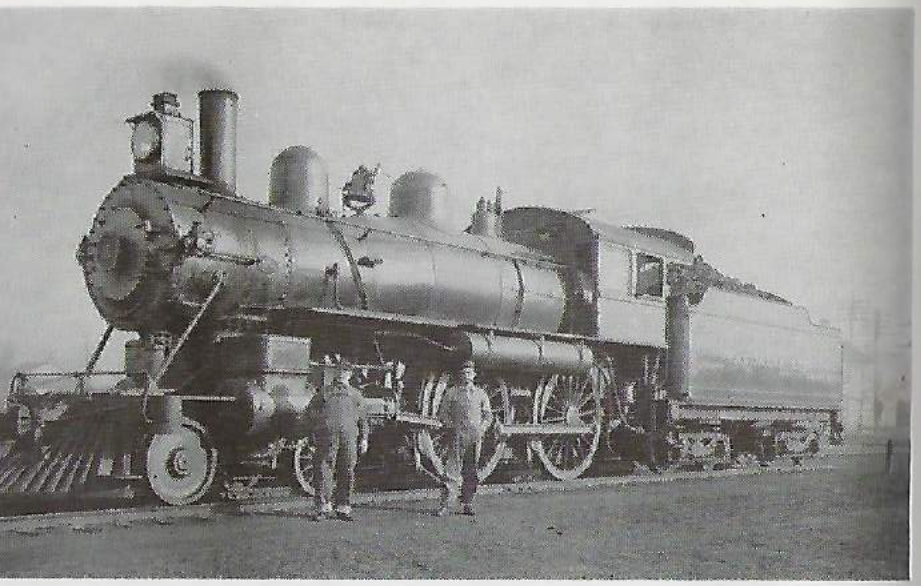
Joint agreements were first tried out, sooner or later one of the three wanted exclusive control of the entire route. In 1868, George B. Roberts, of the Pennsylvania R. R., with three others, secured a charter for the building of the St. Louis, Vandalia & Terre Haute R. R., parallel to but some distance from the St. Louis, Alton & Terre Haute R. R. Construction was immediately commenced and at the outset, on February 10th, 1868, the road was leased to the Terre Haute & Indianapolis R. R. for 999 years. The C. C. C. & I. had not been idle and the Indianapolis & St. Louis R. R. was chartered August 31st, 1867, to build between Indianapolis and Terre Haute and to connect with the St. Louis, Alton & Terre Haute R. R. Both of these new roads were completed in 1870 and thus there came into being, two parallel lines, each of about 230 miles in length being built through a country that was barely able to support but one.



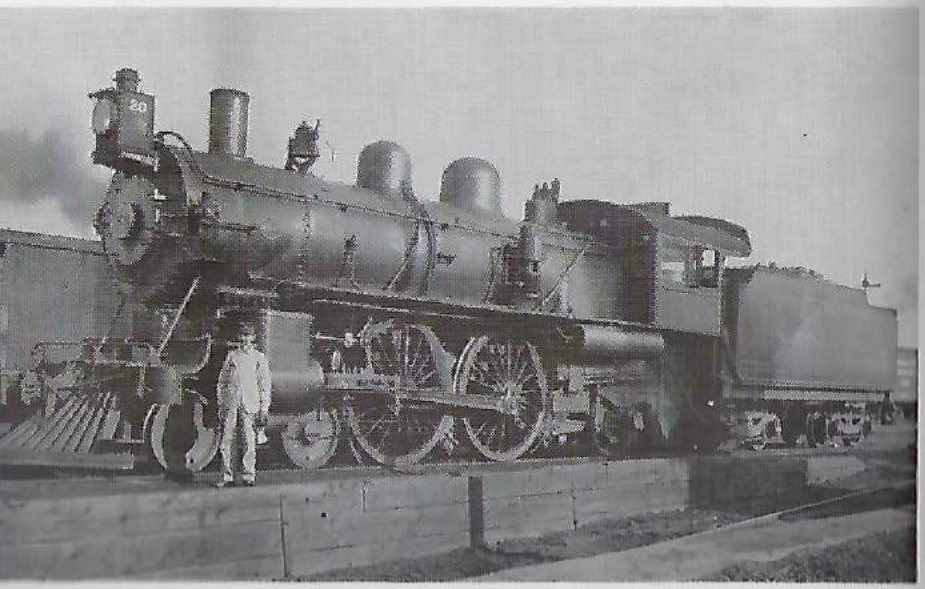
Vandalia #5, VK-1s, Schenectady 1912.



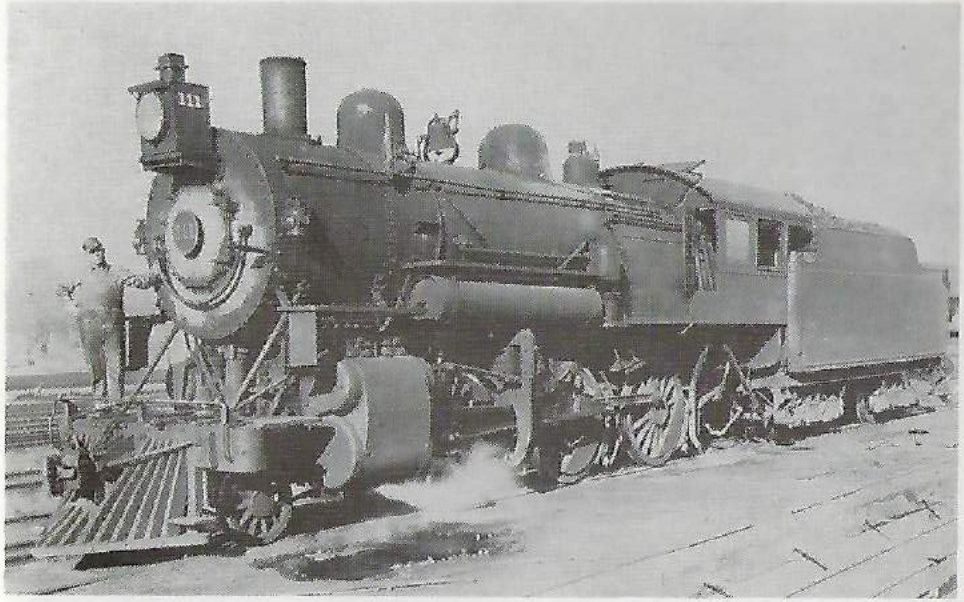
Vandalia #8, VK-1s, Schenectady 1912, approaching Effingham, Ill.



