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Captain William Edward Cole And His Pole Road Locomotives Of the American South

By Mike McKnight and Robert T. Rhode

A problem that faced early Southern loggers was how to move to the sawmill trees felled in swampy areas. In floodplains, it was easy to fell the trees and wait until flood stage for loggers to lash the logs together and float them downriver to the waiting sawmill. Often, the floods were unpredictable or did not come for several months. Sometimes, *logging ditches*, small canals built with boarded sides and constructed about 2′ to 3′ in width, were flooded with water and logs were floated to the mill. An alternative—and one widely used for smaller operations—was to employ mules, oxen, or draft animals to haul the felled logs out of the forest, but this had all the limitations inherent in animal power. A suitable alternative was found in steam engines, particularly small locomotives that could be run into the woods on temporary tracks. The cost of metal tracks was a limiting factor, so inventors turned their efforts toward using the one material that loggers had in abundance: wood.

FIG. 8.—COWLES' PATENT LOCOMOTIVE FOR POLE ROADS.
Constructed by Messrs. Spangenberg, Pendleton & Co., Warren, Ohio.

Edward P. Cowles' pole road locomotive was illustrated in the *Railroad Gazette* for the 16th of April in 1886. This mechanically complicated machine was based on Cowles' 1874 patent and featured universal joints to transmit power to all four wheels. This might have been the only locomotive to have been designed to run either on a pole road or on a county road.

On the Cover

Pole road locomotives enabled businesses in the 1880s, 1890s, and early 1900s to expand their logging operations far beyond the dreams of only a few decades before. This Tanner & Delaney pole road locomotive was used in Alabama. Courtesy Three Notch Museum, Tom Lawson Collection

Inside this Issue

Two main types of tracks came into wide use. The more complex system was known as a wooden *tramway*. This design harkened back to the earliest days of railroading and consisted of sawed timbers with crossties. The locomotives had wide, flat wheels to run on the timbers. The second system was known as a *pole road* and was made of trees with the limbs stripped off. On corners, notches were cut in the logs, which were bent around to make rough curves. The end of each log was coped, so that the end of the next log could be fit on top of it, and 2″ holes were drilled through the logs after they were placed on top of each other. A wooden pin was then driven into place, holding the two logs together and fastening the logs to the ground. The pole road was much simpler and could be erected for a fraction of the cost of a wooden tramway, as much less work had to be done to prepare the trees to become tracks. The lack of crossties also helped drive the cost down.

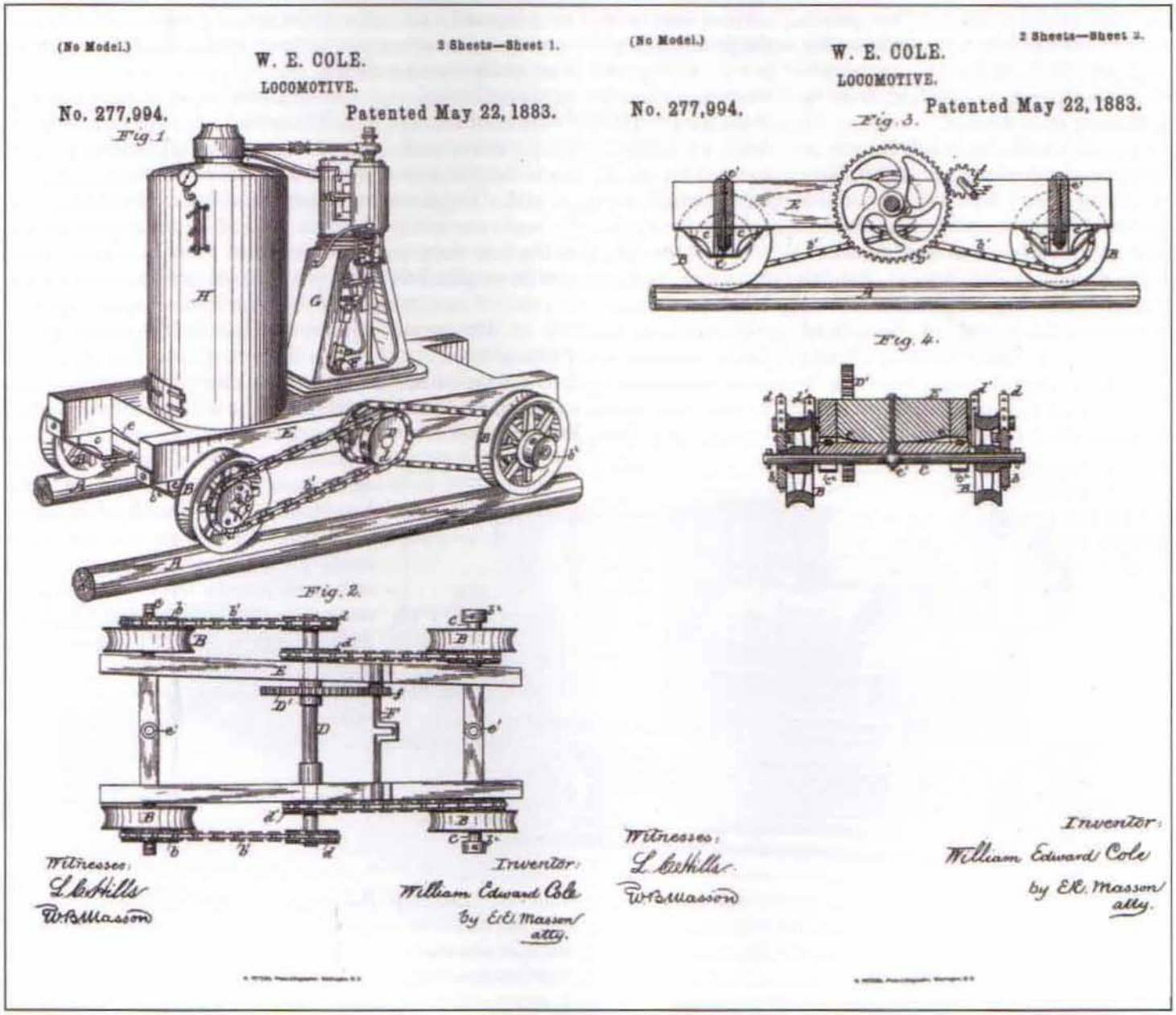
An inventor named Edward P. Cowles, who lived in Wequiock, Wisconsin, northeast of Green Bay, made the effort to build a locomotive to run on pole roads. Cowles was raised on a farm in Genesee County, New York. He had little taste for farm work growing up, instead preferring to invent machines to make work easier for farmers. When the Civil War broke out, he enlisted in the 129th New York Infantry and had worked his way up to first sergeant by

the time he was present at Lee's surrender at Appomattox Courthouse.

Cowles began experimenting with steam traction engines in the early 1870s, and, in 1874, he received U.S. Patent Number 154,846 for a traction engine that was nothing short of revolutionary. It featured a horizontal boiler and a horizontal two-cylinder engine mounted under the frame, with the engine driving all four wheels through a complex system of gears and ball joints. At first, Cowles intended the engine for agriculture, and, in his patent drawing, he showed a pair of plows attached to the engine. By 1880, he had adapted the engine for use on pole roads for logging.

The *Railroad Gazette* for the 16th of April in 1886 ran an article on Cowles' pole road locomotives, which were manufactured by Spangenberg, Pendleton & Company of Warren, Ohio. Four sizes of engines were offered, the largest an engine with 8¼" x 11" cylinders. One novel feature of Cowles' design was that, as it featured steering and flat rims, the locomotive could actually be moved off the pole road and driven down a normal road to tow a load. Strangely enough, the locomotives were offered with either vertical or horizontal boilers.

However revolutionary Cowles' machine was, it was sadly lacking when put into practice. Because of the crude metallurgy and machining of the day, the complex system of gearing and universal joints was too advanced for its time and plagued operators with constant breakdowns. In 1878 in Wisconsin, Cowles' machine handily lost to a much simpler machine in a cross-country race for traction engines. A description of this event, including the frequent



Here are Captain William E. Cole's original patent drawings of his pole road locomotive design. Features of his patent included separate drive chains to each wheel, wheels that would move in and out to follow an uneven track, and front and rear axles which would swivel up and down to follow an uneven track. This simple and robust design proved to be a hit with Southern loggers from the 1880s to the early 1900s.

mechanical problems encountered by Cowles' machine, is found in "The Great Race of 1878" in *Steam Traction* for May and June of 2004.

Though Cowles' pole road locomotive might not have been a particularly useful invention due to its mechanical complexity, he should be remembered as a brilliant inventor. By 1884, he received U.S. Patent Number 303,491 for a flexible truck locomotive. In 1887, Spangenberg, Pendleton & Company built a locomotive of the flexible truck type. Cowles received U.S. Patent Number 307,709 for the unusual design that featured a piston located in between two sets of drive wheels. Two piston rods projected fore and aft from the singular piston, and both piston rods went to separate connecting rods to drive each set of wheels.