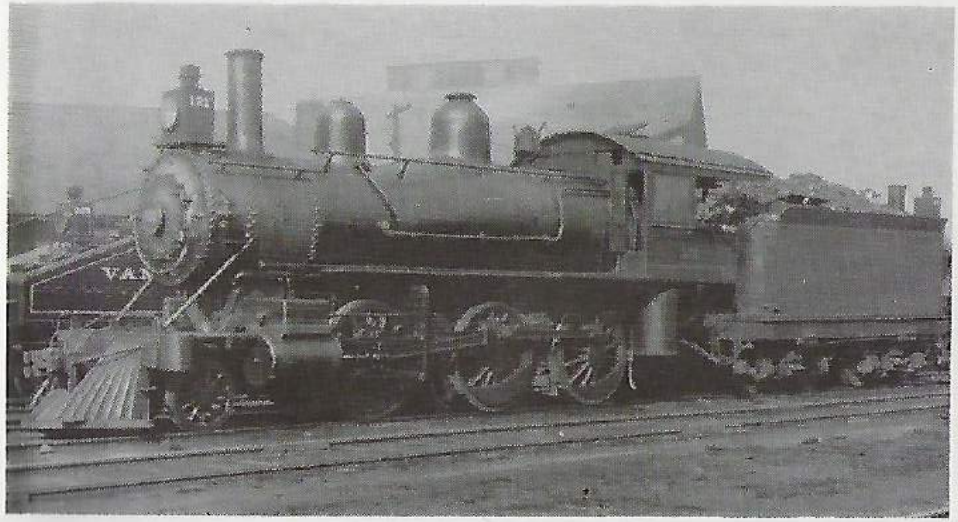
Vandalia #16, VD-6a, Schenectady 1899.



Vandalia #20, VE-1, Schenectady 1902.

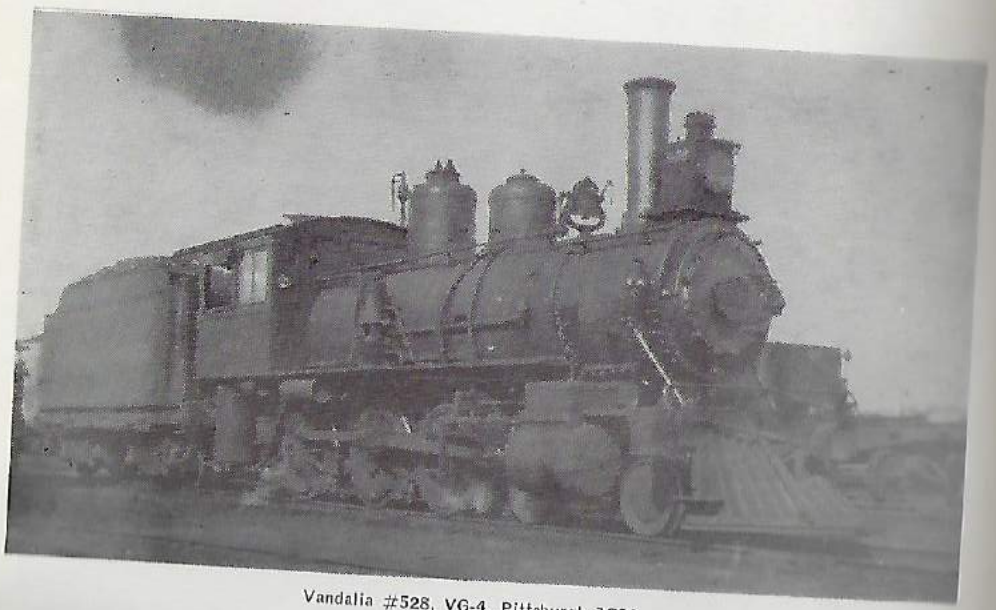


Vandalia #111, VF-5a, Schenectady 1907.



Vandalia #121, VF-4, Pittsburgh 1896.

Vandalia #146, VF-5, Schenectady 1904.



Vandalia #528, VG-4, Pittsburgh 1893.

In 1895 the Pennsylvania R. R. acquired control of the Terre Haute & Indianapolis and subsequent to the receivership, on January 1, 1905, the Vandalia R. R. came into being. This was a consolidation of the Terre Haute & Indianapolis R. R., the St. Louis, Vandalia & Terre Haute R. R., the Terre Haute & Logansport R. R., the Logansport & Toledo R. R. and the Indianapolis & Vincennes R. R., an 800 mile system extending from East St. Louis, Illinois to Indianapolis, Vincennes, South Bend and Butler, all in Indiana. Like the Grand Rapids & Indiana R. R., the Vandalia was operated by its own management but, like all of the other controlled roads, it was brought into the Pennsylvania "family" by a consolidation with the Pittsburgh, Cincinnati, Chicago & St. Louis R. R. on December 10th, 1916.

The records of the Baldwin Works show that they supplied the first twenty-five locomotives to the St. L. V. & T. H. R. R. between 1867 and 1870. These were chiefly of the 4-4-0 type and were typical Baldwin engines of the period. Additional locomotives were purchased from both the Baldwin and the Pittsburgh Works and these were assigned to the roads controlled by the Terre Haute & Indianapolis. In 1890 there was a group of 4-4-0 engines received from the Pittsburgh Works with 19x22″ cylinders and two years later, from the same works came a group of 4-6-0 type locomotives with 20x26″ cylinders and 72″ drivers.

As the result of my visits to that section, there were several groups of their locomotives that left a distinct impression with me. In 1895, the Schenectady Works completed four 4-4-0 type locomotives with 20x24″ cylinders, plain slide valves, 73″ drivers and weighed 129,000 lbs. In 1899, four more of the same type were delivered with 20x26″ cylinders and 78″ drivers. These were typical Schenectady designs found on many of our railroads—B & A, C & N W New Haven and Northern Pacific and unless too heavily loaded, they could turn in a fine performance. Between 1902 and 1910, the Schenectady Works delivered nineteen locomotives of the Atlantic type. The first lot had plain slide valves, those that followed had piston valves. The first group had 20½x26″ cylinders and those that followed had 21x26″ cylinders. All had 79″ drivers and the last group weighed 187,700 lbs. The last ten of this group were subsequently superheated. Their last passenger engines were three groups of Pacific type locomotives from the Schenectady Works delivered between 1910 and 1913. All had 24x26″ cylinders, 80″ drivers and the last eight engine weighed 263,000 lbs. The first group were not superheated upon delivery but superheaters were subsequently applied. All had the Walschaerts valve gear, carried 200 pounds steam pressure. They closely resembled the K-28 class of the P. R. R. and they could and did handle successfully the trains between Indianapolis and St. Louis.