By 1891, Cowles had made his way to New Decatur, Alabama—a city that was becoming a new industrial center of the South. While in Alabama, Cowles received patents on stationary steam engines: U.S. Patent Number 465,241 was for a compound engine, U.S. Patent Number 465,241 was for a balanced valve, and U.S. Patent Number 470,683 was for a cut-off mechanism for a steam engine. By 1896, he had gone on to work for the fledgling automotive manufacturer Packard, where he would make his biggest mark in the engineering world. He received numerous patents while working for Packard. Cowles assigned many patents to the automobile manufacturer, and, later, Packard bought many of his other patents for their cars. While still working for Packard, Cowles conducted an interview in 1917 at age 76 that not only accounted for his exploits during the Civil War but also revealed how his spry mind continued to forge inventions and patents. Cowles died on the 21st of January in 1927 at the advanced age of 87 and was buried in Michigan.

What was needed to adequately fill the Southern loggers' needs for steam power to run on pole roads was a machine much simpler than Cowles'—more robust and easily repaired in the field. As former sawmill worker and famous live steam machinist the late Jesse Livingston once said, "Loggers can tear up anything!"

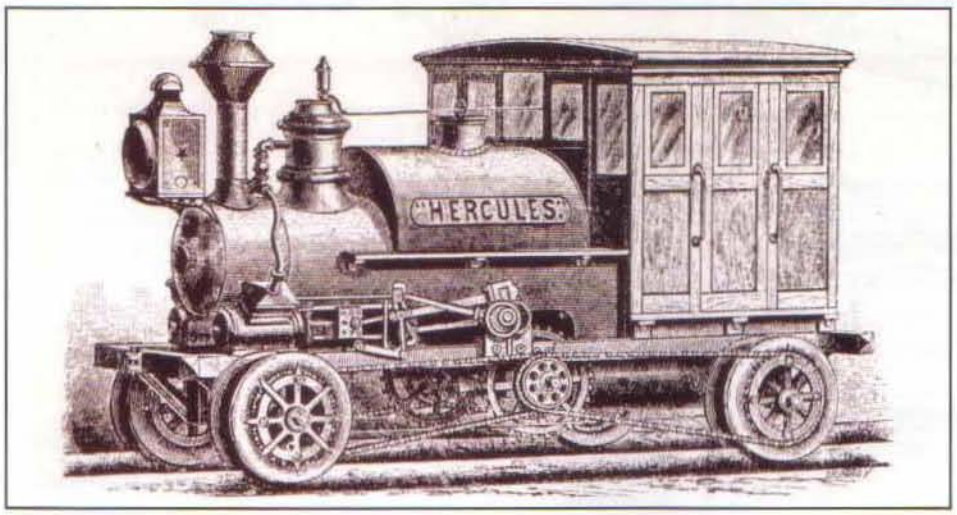
History records that the best design for a pole road locomotive originated in the South.

In 1883, an inventor in Mountain Creek, Alabama, received a patent for a small locomotive built to run on wooden pole rails. He was Captain William Edward Cole. Born in 1848, Cole was the son of James Cole, a railroad worker in Alexandria, Virginia. In the late 1870s, Cole owned and operated a steamboat hauling freight on the Alabama River. According to the *Baltimore Sun* for the 6th of December in 1902, Cole also spent 14 years as an engineer in Atlanta working for the Atlanta and West Point Railroad. By 1880, Cole was in the partnership of Wilkinson & Cole that ran a sawmill, gristmill, and planing mill at Mountain Creek. The *Southern Signal* for the 31st of October in 1884 described Cole as "an enterprising man and if one of his men happens to take a little too much tea, he makes him 'pull the grade'!" No doubt steam power could help out greatly in a lumber business such as Cole's!

On May 22nd in 1883, Cole received U.S. Patent Number 277,994. Cole's patent drawing shows a jackshaft style of locomotive with four wheels turned by sprockets driven from the crankshaft of a small vertical steam engine, which takes its steam from a vertical boiler. Cole wisely made provisions in his patent description to cover other styles of engines and boilers. The chain sprockets on the wheels and the driveshaft were free to move from side to side. Each one of the four wheels was driven independently with its own chain, so that, in the event a chain broke, the other three chains would still drive the locomotive. The underside of the frame was made curved, so that the axles could pivot and allow the boiler and engine to remain level. These innovations took into consideration the inherently uneven nature of the pole roads the locomotive would travel upon. The wheels were made convex to better straddle the logs used for track.

Other builders of early geared logging locomotives—such as Shay and Dunkirk—used vertical engine and boiler configurations, but their gearing was more complex and expensive to manufacture. Though Cole's patent drawings showed a vertical engine and boiler, it is not known if any of his early engines actually used this configuration.

To build the first of his pole road locomotives, Cole (customarily referred to as "Captain W. E. Cole" in newspapers) decided to use the relatively new Montgomery Iron Works. In 1882, the

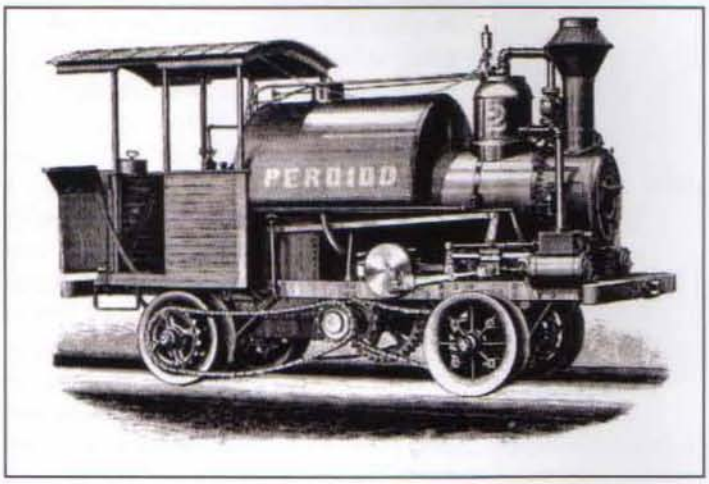


This cut of Cole's pole road locomotive *Hercules* appeared in the *American Machinist* for the 12th of April in 1884. Even though this locomotive has often been attributed to the Nashville, Tennessee, firm of Adams & Price, at the time this illustration was published, Alabama's Montgomery Iron Works was finishing construction of Cole's second, larger locomotive, and Adams & Price had not yet finished building its factory. The first locomotive built by Adams & Price, *Escambia*, would not steam off the factory floor until the end of September of 1884. This is possibly the second locomotive built in Montgomery and shipped to Gullahorn & Brother's mill.

Montgomery Iron Works was founded with a capital of 500 shares at $100 per share, after partners J. M. Carr, B. McAdams, Henry K. Adams, J. R. Mealor, and C. B. Wilkins bought out the machine shops of the Montgomery and Eufala Rail Road.

The *Huntsville Weekly Democrat* for Independence Day in 1883 described the new locomotive being built at the iron works and advised that it would be finished shortly. By the 31st of July in the same year, the *Montgomery Advertiser* alerted readers that Cole's first locomotive (named *Buffalo Bill*) had been successfully tested at the iron works. Though there were no pole road cars yet built that could be pulled for the test, the locomotive successfully navigated around the curved wooden tracks on 25 PSI. According to the article, orders were already obtained for 50 locomotives, with three from sugar plantation owners from Louisiana and the rest from sawmill and turpentine operators from Alabama, Georgia, and Florida. The *Advertiser* stated, however, that the iron works was already so crowded with business that only pole road cars could be built and that no locomotives would be constructed, until the works were enlarged. Even as late as 1885, the firm was employing only 40 hands. The lack of production capacity and capital would prove to be a problem for Cole, who could likely foresee the problems of the iron works postponing future orders for his hotly-demanded locomotives. Cole looked elsewhere to find manufacturers to build his machines, even as the first locomotive was shipped that August to R. D. Burns of Bay Minette, Alabama. By December of the next year, *Buffalo Bill* was at work in Mountain Creek at Cole's own sawmill.

Cole did not have to look far to find another person eager to build his locomotives. The new invention must have suitably impressed Henry K. Adams, plant foreman and major stockholder in the Montgomery Iron Works. Adams was born in Tuskegee, Alabama, on January the 22nd in 1849. In 1901, the *Decatur Weekly News* referred to Adams as an "inventor, mechanical genius and the best all-round man with any sort of tool we ever saw." No stranger to locomotives and steam engines, Adams had served at different points in his career as an engineer in a steam sawmill, a locomotive engineer, and a machinist. According to Andrew Morrison's *The City of Nashville, Illustrated* (1890), when Adams was young, he built a working model of a steam locomotive and started it "in operation under the counter of his father's establishment, to the imminent danger of the entire concern, and to his own personal cost and hazard." One can only imagine the punishment young Adams received from his father for operating a spark-throwing steam engine under the counter of his business! Almost immediately after building and testing the first pole road locomotive in Montgomery, Adams sold his stock and left the iron works. On the 24th of August in 1883, the *Tennessean* informed readers that land had been sold in Nashville to a firm that would build pole road engines.



Here is Adams & Price's locomotive *Perdido*, which was delivered in November of 1885 to the Wallace & Sanford mill in Wilson, Alabama. This locomotive used 7" x 12" cylinders, with a shifting link reverse. This illustration was featured in the *Railroad Gazette* for the 19th of February in 1886.

The *Montgomery Advertiser* for the 4th of December in 1883 lamented the fact that suitable arrangements could not be reached between Cole and the Montgomery Iron Works for production of his pole road locomotives. By this time, Adams had moved to Nashville to incorporate Adams & Price Locomotive and Machine Works, with partners George F. Price, George H. Price, E. A. Price, and Frank Slemmons. Adams & Price would rightly be considered a family business. The Reverend George Washington Fergus Price was George H. Price's father, and Adams' wife, Ida, was the stepdaughter of Rev. George W. F. Price, making George H. Price Adams' brother-in-law. Interestingly (if not also confusingly), the Rev. Price's first wife was Elizabeth Margaret Pooser Price. After Elizabeth passed away, Price married her sister, Eliza Catherine Russell Pooser Price!

Construction was started on a 60′ x 100′ building in December of 1883 for production of locomotives.

The *Tennessean* for the 7th of March in 1884 stated that the charter for the new firm had been registered the previous day and the business organized for "building and selling locomotives, cars, engines and machinery of all kinds, and for the repair of the same, also for carrying on a general foundry business." Adams & Price planned to build locomotives of three sizes: 16, 30, and 50 HP, with a cost of $2,000, $2,250, and $2,500 respectively.

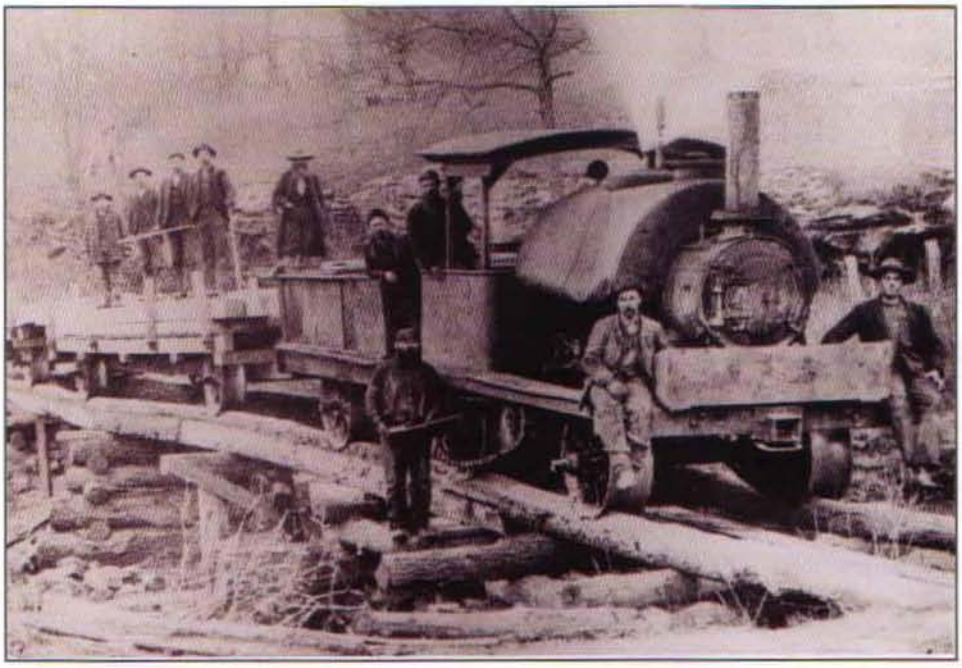
The next month, the *Tennessean* reported that the new factory had begun receiving "some very handsome machinery," including a "large drill, of the latest improved pattern." That same month, technical magazines began running articles featuring an illustration of the locomotives that would be built at the Adams & Price works. By May of 1884, enough machinery had been installed that steam had been raised in the new factory in Nashville.

While Cole was waiting for the Adams & Price factory to gear up to build his locomotives, the Montgomery Iron Works was assembling his second pole road locomotive; in fact, as early as February of 1884, Cole had begun construction of his second, larger pole road engine at the iron works. On the 1st of May, the *Montgomery Advertiser* reported that Cole had received a contract for Gullahorn & Brother to supply the firm's 30,000 foot-a-day sawmill at Coopers with logs hauled by a pole road locomotive, at a promised cost of half what Gullahorn had been paying for hauling.

The *American Machinist* for the 12th of April in 1884 featured an illustration and description of Cole's new engine, which was named *Hercules* and which featured 7" x 10" cylinders.

The *Times-Picayune* for the 18th of May in 1884 described a pulling contest in which the newly built second locomotive at the Montgomery Iron Works came out on top. Without much of a strain, the new locomotive had pulled three railcars with the brakes on. To truly give a test of its strength, the little locomotive was hitched tail-to-tail with a 25-ton conventional locomotive, pulling in the opposite direction, which the pole road locomotive pulled backwards for 40 feet! Poles were laid at an incline, and the new locomotive loaded itself under its own power onto a waiting flatcar to ship to Gullahorn & Brother. The Montgomery Iron Works continued to advertise Cole's pole road locomotives. As late as December 1884, Cole and the iron works were still dancing around, trying to make suitable arrangements to manufacture the locomotives "at home." The iron works said it would take 90 days to construct a locomotive—which must have been frustratingly slow for Cole!

By the end of September in 1884, the first locomotive had been built in the new Adams & Price factory. On the 1st of October in 1884, the *Tennessean* reported the trial of the first locomotive the previous day at 5 PM. The new locomotive, named *Escambia*, was referred to as the "first pole road engine ever built in Nashville and the third machine of this character ever manufactured in this world." With Adams in the cab as the engineer, *Escambia* was put through its paces running up and down hills, as it backed and switched over a cedar pole road laid on the factory grounds. The new locomotive had been built for C. L. Sowell & Company in Wallace Station, Alabama, located in Escambia County. Adams & Price proudly proclaimed that they had already built 16 cars for their first customer to use with *Escambia* and had obtained an order for a second locomotive, as well as 25 flatcars, from the same customer. By the end of October, Adams paid a visit to Major S. R. Sanford, manager of the Wallace Station mill, to see *Escambia* in operation. Sanford was well pleased with the new locomotive. Sanford mentioned that another pole road engine would be used at the Wallace & Sanford mill in Wilson, Alabama.



According to Elmer G. Sulzer's *Ghost Railroads of Kentucky*, this Adams & Price locomotive was used on the Fisher Pole Road in Webbville, Kentucky. Courtesy John H. White, Jr., Railroad Reference Collection and Thomas Norrell Railroad Photographs Collection, Archives Center, National Museum of American History, Smithsonian Institution

In December of 1884, Cole boasted of the fact that *Escambia* had been sold on a 30-day trial period to Sowell, at the conclusion of which, if Sowell was not satisfied with the locomotive, it could be returned. After only ten days, though, the locomotive had sold itself, and Sowell agreed to pay Cole cash money for his new locomotive! Not all were happy with the new locomotive; on the 4th of December in 1884, the *Brewton Banner* ran an article reporting that W. S. Mudge, the engineer of *Escambia*, thought that it was too light for the duty commanded of it and that a heavier engine would be better suited for the service needed. In the next year, however, the same newspaper interviewed W. F. Fox, who was engineer at that time for *Escambia*, and he gladly sang the locomotive's praises.

On the 20th of November in 1885, Sowell wrote to Cole to tell of the company's satisfaction with *Escambia*. Sowell wrote that the firm had run the engine five months and that the only breakdown was one day's time to repair the drive chains. Every day, *Escambia* hauled—for a distance of five miles—72 logs that were an average of 40' long. Sowell claimed, "She is reliable and durable, and we think that mill men would do well to investigate your Pole Road Locomotive and outfit ... "

The *Railroad Gazette* for the 19th of February in 1886 featured an illustration and article about the new 5'– 0" gauge pole road locomotive named *Perdido* that Adams & Price had finished in November 1885 for the Wallace & Sanford mill at Wilson. *Perdido* was to be used to pull seven cars, loaded with three to four logs each. This locomotive used 7" x 12" cylinders with a shifting link reverse. Water capacity was 550 gal. in the saddle tank, and pine wood was used to fire the boiler. The engine shaft used a 10" x 6" pinion to transmit power to a 30" master gear to run the drive wheels. The locomotive was geared with a 4½ to 1 ratio. The *Railroad Gazette* article stated that this locomotive was similar to *Escambia*.