The Vandalia used the Mogul type extensively for freight service. Between 1896 and 1903, the Pittsburgh Works delivered twenty-three of this type with 20x26″ cylinders, 63″ drivers and weighed better than 140,000 lbs. All had plain slide valves, the first half of the group had narrow fireboxes, the last ten engines had wide fireboxes. In 1903-4, the Schenectady Works furnished fifteen locomotives with 21x28″ cylinders, Walschaerts valve gear, 63″ drivers, weight 187,000 lbs., 200 pounds steam

pressure and a tractive effort of 33,300 lbs. In 1907, twelve more were purchased and when these were superheated, they were given a 21½x28″ cylinder.

Under Pennsylvania control, it was only a question of time before their standard classes were sent over. The 1917 roster lists 169 locomotives ordered by the Vandalia and 83 built to P. R. R. standards, 26 of the latter were of the H-3 class. The last order were the four Pacifics, road numbers 9-12, delivered in 1913 and, be it said to their credit that all of these engines handled their passenger trains capably until the time of the consolidation. It was a sad sight to see them standing idle, rusting away, along with a lot of their "sisters" behind the roundhouse in Indianapolis. So much for standardization since they could not be sold for service on other roads. No one wanted them.

Photographs of Vandalia locomotives in actual service are not too common and the illustrations herewith have been selected from the Loomis collection and the files of this Society. They will convey better than words their own description and I hope that my few remarks will place them in their proper setting.

Henry Witherly Benchley (1822-1867)

Lieutenant Governor of Massachusetts—Railroad Conductor in Texas

By Andrew Forest Muir

It is a truism in American politics that, although but one heart beat separates an American vice president from the White House, most whilom vice presidents quickly disappear into the obscurity from which they briefly emerged. Even truer is the principle when applied to lieutenant governors, for the fame of few of the second highest executives of states has survived the termination of their official terms. An interesting case in point is that of Henry Witherly Benchley, who, having served for two years as lieutenant governor of the Commonwealth of Massachusetts shortly before the War of Rebellion, disappeared not only from Massachusetts but from public attention as well.

Benchley was born in Valley Forge, Pennsylvania, February 20, 1822, and his early years are even more obscure than the remainder of his obscure life. As early as 1848, however, he was a resident of Worcester, Massachusetts, where, according to the annual city directories, he worked as an armorer. By 1855 he had become a clerk in a store operated by one Merrifield. Turning his attention to politics, Benchley served in the house of representatives of the General Court of Massachusetts in 1853 and 1854 and in the senate in 1855. On November 6, 1855, he was elected lieutenant governor with 48,831 votes, and on November 4, 1856, he was reelected with 94,330 votes. Covering the calendar years of 1856 and 1857, Benchley's tenure was apparently uneventful. During the latter year, probably because of his former vocation as a mechanic as well as his residence in Worcester, he spoke at the dedication of the Mechanics Hall in that city.

Shortly after the end of his political career, Benchley removed to Texas. The first available record of him there, dated April, 1859, is a broadside announcing the opening of a singing school in San Antonio.

> It is conceded by all [he wrote in it] that the cultivation of Vocal Music is conducive to health, promotes unity and happiness in families, adds charm to social life, and is indispensable to the proper performance of the services of the sanctuary. It can and should be cultivated by all who have a voice to sing, and the ability to appreciate musical sounds.

At a fee of a dollar a month Benchley offered bi-weekly class instruction to both adults and children. Apparently San Antonio was unappreciative of the opportunities he extended, for by April of the following year he had removed Benchley's Singing Class to Houston, where his wife was titillating Victorian propriety with public lectures.

In July, 1860, Benchley began acquiring real estate in Texas, and until the end of his life he was actively engaged in buying and selling. Shortly after the outbreak of the Rebellion he was employed as a conductor by the Houston and Texas Central Railroad Company, then

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In July, 1860, Benchley began acquiring real estate in Texas, and until the end of his life he was actively engaged in buying and selling. Shortly after the outbreak of the Rebellion he was employed as a conductor by the Houston and Texas Central Railroad Company, then

operating between Houston and Millican. A Yankee, and probably an unionist, he possibly sought this job because the first Confederate exemption act had specifically exempted railway workers from military service. Certainly he was serving as a conductor early in the summer of 1863 when an Union officer, who had been captured in southern Louisiana shortly after the fall of Vicksburg, encountered him in this capacity as a group of prisoners was being removed by train from Houston to a prison of war camp at Hempstead.

> The conductor [Colonel Nott wrote] soon came upon his rounds, and as he passed me, asked in a whisper, if there were any Massachusetts officers among the prisoners. He was a tall, fine-looking man, with the tightness and trimness of dress that no one ever finds in a Southerner. I asked who he was, and learnt that he was Lieutenant-Governor B————, of Massachusetts. The fact was even so—an ex-Lieutenant-Governor of Massachusetts was a conductor on the South Western Railroad of Texas!

In February, 1864, Benchley left his position as conductor for another job with the railroad, possibly as armorer agent, but in 1865 he was again working as conductor. As such he continued for the remainder of his active life.

Although the head of a family consisting of his wife, Marietta K. Benchley, and four children, Benchley apparently never maintained a home in Houston, for he appears always to have roomed and boarded in the residence of D. O. Allen, a civil engineer, who served as Benchley's agent and attorney in fact when he was absent from town. His household property, indeed, consisted of no more than a bedstead, two mattresses, a pair of blankets, four pillows, and a trunk. As early as November 15, 1866, Benchley was ill, and he remained under a physician's care until February 24, 1867, when, during the absence of his wife in the north, he died of an unspecified disease. A day or two later his remains, encased in a metal coffin, were followed by eight carriages to the Masonic and Episcopal cemeteries, and there the burial service was read by the Reverend W. Rees, a Methodist minister. The Houston and Texas Central later erected a modest tombstone at his grave.

The only memorial to Benchley is the town of Benchley, in southwestern Robertson County, Texas, on the route of the former Houston and Texas Central. This settlement, originally known as Staggers Point, was named Benchley in honor of the former conductor by the land trustees of the railroad company who platted the town in 1869.

Worth Reading

Compiled by ELIZABETH O. CULLEN, *Librarian,*

Bureau of Railway Economics, Association of American Railroads,
Washington 6, D. C.

Books and Pamphlets

Applications of Electricity to Railways 1953. Bibliography of Periodical Articles . . ., prepared by Edmund Arthur Freeman, assistant librarian, Bureau of Railway Economics Library, Association of American Railroads. iv, 46 p. Classified by subjects such as "Railroad Electrification"; "Locomotives, Diesel-Electric"; "Locomotives, Electric"; "Air Conditioning, Cooling, Heating, Ventilation"; "Brakes"; Current"; "Electronics"; "Equipment—[in offices, railcars, shops, stations, terminals, trains, and yards]"; "Power"; "Radio and Communications"; "Signals and Train Control"; "Snow and Ice Melters"; "Television"; "Testing Equipment"; "Welding", and compiled from 46 periodicals published in United States, Great Britain, France, Germany, Belgium, and Switzerland. Appendix, pp. 33-46, contains lists contributed by the Communications, Electrical, and Signal Sections, A. A. R., Chicago, Illinois. Free on request to BRE Library, Washington 6, D. C.