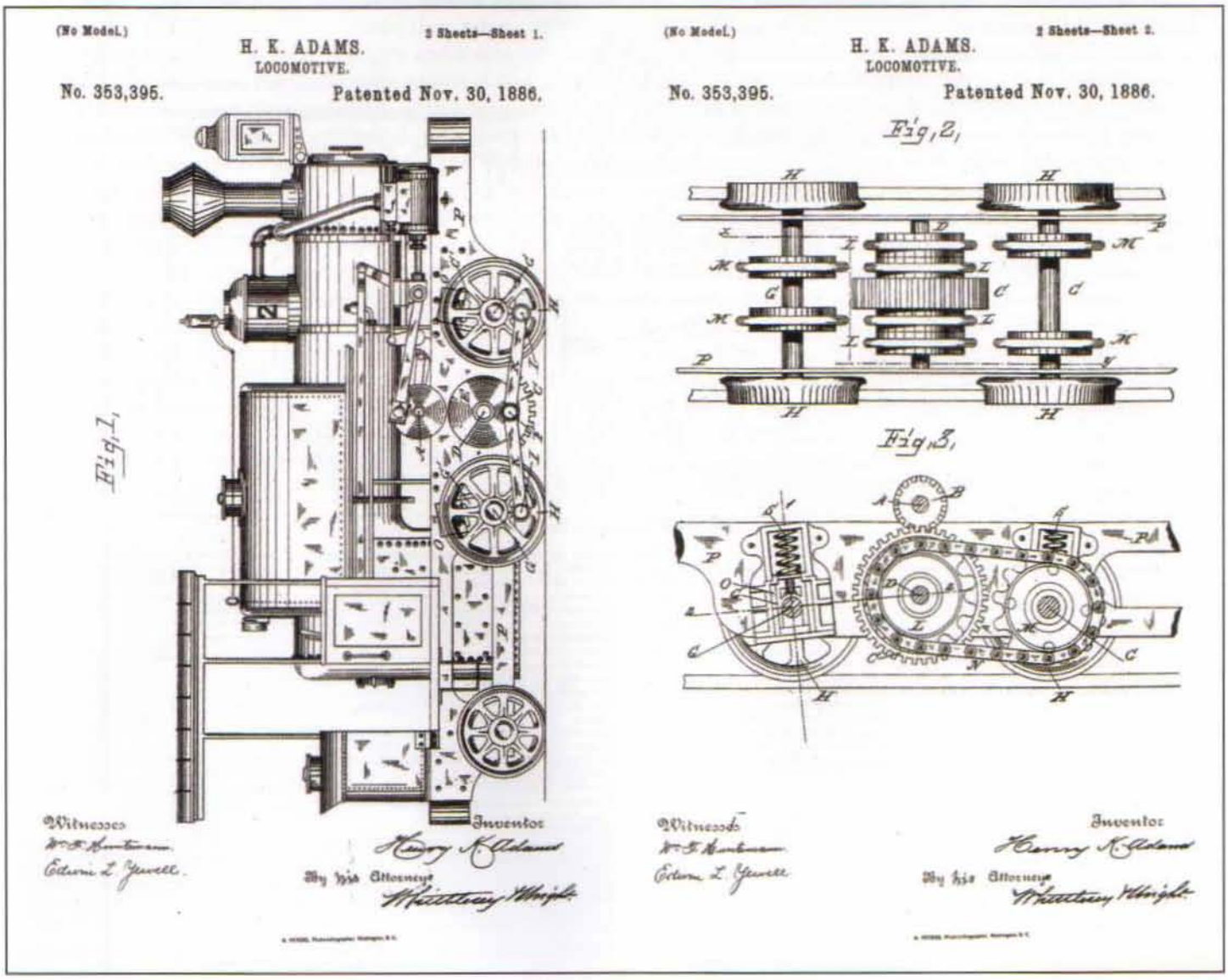
The *Brewton Banner* for the 3rd of December in 1885 announced the arrival of *Perdido* at Brewton, Alabama, on November 27th. A large crowd assembled to watch the nine-ton locomotive

as it was offloaded from a flatcar on the Louisville and Nashville Railroad before it crawled on its own on pole road tracks laid straight onto the local dirt roads. The newspaper reporter remarked that it reminded him of the Irishman who had seen his first steam car and had exclaimed, "Be jasus it's a steam boat in search of water"! Reports claimed that it made only 400 or 500 yards that day and that it had about five to six days to reach its destination at Wilson. Horses and wagons kept the locomotive supplied with casks of water on its journey to the sawmill. By the 29th of November, Cole traveled to Wilson to help lay out the location for the new road, which was to be named the Perdido Pole Road. It is listed and described in the 1887 issue of *Poor's Directory of Railroad Officials* as containing five miles of 5'– 0" gauge track, with *Perdido* as its only locomotive pulling six pole road cars and operated by Wallace, Sanford & Company in Escambia County.

On the 6th of February in 1886, Wallace & Sanford wrote a letter to Cole reporting on the company's satisfaction with *Perdido* and highlighting the service the locomotive gave: "We like it, and the more we use it, the better we like it … . The largest load that we have hauled was 28 logs that averaged about 35 cubic feet. She will make from 4 to 5 miles an hour, with 10,000' of logs, board measure, and climb grades 150 to 200 feet to the mile."

The February article from the *Railroad Gazette* says Adams & Price had plans to build larger locomotives, geared 3 to 1, with six 36" drivers and 9" x 16" cylinders. Estimated speed was to be 12 miles an hour, and the locomotive was designed to run not only on pole roads but also on wooden tramways—or even regular steel rails! The chain drive for the new locomotives was intended to be inside the frame; previous locomotives built under Cole's patent placed the drive outside the frame.

U.S. Patent Number 353,395 was issued to H. K. Adams on the 30th of November in 1886; it covered many of the features of his new style of locomotives. Offered as an alternative to the drive chains in this new design were side rods to connect each set of drive wheels, making it somewhat similar



Here are the patent drawings of Henry K. Adams' locomotive of 1886. This design could use either drive rods or chains to propel the locomotive. Adams claimed that the chains were a weak point of Cole's original design.

American Journal of Railway Appliances

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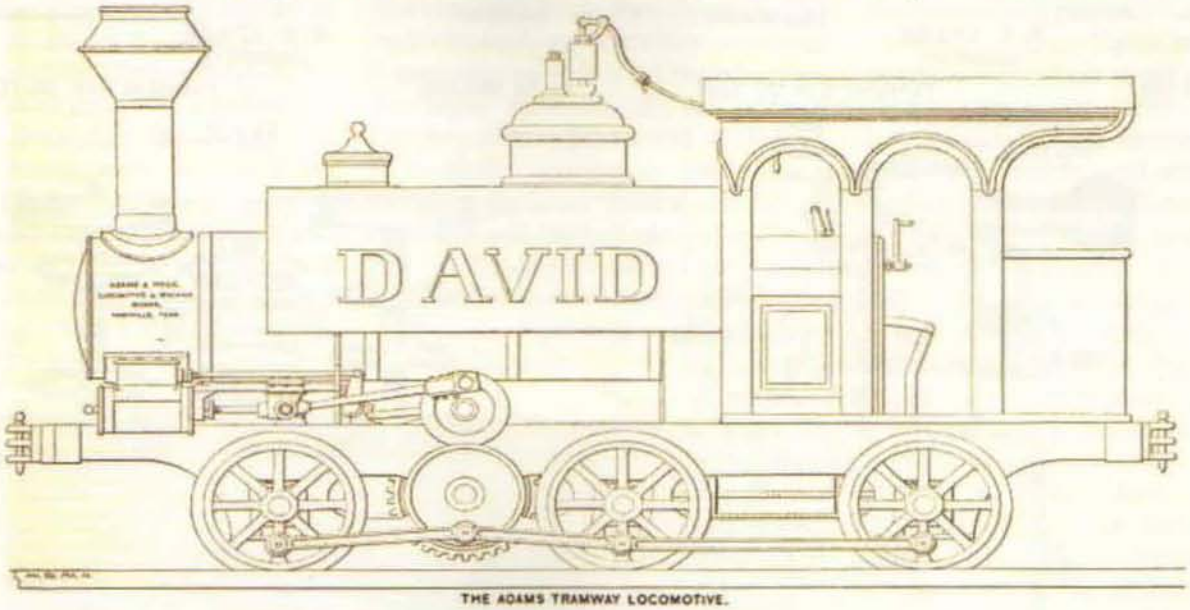
Adams' Tramway Locomotive.