Arid Domain—The Santa Fe Railway and Its Western Land Grant, by William S. Greever. x, 184 p. Stanford, Calif., Stanford University Press. $4.00.

Britain's Atomic Factories—The Story of Atomic Energy in Britain, by K. E. B. Jay, Division of Atomic Energy, Ministry of Supply. ix, 100 p., illus., diagrs. London, England, Her Majesty's Stationery Office. 5 shillings. For sale for $1.25, by British Information Services Sales Office, 30 Rockefeller Plaza, New York 20, N. Y.

British Railway History—An Outline from the Accessions of William IV to the Nationalisation of Railways, 1830-1876, by Hamilton Ellis. 443 p. Illus. London, England, George Allen and Unwin Ltd. $4.62.

. . . *Centralized Traffic Control—Multiple Line Systems including Carrier Control Operation,* by Signal Section, Association of American Railroads, Chicago 5, Illinois. *Chapter IV—Part 2* of its American Railway signaling Principles and Practices, published 1954. 147 p., illus., diagrs. For sale by Signal Section, 59 E. Van Buren St., Chicago 5, Ill. $1.25. Original (1940) edition of Ch. IV describes the series line systems, and is now referred to as Part 1.

Chinese Railways and British Interests 1898-1911, by E-tu Zen Sun (Mrs. Shiou-Chuan Sun). x, 230 p. New York, King's Crown Press, Columbia University. No price given.

The Class Rate Cases and the Minnesota Economy, by Edmund A. Nightingale, professor of economics and transportation, University of Minnesota. 6 p. Published as Business News Notes No. 19, Dec. 1954

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. . . Code of Rules Governing the Condition of, and Repairs to, Freight and Passenger Cars for the Interchange of Traffic adopted by Association of American Railroads Operations and Maintenance Dept. Mechanical Division. Effective January 1, 1955. 389 p. For sale by Mechanical Division, A. A. R., 59 E. Van Buren St., Chicago 5, Illinois. 83 cents.

The Commerce Clause in the Constitution of the United States, by M. Ramaswamy, advocate, High Court of Mysore, Bangalore, India. 648 p. With a foreword by Robert H. Jackson. New York, Longmans, Green & Co. $10.50. ". . . This book is a painstaking study of the judicial development of this great federal power. It does not follow the classifications conventional in most discussions of the subject by American scholars. It is not an effort to bring the [Supreme] Court's work to the bar of judgment. It is a comprehensive review of the application of this clause to solve the conflicts and controversies that have arisen between local and national interests. . . ."

Development of Pressurizing, Combustion, and Ash Separation Equipment for a Direct-Fired, Coal-Burning, Gas Turbine Locomotive, by J. I. Yellot and others. 37 p. Illus., diagrs., graphs. New York 18, N. Y., American Society of Mechanical Engineers. 50 cents.

Diesel-Electrics . . . How to Keep 'Em Rolling. 139 p. Illus., Diagrs. New York 7, N. Y., Simmons-Boardman Publishing Corporation. Reprinted from Railway Locomotives and Cars.

The Economic State of New England. Report of Committee of New England, National Planning Association. xii, 738 p. Published by arrangement with the New England Council by Yale University Press, New Haven, Conn. $6.00. "Freight rates and New England's competitive position" pp. 443-471. "The New England transportation system and its uses" pp. 473-526.

Economics of Canadian Transportation, by A. W. Currie. vii, 727 p. Toronto, University of Toronto Press. $10.00. ". . . A fundamental and persistent problem in the history of Canadian transportation is the interplay of two radically different concepts: straight business principles on the one hand; and such matters as national unity, the movement of trade through Canadian ports, the opening up of new areas, defence, and avoiding the ruination of national credit on the other . . ."

The Economics of Transport, by Michael R. Bonavia. With an Introduction by C. W. Guillebaud. Revised ed., 1954. "Cambridge Economic Handbooks.—IX." xii, 219 p. London, England, Nisbet & Co. Ltd.; Cambridge, England, at the University Press. 8 shillings 6 pence.

Economics of Transportation in the United States—Some Essential Sources, A Bibliographical Memorandum, by Elizabeth O. Cullen, librarian, Bureau of Railway Economics Library, Association of American Railroads, Washington 6, D. C. 29 mimeo. 1. Free on request to BRE Library. "Requests for information on economic, financial, and legal aspects of transportation regulation, co-ordination, and consolidation in the United States are being received in increasing numbers from

railroad officers and from students of transportation throughout the world. . . . As an introduction to essential sources of information about the United States of America, the following bibliographical memorandum has been prepared to respond to these requests. Dated September 20, 1954.

The Florida Special, 1888-1954. A History, including Newspaper Accounts of the Initial Run, Jan. 9, 1888. 3 mimeo. 1. Free on request to Atlantic Coast Line Railroad Public Relations Representative, Wilmington, North Carolina.

The Freight Traffic Red Book . . . 1955. 26th annual edition, compiled and edited by Charles J. Fagg, Walter W. Weller. 1372 p. including Indexes. Folded map in color of Railroad Freight Classification Territories and Freight Association Rate Territories. New York 13, N. Y., Traffic Publishing Company. $15.00. "A Practical Reference Book for those actively engaged in Traffic Work; An Everyday Guide for the Shipper; A Condensed but Comprehensive Text Book for the Student of Freight Transportation" as well as for students in many other fields.

Gateway to the Northwest—The Story of The Minnesota Transfer Railway, by Frank P. Donovan, Jr. 32 p. Illus., Maps. Published by author, 114 W. 45th St., Minneapolis 9, Minn. 60 cents, paper-bound; $2.00 cloth-bound.

Great Railroad Stories of the World, edited with notes by Samuel Moskowitz. Introduction by Freeman H. Hubbard. New York, The McBride Co. $3.95. xii, 331 p. Contains: *Big Engine,* by William Edward Hayes; *Blowing Up A Train,* by T. E. Lawrence; *The Far and Near,* by Thomas Wolfe; *Flagman Thiel,* by Gerhart Hauptmann; *The Man Who Confessed,* by Frank L. Packard; *Mrs. Union Station,* by Doug Welch; *The Signal Man,* by Charles Dickens; *The Stolen Railroad Train,* by Marquis James; *A Tale of the Old Main Line,* by A. W. Somerville; *Trackside Grave,* by Jack McLarn; *A Toot for A Toot,* by Octavus Roy Cohen; *Train Going,* by William Saroyan; *Virginia and Truckee,* by Lucius Beebe and Charles Clegg; *Yardmaster,* by Jack McLarn.

A History of Piggy-Back, by Seymour Weitz. 23 proc. 1. Paper submitted to American Society of Traffic and Transportation, December 1954. Author's address is New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.

Important Accessions 1954, Bureau of Railway Economics Library, by Harry L. Eddy, asst. reference librarian. 11 proc. 1. Sent out with its Recent Accessions of Interest No. 1020, Jan. 26, 1955. Free on request to BRE Library, Association of American Railroads, Washington 6, D. C. Lists annual reports of foreign railroads; bibliographies and reference lists; books; periodicals; proceedings; statistics and year books, and United States Government reports.

List of Maps showing Railway Lines—Revised December 1954, by Association of American Railroads, Washington 6, D. C. Free on request. " . . . While this Association does not publish maps for distribution, we have canvassed the publishing field and compiled the accompanying list of more than two hundred maps and atlases, with addresses of publishers, . . . "

Little Engines and BIG MEN, by Gilbert A. Lathrop. 326 p. Illus. Caldwell, Idaho, Caxton Printers, Ltd. $5.00. "This book is dedicated to the memory of Big Men and their Little Engines who lived the events which made the Story of Colorado's Narrow Gauges possible." ". . . they opened to men and their families homes in the then inaccessible high country . . . There was a fraternity that was deeper than friendship between the folks who lived along the narrow gauges and the men who operated the trains. . . . "

Locomotives In Our Lines—Railroad Experiences of Three Brothers for More Than Sixty Years 1890-1951, by A. Sheldon Pennoyer. xv, 238 p. Illus. New York, Hastings House—Publishers. $5.00. " . . . three brothers with careers as different as diplomacy, painting and law. . . . "

Moody's Transportation Manual—Railroads—Airlines—Shipping—Traction, Bus and Truck Lines—1954. xxxvii, 1529 p., with Special Features Section, pp.a1—a114 inserted bet. pp. 800 and 801. New York 6, N. Y., Moody's Investors Service. $63.00. American and foreign coverage.

New 'Push-Button' Railway Fun, Reporter Discovers, by Alfred C. Anderson. ". . . From Memphis to Bruceton on NC&St.L. . . ." Reprint from Memphis, Tenn. Press-Scimitar, Sept. 16, 1954, free on request to Nashville, Chattanooga & St. Louis Ry. Public Relations Representative, D. R. Hackney, Union Station, Nashville 2, Tenn.

"The Nickel Plate Road"—A Short History of the New York, Chicago & St. Louis R. R., by Lynne L. White, chairman of the board and president, . . . Cleveland, Ohio. 28 p. New York, San Francisco, Montreal, The Newcomen Society in North America. Address at "1954 Lake Erie Dinner," Hotel Lawrence, Erie, Penna., of The Newcomen Society, Nov. 11, 1954.

Off With the Old—On With the New . . . The Story of the Steam Locomotives of the Bessemer and Lake Erie Railroad and Predecessor Companies, by Roy C. Beaver, general manager, Frick Building, Pittsburgh 30, Penna. Dated July 15, 1954 and distributed in place of September issue of The Bessemer Bulletin. 64 p. Illus. For copies write to Mr. Beaver.

Popular Carriage—Two Centuries of Carriage Design for Road and Rail, by C. Hamilton Ellis. 32 p. Illus. London, Eng., British Transport Commission. 1 shilling.

Presentation of the Association of American Railroads to the Working Group of the President's Cabinet Committee on Transport Policy and Organization—A Summary. 16 mimeo. 1. Free on request to Law Department, Association of American Railroads, Washington 6, D. C.

Productivity—A Critique of Current Usage, by Lawis A. Maverick, professor of economics, Southern Illinois University. 34 p. including "Selected Bibliography" pp. 22-30. For sale by author, 701 South Oakland Avenue, Carbondale, Ill.

Progress in Railway Mechanical Engineering 1953-1954, by Committee (RR-6) on Survey, The American Society of Mechanical Engineers. T. F. Perkinson, chairman. Preprint. 17 proc. p. 46 illus. and diagrs.

Bibliography p. 15. Captions for illustrations, pp. 15-17. "Preprints will be available until October 1, 1955" from The Society, 29 W. 39th St., New York 18, N. Y. 25 cents to members; 50 cents to others. ". . . Nuclear energy, as it concerns motive power, received notable attention during the year . . ." p. 2. ". . . No treatise on the subject of railroad equipment would be complete without a reference to so-called 'Piggyback' or rail-trailer operation. . . ." p. 13.

Rail Oddities—Odd and Interesting Facts about the Railroads. December 1954 edition. 40 p. Illus. Free on request to Association of American Railroads, Washington 6, D. C.

Rail Trailer. Trailers on Flat Cars—A Series of Questions and Answers. April 1954, by The Rail-Trailer Co., 228 N. LaSalle Street, Chicago 1, Ill. [100] mimeo. 1. Free on request to the company. ". . . contains over 125 questions and answers, so planned as to bring out all the facts concerning the economic, legal and historical development of trailers on flat cars."

The Railroad Passenger Deficit Problem. 1954 report of Special Committee on Cooperation with the Interstate Commerce Commission in the study of the . . . Problem. Washington, D. C., P. O. Box 684, National Association of Railroad and Utilities Commissioners. $1.00.

Railroads—Yesterday, Today and Tomorrow, by Owen Clarke, Interstate Commerce Commissioner. 19 mimeo. 1. Remarks at Seattle, Washington, Chamber of Commerce Railroad Day, Oct. 22, 1954. Abstracts in Traffic World, Oct. 23, 1954, pp. 35-36; Railway Age, Oct. 25, p. 8.

Realistic Goals for Railway Passenger Car Design, by T. C. Gray, vice-president, Engineering, Pullman-Standard Car Mftg. Co. 28 p. Illus., Diagrs. Contributed by Railroad Division, The American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. Preprints available from the Society until Oct. 1, 1955, but price not stated. Abstract including illustrations and diagrams in Railway Locomotives and Cars, January 1955, pp. 52-55, 60.

Traffic World's Questions and Answer Book—Vol. 6. xx, 226 p. Washington 5, D. C., The Traffic Service Corporation. $3.00. ". . . contains all . . . that have appeared in Traffic World from July, 1953 to June, 1954, inclusive."

Train and Engine Books for Children, 6th edition. ". . . a guide to library reading and as a buying guide . . ." 19 p. Free on request to Association of American Railroads, Washington 6, D. C.