We illustrate in this connection a side elevation of a tramway locomotive that has some novel and advantageous features for light work. It is fitted up with gearing so that small cylinders can be used for driving and run at a high speed, as it is not intended that the locomotive should attain the high speed of ordinary engines upon surface roads. The general features of its construction will be readily understood from the engraving. The engines are so geared that they run three revolutions to one of the driving shaft, the pinion on the driving shaft being 10 in. diameter and 6 in. face, meshing in with a spur gear on the main shaft 30 in. diameter with the same face. The master shaft, as the makers call it, carries crank disks which are provided with pins, by means of which connections with the driving wheels are made. The side rods are furnished with bronze bushing. The frame is of the plate type, which is so extensively used abroad. It is so made that it is self-supporting and requires no braces from the boiler, and furnishes ample means for fastening the cylinders and other parts. The cut represents the style that is made to run on railroads and tramways, and its principal dimensions are given below.

Gauge of road	4 ft. 8½ in. or 5 ft.
Fuel	Wood or coal.
Number of coupled wheels	Six.
Position of cylinders	Outside.
Diameter of cylinders	9 in.
Stroke of piston	12 in.
Distance cylinder center to center	61 in.
Size of steam ports	¾ in. by 7 in.
Size of exhaust ports	2 in. by 7 in.
Width of bridge	¾ in.
Type of valve	Unbalanced slide.
Lap of valve, outside	¾ in.
Lap of valve, inside	1-16 in.
Lead of valve	1-32 in.
Size of valve stem	1 in.
Diameter of piston rod	1¼ in.
Thickness of piston horizontal meas.	4¼ in.
Kind of piston rod packing	Fibrous.
Kind of valve rod packing	Fibrous.
Number of guide bars	One.
Length of guide bars	30¼ in.
Width of guide bars, top	3 in.
Width of guide bars, thickness	1¼ in.
Size of cross-head pin	1¼ in.
Type of valve gear	Link shifting type.
Diameter of eccentrics	9 in.
Width of eccentrics	2 in.
Length of eccentric rod, radius of link	22 in.
Throw of eccentrics	2 13-16 in.
Size of the main crank pin; engine shaft disks	2¾ in. long by 2¾ in. diam.
Size of side rod pins, front & trail, 3 by 3 in.	
Length of main frame, from buffer to buffer	17 ft.
Length of driving axle springs between centers	36 in.
Diameter of driving pinion	10 in.
Diameter of gear	30 in.
Diameter of crank outside of disk	20 in.
Throw of crank	12 in.
Size of crank pin	3¼ in. by 6 in.
Main disk pin, 3¼ dl., 6 in. long, two bgs.	
Size of side rod pin, front & trail, 3 by 3 in.	
Type of frame, plate frame 26 in. deep ¾ in. thick.	
Diameter of driving wheels	30 in.
Length of wheel base	120 in.
Distance between center and back driver center	60 in.
Distance between center and front driver center	60 in.
Thickness of tires	2½ in.
Diameter of smallest plating inside	31¼ in.
Material of plates	Steel, 9-32 in.
Thickness of plates	9-32 in.
Length of barrel	103¼ in.
Thickness of smoke-box tube plates	½ in.
Inside fire-box, material	Steel.
Inside fire-box, width at top	26½ in.



THE ADAMS TRAMWAY LOCOMOTIVE.

Inside fire-box, width at bottom	26½ in.
Inside fire-box, length at top	38 in.
Inside fire-box, length at bottom	38 in.
Inside fire-box, water space front	2 in.
Inside fire-box, water space sides	2 in.
Inside fire-box, water space back	2 in.
Distance between stays	5 in.
Diameter of stays	½ in.
Material of stays	Iron.
Thickness of tube plate	½ in.
Thickness of crown plate	½ in.
Thickness of side and back plates	½ in.
Material of tubes	Iron.
Length of tubes	84 in.
Diameter of tubes	2 in.
Thickness of metal	Ordinary thickness.
Distance of tubes apart	2½ in.
Number of tubes	52.
Heating surface of tubes	192 feet.
Heating surface of fire-box	48 feet.
Total heating surface	220 feet.
Grate area in sq. ft.	7 feet.
Height of boiler center from rail	64½ in.
Diameter of chimney	11 in.
Height of stack from rail	114½ in.
Number of safety valves	2
Diameter steam dome, inside	18 in.
Height of dome	28 in.
Size of steam pipe	2½ in.
Type of safety valve	Kunkle.
Diameter of valves on seat	1¼ in.
Length of cab inside	92½ in.
Width of cab across, inside	80 in.
Roof outside	95 in.
Number of injectors, one No. 20 Hancock Locomotive Inspirator.	
Number of pumps, one pump 3 in. plunger 4 in. stroke.	
Description of brake, steam, English style.	
Pipe area through tubes	160 in.
Ratio fire grate to heating surface	1 to 33.
Ratio of free area through tubes to total grate area	about 1 to 6.
Weight on forward drivers, loaded for work	8,000 lbs.
Weight on center drivers, when loaded for work	7,000 lbs.
Weight on back drivers when loaded for work	7,000 lbs.
Capacity of tank	500 gal.
Capacity of coal box	2,000 gal.

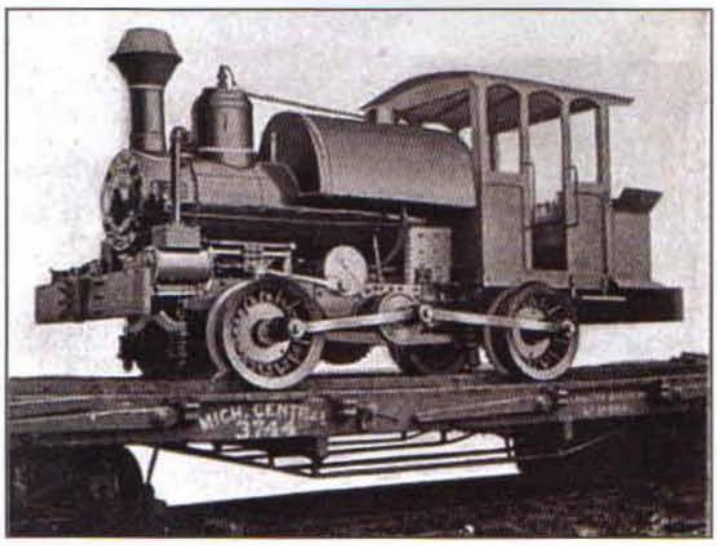
The *American Journal of Railway Appliances* for the 15th of April in 1887 featured an article that was complete with specifications for Adams & Price's tramway locomotive *David*. It is hoped there might be enough information from the specifications that an enterprising live steam modeler might build a working model of this locomotive! By this time, the firm of Adams & Price was also offering to build tramway locomotives and small standard gauge locomotives, along with pole road locomotives.

to a conventional locomotive. In his patent, Adams claimed that the drive chains were the parts most likely to break in the original design.

The *American Journal of Railway Appliances* for the 15th of April in 1887 featured an article with an illustration of one of Adams & Price's new tramway locomotives. Named *David*, the locomotive featured six 30" diameter drivers driven by side rods from a crank disk in between the first two drivers. Two 9" x 12" cylinders were used. Coal or wood could be used to fire the boiler, which had 52 2" tubes. Gauge was set at either 4'–8½" or 5'–0". Flanged wheels were shown in the illustration, though concave wheels could be fitted for pole roads. Overall, the appearance of the new locomotive could be described as European—probably a bit fancy for most Southern lumbermen of the time! Interestingly, this second style of Adams & Price locomotive featured a drive design somewhat resembling a German jackshaft locomotive built in the 1870s by Maschinenfabrik in Aarau, Switzerland.

Since its inception, the firm of Adams & Price had expressed a desire to expand the works. The *Railway World* for the 12th of February in 1887 noted that Adams & Price were adding on a new 50' x 60' foundry and a new 50' x 100' car shop. The next year, the *Tennessean* reported that Adams & Price were doubling their capacity. At this time, the firm used ten molders and had a cupola with three tons of capacity. They built locomotives, logging cars, and bottom- and side-dump cars. On the 20th of October in 1888, the *Austin American Statesman* claimed that Adams & Price were continually adding "small tools and fixtures to both their machine shop and their foundry." In 1888, Adams & Price also built a large brick machine invented by Nashville resident John E. Lesueur for use in his brick factory.

Disaster struck the firm on the 11th of October in 1890; newspapers across the country reported that a huge fire had destroyed the facility. Luckily, insurance covered most of the $20,000 loss, and the city directory of the following year stated that the factory had been rebuilt in the absolutely staggeringly short period of only 90 days. The firm not only rebuilt the works but also enlarged the buildings and relocated them closer to the rail line along the company's property.



Here is a later style of Adams & Price pole road locomotive with side rods connecting the drive wheels.

Though prospects must have seemed bright for Nashville's premier locomotive builder in the early 1890s after the firm's speedy rebuild, the next few years would prove challenging for all businesses, as the U.S. entered the Panic of 1893.