Transportation and Communication, by G. Lloyd Wilson. xi, 757 p. New York, Appleton-Century-Crofts, Inc. $6.00. ". . . designed as a general textbook for under-graduate students of business administration or graduate students who have not had a course in the transportation and communication utilities . . ."

Transportation In An Atomic Age, by Richard L. Bowditch, chairman of the board, Chamber of Commerce of the United States. 17 mimeo. 1. Address to 9th annual meeting, American Society of Traffic and Transportation, Inc., October 29, 1954. Free on request to Chamber of Commerce of the United States, Washington 6, D. C. ". . . If we're going to think of transportation in terms of an atomic age, let's project

our thinking to the year 1975. I choose that date because it's the one that has been selected by the President's Material Policy Commission in its 1952 report as the base year for projecting future needs of the nation. And I have another reason for choosing 1975. It's so close to 1976—the 200th anniversary of the United States—and Dr. George R. Harrison, Dean of the School of Science at MIT, has made some highly interesting projections based on 1976. By the year 1975, we will have just begun to reap the benefits of atomic energy. . . ."

WHO'S WHO in Railroading in North America—13th Edition—1954. C. B. Tavenner, editor. Anna Ortlinghaus, associate editor. 805 p. New York 7, Simmons-Boardman Publishing Corporation. $14.00.

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Andean Rollercoaster, by Barrie Tait. The Grace Log, Jan.-Feb. 1955, pp. 8-9. Illus. ". . . The Guayaquil and Quito Railway. . . . it provides travelers with a complete portrait of Ecuador—from snowy heights to jungle floor . . ."

Application of Modern Scientific Research on Railroads of the United States, by Loyd J. Kiernan. United Nations Transport and Communications Review, July-Sept. 1954, pp. 26-54.

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Burlington Route Installs First Prestressed Concrete Trestle Slabs in the U. S. Concrete for Railways No. 51, [1955], pp. 3-5. Illus.

The Burlington To Try Building Truck Trailers in Nebraska Car Shops. If Pilot Model Proves Successful, Line May Build All Its Own Units Instead of Buying, by Ray Vicker. The Wall Street Journal, Feb. 1, 1955, p. 4.

Capital Development in U. S. A. Transportation, by Wilfred Owen. British Transport Review, Dec. 1954, pp. 202-212. ". . . Demands for new transportation investment have been compounded by the fact that people and goods are not moving in the same way or even in the same places as they did before the war. Changes in methods of movement have been accompanied by shifts in population from the East to the West and from the centre of cities to the more remote suburbs. . . . the two major areas in the postwar capital development programme have been railroad and highway transportation . . ."

CHICAGO UNLIMITED. Town & Country, Dec. 1954, pp. 86-87, 130, 133, 136. Illus. Prize plans for future development in Carson Pirie Scott's Centennial Competition, which include "a single transportation terminal which would not only handle Chicago's passenger railway traffic, but would also contain a bus terminal and a heliport" p. 133. Given to the City of Chicago.

Cotton Belt Builds Tilt-Up Freight House in Dallas. Concrete for Railways No. 51 [1955] pp. 6-9. Illus.

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Faith in Steam . . . The Story of Norfolk & Western Locomotives, by David P. Morgan. Trains, November 1954, pp. 18-30. Illus.

Ferrocarriles Nacionales—El Ferrocarril Guayaquil—Quito, Su Pasado, Su Presente y Su Porvenir, by Magdaleno Collaguazo. List of General Managers since June 1944, p. 12. Financial and operating statistics 1941-1953, p. 12. Nariz del Diablo—Revista Ferroviario, Quito, Ecuador, Diciembre 1954, pp. 7-12.

The First Diesel Rack Locomotive. Diesel Railway Traction, London, England, pp. 255-256. Illus. For Monte Generoso Ry., Switzerland.

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Magnetic Particle Testing of Freight and Passenger Car Parts, by Kermit Skeie. The Car Foremen's Association of Chicago. . . . official proceedings covering the meeting of December 1954, pp. 20-28.

Nevada's Golden Railroad, by Lucius Beebe. Railroad Magazine, Jan. 1955, pp. 10-21, 56. Map and Illus. "The Virginia & Truckee, which served Nevada's fabled Comstock Lode during its bonzana years of the nineteenth century, was altogether a unique operation. It enjoyed the distinction of becoming legendary in its lifetime. . . ."

N S B Tekniske Meddelelser, Oslo, Norway, Sept. 1954—[Norwegian State Railways Centennial Issue, reviewing track development; locomotives and cars; construction and extension of lines; telephones, telegraph and other communications; signaling and interlocking for 100 years and electrified sections and electrical equipment for the last 40 years, with a reflection by a railway official (Nils Eckhoff) on the century of development and the solution of today's railroad problems] [59] p.

Overseas Railways 1954—A Railway Gazette Publication, London, England. 136 p. Illus. Maps. Articles on railroads in Australia and New Zealand; East Africa, Nigeria, Nyasaland, Rhodesia, South Africa, Sudan; Iraq; Burma; Ceylon; India; Malaya; Pakistan; Thailand; Canada; South America; Eire, introduced by "Railway Progress During 1954" by The Editor of The Railway Gazette. 238 p. of advertisements carrying out theme, illustrated part in color.

Piggy-Back Railroading—There's Happy Motoring Ahead Once Those Trucks Are Off The Road, by William F. McDermot. Pageant, December 1954, pp. 94-95. ". . . One of these days a most welcome, familiar sight will be a freight train of 100 cars speeding across the landscape with 200 mammoth truck trailers in tow. Just imagine those 200 trucks clogging the highway in your land, and you'll give thanks for the advent of piggy-back railroading."

Piggy-Backs . . . How're They Doing? by Nancy Ford. Modern Railroads, Feb. 1955, pp. 53-55. "A new era in transportation will be under way when the biggest railroad starts a new piggy-back service this month" [PRR's "True-Train"] ". . . And Now 'Fishy-backs' "—box, p. 55, Miami, Fla. to Puerto Rico, from March 1—"a project of TMT Trailer Ferry, Inc."

Planned Progress Projected, by D. B. Jenks, executive vice president, Rock Island. Central Western Shippers Advisory Board Proceedings No. 70, Nov. 8-9, 1954, Lincoln, Nebraska, pp. 23-27. ". . . I think the time has come for us to take a good, straight look at the future of the railroad industry as we, on the Rock Island, see it. . . . The other day I was talking to Harley Earl, Chief Designer for General Motors, and he was telling how they were working as much as five to ten years in advance for car models. Well, we are working on advance designs for better transportation, and we are looking more than ten years ahead. . . ."

Push-Button Railroading—Freight Cars Are Classified by Electro-pneumatic Devices, by J. C. Pierce. Compressed Air Magazine, Nov. 1954, pp. 308-312. Illus. At Bensenville, Ill. yard of The Milwaukee Road.

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Rails West—The Rock Island Excursion of 1854 as reported by Charles F. Babcock. Minnesota History, Winter 1954, pp. 133-143. Illus. Babcock was "editor of a leading Connecticut newspaper, the New Haven Palladium . . . from June 1 to 15, he mailed . . . long and detailed letters that were published each day in his paper. Clipped from the Palladium and mounted in a little leather-bound notebook, a set was presented to the Minnesota Historical Society in 1933 by Mr. Jefferson Jones of Minneapolis. . . ."

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Railway Freight Traffic Piggyback Issue, January 1955. 56 p. illus., with most advertisements related to subject.

The Railways of Australia 1854-1954. The Railway Gazette, London, Eng., Sept. 17, 1954, pp. 321-323. Map p. 320. See also p. 315 for "The First Steam Railway in Australia. Contemporary drawing by S. T. Gill of the original city terminus of the Melbourne & Hobsons Bay Railway in 1854."

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New Books

Gateway to the Northwest, by Frank P. Donovan, Jr. 32 pages, 7⅞ x 5¼. Published by the author, 114 West 45th Street, Minneapolis (9), Minnesota. Illustrated. Price, 60c paper; $2.00 cloth.

This is a story of the Minnesota Transfer Railway, a road controlled by the nine railroads entering the Twin Cities, and the way it functions and serves the Northwest. The road is to the northwest what the Potomac Yards, opposite Washington, is to the south. True, the Minnesota Transfer Ry. does not run any "limiteds" with vista domes cars but, in its daily performance it shuffles plenty of freight cars to their proper destinations. In this book the author has combined with the daily performance, a brief account of its managers, its motive power and how the road came into being. There are two good maps to show its location and connections, several illustrations and an index. Our author-member is to be congratulated for his presentation of this subject and we can only hope our members will encourage him in this effort.

Locomotives of the Western Pacific, by Fred A. Stindt and Guy L. Dunscomb. 140 pages, 6 x 10, flexible ring type binder. Published by the authors, copies may be procured from Guy L. Dunscomb, 1027 Yale Ave., Modesto, California. Price $4.00, California residents $4.12.

The Western Pacific was by no means our first railroad to reach the Pacific Coast nor is it the largest but, from the reports that reach us here in the East, it is noted for its "California Zephyr," the scenic Feather River canyon and its capable management.

The authors of this interesting book have chosen to tell their story by the means of pictures; a fact that every "railfan" will appreciate. Where all of these illustrations came from over the years, one can simply wonder but it must have represented time and effort to assemble them and prepare them for the printer. However, the book has other good points besides the illustrations. The first thirty-four pages cover a brief history of the road and its branches, together with two good maps. The individual railroads acquired are given in detail and the railroad facilities are given at the different places. There is a good general description of all of their locomotives and additional history on certain locomotives. There is a complete roster and specifications of all locomotives together with their disposition and at the close there are several pages containing diagrams of the different locomotive classes, together with the dimensions which, in the years to come, should be of value to the model building fraternity. Some of our members gained the impression from the notice mailed them, that this book was published by our Pacific Coast Chapter. Such is not the case, it is the joint effort of the two authors who offered to set aside a portion of the receipts from each book for the equipment fund of that chapter. So far as the book is concerned, it represents one of the most careful and complete pieces of research that has been made in years of a single railroad and its interesting form of presentation cannot help but interest our membership. The quality of the work is in keeping with the road itself.

Grierson's Raid, by D. Alexander Brown. 261 pages, 9 x 6, illustrated. Published by the University of Illinois Press, Urbana, Illinois. Price $4.00.

This is the story of a volunteer brigade of Union cavalrymen under the command of Colonel Benjamin Grierson, that left their headquarters in La Grange, Tenn. on April 17, 1863 and sixteen days, 600 miles and several skirmishes later, entered Baton Rouge in triumph having ridden through the entire length of the state of Mississippi.

Grant was getting ready to attack Vicksburg and the purpose of this raid was to harass and divert the Confederates and to cut the Vicksburg & Meridian R. R. if possible. Within each cover of the book is shown the daily progress of the raiders and each chapter is devoted to a days advance with an inset map. The author, who by the way is the Librarian of the University of Illinois, has presented a smooth flowing account of this daring raid and many of the facts are based on the diary of one Sergeant Richard Surby of the scouts. As you read the book, one cannot but wonder how long Grierson's luck will hold in the face of all of those Confederate troops but, by clever maneuvers and ruses he succeeds in outwitting them and gains the safety of Baton Rouge. There is some railroad material in this book that will be of interest to the railroad historian but the book as a whole should be of interest because it recounts one of the most daring exploits of the Union Army.

British Railway History, 1830-1876, by Hamilton Ellis. 443 pages, 9⅛ x 6, illustrated. Published by George Allen and Unwin Ltd., London but copies may be procured from The Macmillan Co., 60 Fifth Ave., New York (11), N. Y. Price $6.75.

This is evidently the first volume in a set to cover the history of the British Railways to the time of their amalgamation into one large system. The author has wisely divided this work into three parts: 1830-1845, 1845-1861 and 1861-1876. In each part he has devoted his chapters to the origin and growth of the railways of that period and included a special chapter on the locomotives or the mechanical development during that same period. Thus the period from the building of the Liverpool & Manchester R. R., the first inter-city line to the time the Midland Ry. was completed to the border, the third and last main line, is covered in this book.

To the average American, who is not too familiar with his British railways and the location of many of the cities, this book may be a bit difficult but there are so many of the larger and well known companies covered that he should have no difficulty in following the story.

But the book is not a recitation of consolidations and dates. The author has succeeded in making these corporations very much alive through their management, some of which was honest, as on the Great Western and some of which was not as shown by Messrs. Hudson and Huish on their respective companies. In the early years, some of the railway magnates acted the part of robber barons. Then there are the men in the locomotive departments—Webb of the London & North Western and Stroudley, Drummond, Johnson, James and Patrick Stirling, David Jones and William Adams, to name a few. The author has given the part each played on his particular road.