The *Age of Steel* for the 5th of January in 1894 printed a letter from Adams & Price detailing the company's lean times during the previous year and mentioning some of the work the firm performed in addition to manufacturing locomotives and railcars: "The middle of May was the first time we were compelled to shut down our machine shops for want of orders since we have been in the business, and the two months following we did nothing in that department at all, and very little in the foundry department. About the 15th of July we commenced on orders for sorghum cane mills, and ran pretty full on them until about the 15th of October. Along with other small orders that came along, we managed to get through the month. Then came election times, with candidates who shook everybody's hand, and talked Blue Sky & Co. 1. Just then business was at a standstill. No one dared to place an order for fear time would cease, and they would have their trouble for nothing. November 6th came and went. The ball rolled, and the side of it that was occupied by the Wilson bill men and Silver Dick from your state, somehow or other stopped face down. Well, since then orders have been coming in pretty freely, and now we will say that never in the history of our business have we had a brighter outlook for business. We have enough orders booked to keep us going through the winter months, and are booking some every day. 2. We do most of our business in the Southern States. We have quite a trade with saw mill men, lumber driers, lumber drier wheels, transfer cars, lumber trucks, logging cars, pole road cars, locomotives for tramways and pole road service, machinery repairs, castings of all kinds, and general foundry work and architectural iron work. All the above are in our line of trade in the South. We have furnished the castings and other iron work for several of the largest cotton mills that have been built in the South. We build experimental machinery, too, and overhaul locomotives for companies who do not own their own shops. We have two locomotives in hand now to rebuild. We make a specialty of snuff mill machinery, and, as far as we know, we are the only firm in the United States that are devoting any attention to that line. We have made some very fine improvements in the machinery for grinding and packing and handling the material for snuff. 3. Our outlook is very bright, as we said before. We have had the famine; now we are having the beginning of a feast. We hope the feast will last, and certainly expect it to last for two or three years, anyhow. 4. We will be satisfied with what we have now, with a few additional tools and fixtures that we will be compelled to put in. But we will not go any further than what we are compelled to. Our present facilities have looked very large during the past eighteen months, but they begin now to fit the times in their dimensions. We will put in another cupola for melting pig iron, and enlarge our capacity for blowing in the foundry, and may blow more in the trade journals, when we get able to pay for 'blowing our own horn.'"

Adams & Price's optimistic outlook proved to be sadly inaccurate. By the end of 1894, the *Tennessean*, which always painted a glowing picture of Adams & Price, began routinely to list lawsuits against the struggling company as people tried to collect nonexistent money from the firm. The legal wrangling continued as times got worse. By early 1897, it had become so bad that Colbert Iron Company enlisted Stokes & Stokes to try to obtain a payment of $231 due from Adams & Price.

The *Tennessean* for the 11th of April in 1897 reported that Levy Dodge had purchased the Adams & Price factory for the sum of $10,500. The so-called Panic of 1893, which actually dragged on until 1897, claimed the lives of many businesses of the time. Another casualty of the difficult times, the Montgomery Iron Works was also sold out and reorganized as the Southern Iron Works in 1896.

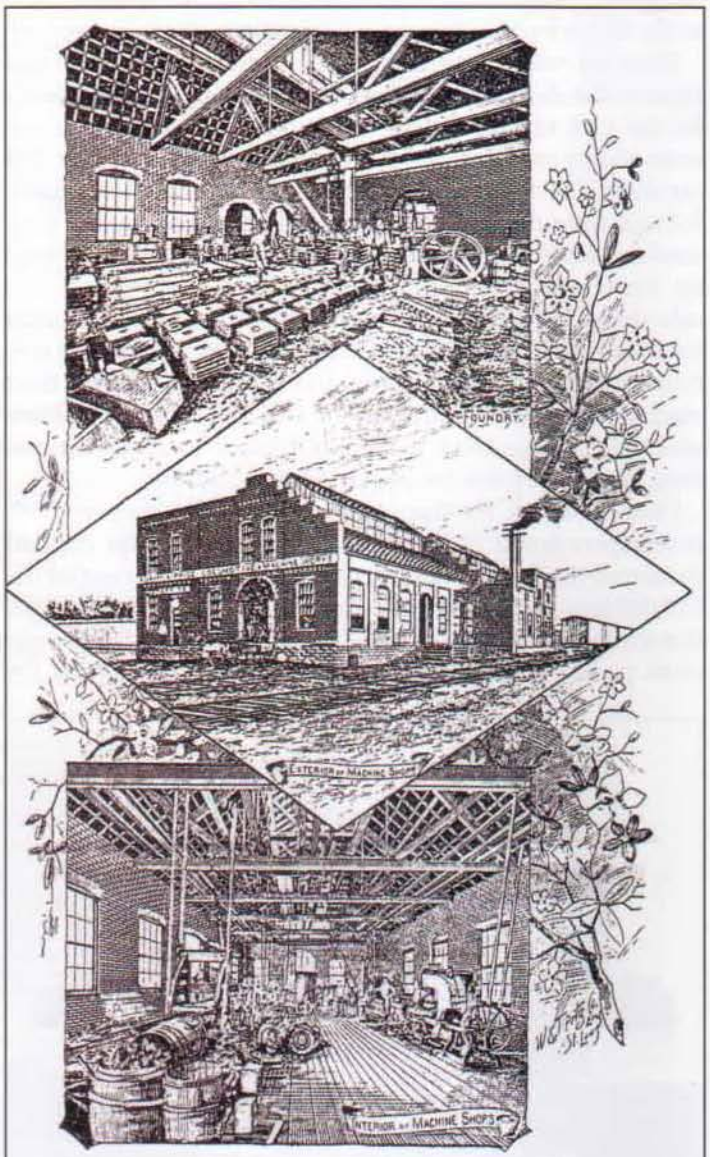
After spending a few years running his own company in Nashville, H. K. Adams Engineering, Adams moved back to his home state and founded North Alabama Engineering in New Decatur with partner Robert Dyas in 1901. Adams' son, Julian W. Adams, served as an engineer in the new firm. The business got its start through the purchase of the old plant of the Ivens & Sons Machine Works for $10,000. The *Decatur Weekly News* reported that the new company would employ 150 workers. The firm concentrated on stationary steam engines, hay presses, and sawmill equipment while also constructing a brick-making factory. Within a few years, Adams had moved back to Nashville to work for the Nashville, Chattanooga and St. Louis Railroad as a draftsman. Adams continued to receive patents on locomotives, as well as a machine to make flexible staybolts. He worked for the railroad until he passed away on the 3rd of July in 1933 at age 84.

Not content with having only the fledgling company of Adams & Price to build his pole road locomotives during the mid-1880s, Cole also made arrangements with the well-established firm of Tanner & Delaney Engine Company of Richmond, Virginia. The massive firm of Tanner & Delaney boasted the capacity to build at least one locomotive a day, which must have been music to the tired ears of Cole.

William Elam Tanner was born on the 13th of March in 1836 in New Canton, Virginia. His father, John Tanner, was employed at the famous Tredegar Iron Works in Richmond by the early 1840s and became one of Joseph R. Anderson's partners in the works. The elder Tanner obtained employment for his son as a bookkeeper by the mid-1850s, and, within a few years, the younger Tanner was brought on as a partner. In 1862, the younger Tanner joined an artillery unit but was called back to the iron works. During the Civil War, Tredegar was the largest producer of iron, ordnance, and cannon for the Confederacy, so many of the employees who initially went into the service were called back to work at the company. The Tredegar Battalion was formed to defend the iron works and the city of Richmond. Tanner was made Lieutenant Colonel of the battalion.

After the Civil War ended in 1865, Tanner left the Tredegar Iron Works and joined Jacob Otto Ehbets in a partnership to found the Metropolitan Iron and Brass Works. In his book *Tredegar Iron Works: Richmond's Foundry on the James*, author Nathan Vernon Madison reveals that Ehbets was a German immigrant who had worked at Tredegar since 1857. During the Civil War, Ehbets was involved with the project to build the famous Confederate ironclad CSS *Virginia*, commonly remembered by its original name, the *Merrimack*.

Alexander Delaney was born in Dalbeattie, Scotland, either "around 1829" or in 1831, with both dates insufficiently documented. He immigrated to the United States as a young man. His uncle, Mathew Delaney, was employed at Tredegar as an engineer and foreman and brought Alexander into the company by the early 1850s after Alexander moved to Richmond. Mathew Delaney was foreman and partner in Tredegar's locomotive department and had improved the quality of the firm's locomotives. In 1858, Alexander's uncle passed away, leaving Mathew's young son, Chester Alexander, to the care of his nephew. After the start of the Civil War, Delaney



ADAMS & PRICE LOCOMOTIVE AND MACHINE WORKS, NASHVILLE, TENN.

Andrew Morrison's book *The City of Nashville* featured these interior and exterior views of Adams & Price Locomotive & Machine Works after rebuilding from the disastrous fire of 1890.

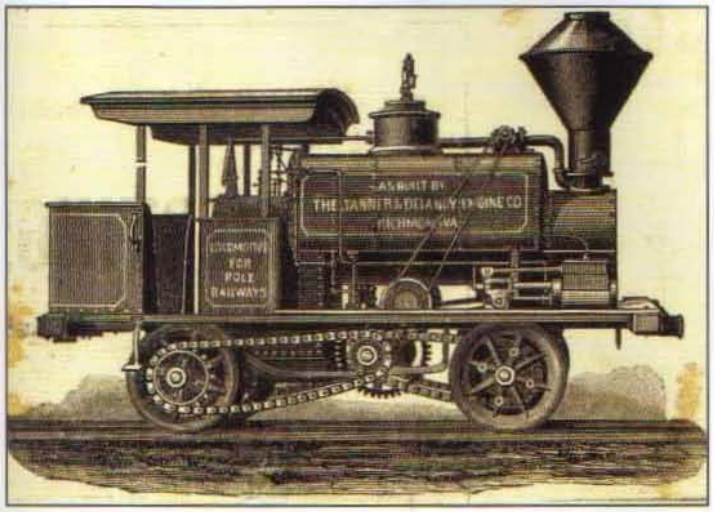
resigned his position at the iron works and enlisted for active service, but he was brought back to the iron works almost immediately and made superintendent over the entire establishment. Like Tanner, Delaney also served in the Tredegar Battalion.

After the war had ended, Delaney left Tredegar and worked with the stove manufacturer Snyder, Bowers & Company, until one of the partners died in 1867. Delaney co-patented a box stove with Asa Snyder. On the 1st of January in 1868, Delaney joined the partnership of the Metropolitan Iron Works.

Tanner and Delaney bought out Ehbets' portion of the partnership in 1869. Soon after, the firm was called Wm. Tanner & Company.

The firm built an extensive line of woodworking and agricultural equipment. Portable and stationary steam engines, sawmills and other woodworking machinery, and threshing machines formed a large percentage of the company's production. Another major line of products that Tanner & Delaney offered was equipment for gas works. Alexander Delaney obtained numerous patents for sawmill dogs and spark arrestors for steam engines, among others. On the 11th of November in 1881, the company suffered a massive fire that destroyed the works, with a loss reported of $100,000. Afterward, the factory was rebuilt and greatly expanded, and, after reorganizing, the firm's name was changed to Tanner & Delaney Engine Company.

As early as 1877, Tanner was offering light gauge and tramway locomotives, which made the company a logical choice to manufacture Cole's locomotives. The *Montgomery Advertiser* for the 25th of August in 1885 noted that Delaney had spent the prior week examining one of Cole's pole road locomotives used at Cole's mill at Mountain Creek, Alabama, and that plans were being discussed with Cole to manufacture his locomotives. The same newspaper for the 2nd of September in 1885 noted that Tanner & Delaney had struck a deal with Cole to manufacture his pole road locomotives.



This catalog cut depicts Tanner & Delaney's pole road locomotive. Tanner & Delaney's locomotives featured a governor that limited engine speed—possibly one of few locomotives to do so. Courtesy John H. White, Jr., Railroad Reference Collection and Thomas Norrell Railroad Photographs Collection, Archives Center, National Museum of American History, Smithsonian Institution

The *American Lumberman* for the 27th of April in 1935 revealed that, in 1885, two pole road locomotives were in use by Wilkinson & Cole, including *Buffalo Bill*. Other details included were that *Bill* weighed six tons, could haul 30,000 lbs., and could ascend a grade of 300 feet to the mile. The other locomotive weighed ten tons and had twice the hauling capacity at 60,000 lbs., while pulling the same grade. The average cost for building the pole roads was quoted at $100 a mile, which enabled the lumber company to lay pole roads deep into the forests at low cost, so that teams would not have to drag the downed logs beyond 3/4 of a mile to a waiting pole road car and locomotive.

The *Montgomery Advertiser* for the 11th of September in 1885 stated that Cole had just returned from a trip to Richmond, Virginia, and Nashville, Tennessee, where he had been "making arrangements for the manufacturing of his pole road locomotives." The paper again reported a demand far outstripping manufacturing capacity for Cole's new locomotives. Cole also stated that he had designed a dual-purpose pole road locomotive that could be used as a stationary engine to power a sawmill to cut between 12,000 and 15,000 board-feet of lumber in a day and then be changed over to a locomotive in just five minutes to haul the lumber. Tanner & Delaney planned to ship a pole road locomotive and cars to the World's Industrial and Cotton Centennial Exposition in New Orleans in January of 1886, where it would operate over a ½ mile of track on the grounds.

The *Railroad Gazette* for the 30th of April in 1886 reported that a pole road locomotive had been given a trial at the Tanner & Delaney factory on April 20th in front of railroad and lumber officials, and that the "company has a number of orders on hand and have already quite a number of them at work."

In 1886, Tanner & Delaney advertised two sizes and styles of pole road locomotives: a double cylinder 7″ x 12″ locomotive, and a single cylinder 8½″ x 10″ locomotive. It is curious that Tanner & Delaney manufactured a single cylinder locomotive with the inherent difficulty in starting a single cylinder steam engine on top dead center. The locomotives used 30″ diameter wheels and had a 500 gal. saddle tank. The double cylinder locomotive weighed 23,900 lbs. dry.

Another curious feature of Tanner & Delaney steam engines was the lack of cylinder drain cocks. By this time, most steam engine builders were building engines with drain cocks to enable the engineer to drain condensed water from the cylinders before reaching operating temperatures. Early steam engines did not have drain cocks, and the engineers had to be more careful when warming the engine up, or damage could occur to the engine from a "water slug" in the cylinder. Tanner & Delaney touted their lack of drain cocks as allowing more water into the exhaust, thus reducing the risk of sparks! More than likely, it was just an attractive-sounding feature that was used to make their engines a few dollars cheaper to build and more competitive in the marketplace of economy-minded sawmill operators.

One other amazing feature of Tanner & Delaney pole locomotives was the use of a governor that was mounted horizon-

tally in the steam pipe over the saddle tank. This makes Tanner & Delaney one of the few manufacturers—if not the only American locomotive manufacturer—to use a governor to limit the engine speed.

The later catalogs of Tanner & Delaney featured a large section on the firm's pole road locomotives and included two pages devoted to the construction and care of a pole road. A typical catalog offered a section of testimonials from users of Tanner & Delaney products over the entire South. At least two pictures have survived that show the company's locomotives at work in the swamps of Mississippi and Alabama.

In a letter written on the 21st of July in 1886 to *Light, Heat and Power*, Tanner & Delaney stated that the firm had shipped "sixteen car loads of machinery, including light locomotives, pole road locomotives, stationary engines, sawmills and gas apparatus" in the previous weeks. One pole road locomotive had been shipped to no less a personage than Governor Drew of Florida. The company reportedly was also at work building 12 logging locomotives at the time. The *Richmond Dispatch* for the 25th of August in 1886 stated that Tanner & Delaney was shipping a load of equipment, including a locomotive and 14 timber cars, to a customer from South America that cut mahogany timber.

In his 1894 publication *The Forester*, author James Brown revealed some statistics of North American pole roads. By the year 1886, there were 383 pole roads in North America covering 2,287.5 miles. Four hundred and twenty-eight steam powered pole road locomotives puffed and crawled their way through the forests and swamps at the rate of 5 MPH, and 5,082 lumber cars were in use. Brown listed the price for a Tanner & Delaney locomotive as $3,000, and the firm's timber cars cost $125 each. Most builders provided only the castings and metal for the timber cars, which saved on shipping, as lumbermen could provide their own wooden frames from their mills. The $125 price tag for a Tanner & Delaney timber car may have purchased only the metal parts and castings.

One odd feature of pole road locomotives should be noted. Instead of being hitched to the front of all their cars per normal mainline practice, pole road locomotives were usually hitched in the middle of their loaded cars. This way, a locomotive could detach from half of the load to ascend a really heavy grade and push the front cars to the top of the hill. The locomotive could then detach from the front cars, back down the grade, and shunt the last half of the loaded cars up the hill and hook onto the full load on level ground. This strategy enabled steeper grades to be climbed and heavier loads pulled with a smaller engine than would normally be possible by one having to tow all cars at one time.