Through the years histories of the individual railroads have been written and, because of the amalgamation, several have appeared in recent years. Some have been authored by the author of this book but this is the first attempt to include all of the railways in a series. Thanks to the well arranged index, this book will be invaluable for reference work but aside from that, if ever one undertakes a similar venture for the railroads in our own country, the author will do well to follow in the path set by Hamilton Ellis. Also, we had our periods of inflation, of overbuilding, our "robber baron period" and our rate wars until we had the steadying influence of the Interstate Commerce Commission in 1887. We were certainly no better and perhaps, no worse. One thing with this author, where praise is deserved, it has been awarded and, by the same token he has dealt out fair criticism even in the use of devices or methods used by our American railroads over those of the British. For a fair and comprehensive history of the British Railways, between the dates mentioned, there is no better book than this one to serve your purpose.

Locomotives in our Lives, by A. Sheldon Pennoyer. 238 pages, 11 x 7¾, illustrated. Published by Hastings House, 41 East 50th St., New York (22), N. Y. Price $5.00.

This is the story of the experiences of three brothers and their adventures with railroads commencing in the "gay nineties" and continuing to the present. Since this is the story of the author and his two brothers, there is no need for comment, one can only hope that Richard was "tanned in the proper place" after "borrowing" that S. F. & N. P. locomotive. The book as a whole, is of interest but this reviewer feels that the author is better at his own vocation as an artist for the work is not carefully planned and is sometimes difficult to follow.

Since many of the paintings done by the author are illustrated, it might do no harm to add a few words of comment here. The majority of our early locomotive builders had definite "earmarks" for their locomotives. These took the form in the stack, the tone of the bell, the shape of the bell yoke, the contour of the sand box and steam dome and the cab as well as others. There are probably not over half a dozen men alive today that can tell the builder and the approximate date of construction from an ordinary photograph but, if one is to delineate these locomotives, he must know these features. In addition he must know something of their capabilities, the line itself and all the hundred and one details that accompany the railroad. In later years, with the advent of railroad standards, he must know these as they originated on the different railroads.

Of the four reproductions of this author handled by this Society several years ago, the one of the "Stourbridge Lion" probably presented the most study and careful execution; those of "Snow Bound" and the "Pioneer" were the most artistic from a color point of view but the "American Express Train of 1870" was overdrawn. The artist claims that one train had had an engine failure and another came along and he depicted this train made up of both. The make up does not indicate

this and most of us are of the opinion that the little locomotive never could have handled such a long train.

A few years back an artist spent a summer in one of our northern New England states and every afternoon there came this two car local making a pretty picture skirting the lake. There was no regular engine assigned the train, sometimes it was of one type and sometimes another and, when the artist decided to paint the scene with the train in the foreground, he evolved a type of locomotive that no one ever saw before or since, thinking that was the best way out of the difficulty. Omitting the train, it was a beautiful painting. Another of our famous artists depicted a wonderful scene with one of our best passenger trains but, right in the foreground, he painted a rail joint that was entirely foreign to what that road used. A small item perhaps but, nevertheless it was out of place. In work of this kind, "artistic license," a convenient refuge, is not permitted.

The author exclaims with delight when he learned that locomotive driving wheels were painted red on the Hudson River locomotive "Empire State." Well, most of them were at the time. Science has come to our rescue and now we can determine accurately the original colors as shown in an ordinary photograph. With this, no artist should go wrong. In his painting of this locomotive and train, if it is standing still, one wonders what the crew are doing and why there is not some sign of life from the passengers at being stopped at this point and if it is moving slowly, then the smoke coming out of the stack is wrong.

His painting for Mr. Winterrowd, Vice President of the Lima Locomotive Works shows a non-descript locomotive and train with two men so close to the locomotive in the foreground, you wonder if they ever heard of "safety first." True, Mr. Winterrowd commissioned the author to paint "any train" and the artist used his own imagination. One wonders if Mr. Winterrowd might not have meant "any train that you are familiar" and, it would have been nice if the artist had selected one drawn by a Lima-built locomotive.

Two portraits of the "De Witt Clinton" appear, the second one an improvement over the first. "The Mountain Division" showing two modern trains passing each other, one wonders why the engineers have not shut off their headlights, something done on most railroads when trains pass each other at night. His painting for the late Daniel Willard, President of the Baltimore & Ohio R. R. faithfully shows the "W. K. Blodgett," a Rhode Island locomotive with its train of three cars but the latter seem to be crowded into the picture.

Delineation of our locomotives or trains, whether old or modern is not easy, it requires not only skill but a fundamental amount of knowledge and study of all phases of the subject but with the knowledge and the material we have at our disposal today, it should be of great help to any of these artists.

Richard H. Johnston

Richard Holland Johnston, retired librarian of the Bureau of Railway Economics of the Association of American Railroads and Life Member of this Society, passed away on January 2nd, last.

Born in Windsor, Ontario, where his father was a Methodist minister, he was graduated from the University of Toronto in 1889 and did post graduate work in theology at Victoria College. He was librarian at the latter college until 1897.

It was this year that Dr. Johnston came to this country and joined the staff of the Library of Congress. He helped the library move from the Capitol to its present site. In 1910 he joined the Bureau of Railway Economics and, with two truckloads of books and a staff of cataloguers, he started their library. When the Association of American Railroads was formed and included the Bureau of Railway Economics, Dr. Johnston and his staff became a part of that organization. Upon his retirement in 1947, this library had some 300,000 books, pamphlets, reports, etc., relating to transportation which is generally conceded as second to none in this country.

Honored by all of the library societies, he wrote a "Bibliography of Thomas Jefferson" in 1905. But the work for which he will always be known best is the one entitled "Railway Economics" which is a collective catalogue listing the books on railroads and transportation in fourteen American libraries. Altho' published in 1912 and out of date because of the years that intervened, it still has great value to the researcher.

Two years after this Society was formed, in 1923, Dr. Johnston applied for and was granted a Life Membership. He always felt that our work, in a measure, supplemented that of his own and the relations between this Society and the Bureau of Railway Economics have always been the most cordial.

"The Chief," as he was affectionately called, was nationally known in library and railroad circles and his passing will leave a gap that will be difficult to fill. Perhaps the library of the Bureau of Railway Economics can be justly considered his life work and monument. If so, I can think of a no more useful memorial to serve the interests of those that are interested in transportation and its history.

In Memory of

Graham Brush
Annual Member
30 East 68th St., New York, N. Y.
Who Died on July 1, 1954

Edward H. Coe
Life Member
8048 North 7th Ave., Phoenix, Arizona
Who Died on Nov. 2, 1954

Harry Cotterell, Jr.
Annual Member
36 Alexander St., Newark, New Jersey
Who Died on February 2nd, 1955

Richard H. Johnston
Life Member
Washington, D. C.
Who Died on January 2nd, 1955

George Plumly
Contributing Member
2812 Midvale Ave., Philadelphia, Pa.
Who Died on August 18, 1954

Kenneth M. Pratt
Annual Member
Bennington, Vermont
Who Died on August 7, 1954