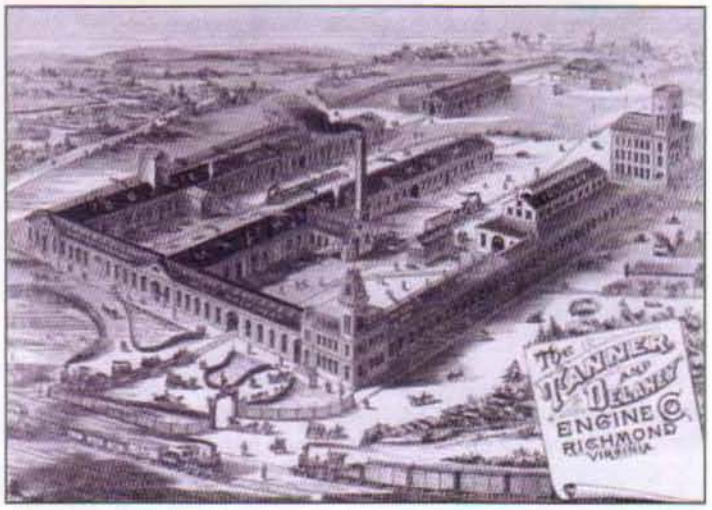
A weakness of the pole roads was that the tracks were made of a flammable material. A boiler could throw sparks, and fires were bound to happen on the tracks—even when the smokestack had a spark arrestor on it. In 1956, an 80-year-old former pole road fireman named Will Smith wrote to the *Tampa Tribune* and related some of his experiences as a young man running a pole road engine in Georgia. He said it was not uncommon for holes to be burned in sections of the pole road track, which operators would fill in with whatever chunks of wood they could find to keep the train moving along. Smith said he had a habit of running alongside the slow moving locomotive to gather up dry pine knots and scraps of dry wood to mix in with the slabs the engine burned. One time, as Smith prepared to jump off to gather knots, the locomotive struck a hole in the track, and he was violently pitched off, hitting a log and leaving a large gash in his leg. The scars of his wounded leg were visible the rest of his life.

Smith also told that, on another occasion, he had backed his locomotive and cars to the top of a hill on a newly laid pole road that still had bark on the pine logs used to construct the road. A rain storm blew up and soaked the tracks while the train was being loaded. When the locomotive took off downhill with its load, the train practically flew down the slick roadway, causing all the bark to come off the pole tracks and pile up in front of the drivers! The locomotive became immobilized, and the bark had to be shoveled off the road to help the drivers bite into the poles.

On the 27th of July in 1887, U.S. Patent Number 367,335 was issued to John Blasdale of Baltimore, Maryland, and assigned to Tanner & Delaney. This patent was for an improvement in the original wheel design of Cole's pole road locomotives and featured renewable bearing sleeves using rubber to cushion the chain sprockets against the shock of starting.

In the 31st volume in 1887, *Harper's Weekly* said the Tanner & Delaney works stretched over 12 acres, the firm employed 800 men, and the factory had the capacity to produce over 300 steam engines in a year.

Though the firm seemed poised for success, Tanner & Delaney began experiencing financial difficulties toward the late 1880s. The company had grown too rapidly, especially given the difficult economic times of the 1880s. The original partners lost control as they could not repay the debts incurred from expanding their works. Tanner resigned in January of 1887. Delaney left the firm by May of 1887, and, within a few months, he joined the company of Tappey & Steel in Petersburg, Virginia. The company then became

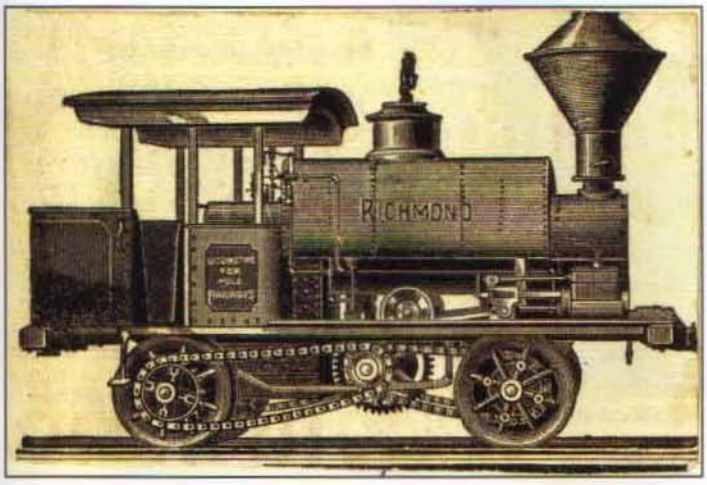


Here is an 1886 illustration of Tanner & Delaney's massive factory, which was built in an "E" shape.

known as Tappey, Steel & Delaney and built products similar to Tanner & Delaney's earlier agricultural line: portable steam engines, tobacco handling products, and sawmills. By July of 1888, the firm became known as Tappey & Delaney and was offering locomotives and pole road cars. Though the firm boasted 40 years of production by the time Delaney joined them, the partnership proved short-lived and Delaney left the company by 1889. Delaney moved back to Richmond and joined the iron works of Chamblin, Delaney, & Scott, where he worked until 1895. In March of that year, he was elected "Engineer of Pumphouses of the City Water Department," a position he held until he died on the 23rd of March in 1910.

After leaving Tanner & Delaney in early 1887, Tanner pursued other business ventures. By 1889, he was employed by the Burton Electric Company of Richmond, and he also spent time as co-founder and company vice president of the Minnesota Iron-Car Company, of Duluth. Tanner died on the 6th of August in 1898 in his native Richmond.

In November of 1887, Tanner & Delaney was reorganized as the Richmond Locomotive and Machine Works. Former vice-president of Tanner & Delaney William R. Trigg was appointed president of the new firm. Pole road locomotives were still built by the newly reorganized firm, and, in November of 1888, Richmond Locomotive exhibited one of the firm's pole road locomotives at the Chattahoochee Valley Exposition in Columbus, Georgia. Business appeared to still be brisk for pole road locomotives, as the *Atlanta Constitution* for November 25th of that year reported that the first locomotive that had been built for the exposition had been sold before it could be delivered, and the second locomotive, which actually appeared at the exposition, was sold before the end of the show. At the time, J. A. Yancey was Richmond's general manager and auditor, and it was reported he was planning to spend that winter in Georgia handling business for pole road locomotives.



After Tanner & Delaney was reorganized as Richmond Locomotive and Machine Works, a governor was no longer featured on the company's pole road locomotives. The single cylinder locomotives produced by Tanner & Delaney were likewise discontinued; otherwise, the engines appeared quite similar to those built by Tanner & Delaney. Richmond continued to build pole road locomotives until 1895. Courtesy John H. White, Jr., Railroad Reference Collection and Thomas Norrell Railroad Photographs Collection, Archives Center, National Museum of American History, Smithsonian Institution

Though the business in pole road locomotives appeared promising, the owners of Richmond Locomotive and Machine Works decided to shift the company's focus to large standard gauge locomotives for main line railroads. Technical publications of the time reported that the rights to manufacture Cole's pole road locomotives and rolling stock were sold to a Richmond firm known as the Pole Road Locomotive Company. Chartered on the 6th of December in 1888, the new company listed its officers as R. A. Lancaster, president; William H. Lucke, secretary and treasurer; and J. A. Yancey, general manager. The *Engineering News* for the 2nd of March in 1889 ran a short article about the Pole Road Locomotive Company with details about its planned locomotive designs. Three models were to be built. The smallest would feature cylinders 6½" x 10" and would weigh 22,000 lbs. The next biggest size would feature cylinders 7" x 12" and would weigh 29,000 lbs. The largest size would feature cylinders 8" x 12" and would weigh 31,000 lbs. Water would be carried in a saddle tank atop the boiler, with capacity between 350 gal. and 650 gal., ranging from the smallest to the largest size of locomotive. Each locomotive would be equipped with two injectors to feed water into the boiler. The 8" x 12" engine would be rated to pull cars loaded with logs containing 8,000 to 10,000 board-feet between 4 and 5 MPH. It is not known how many locomotives the new firm actually produced, but there does not seem to be much mention of the company after its founding. Logging railroad historian Tom Lawson has found that at least one engine was shipped from the new company.

Lawson has investigated existing fragmentary production records of Richmond Locomotive and Machine Works and has learned that at least some pole road engines continued to be built into the 1890s, including one shipped in 1895 to Conadon & Company. Literature from Richmond Locomotive and Machine Works providing details of pole road locomotives features engines offered in the same sizes advertised by the Pole Road Locomotive Company. Gone from the Richmond factory cuts were the governor to limit engine speed that Tanner & Delaney used, and no single cylinder engines are listed. Curiously enough, the wheel gauge was expanded from the 5'– 0" gauge that was seen in both Tanner & Delaney and Adams & Price to a 5'– 2"gauge in Richmond literature.

The year of 1891 proved to be a difficult one for Richmond Locomotive & Machine Works, as the firm suffered a disastrous fire that destroyed part of the naval contract work they were building. Further, a strike lasted several months. By the end of 1891, newspapers carried stories about the firm building large, main line Consolidation engines. Richmond branched off into building marine engines and boilers. After witnessing a period of expansion, Trigg had left Richmond and started his own shipbuilding firm on the James River by 1900. In 1901, Richmond Locomotive & Machine Works was sold to a Chicago businessman named Joseph Leiter for the

tidy sum of $3,000,000 and became part of the American Locomotive Company, or ALCO.

Even though Cole's locomotive was not the first designed to run on wooden rails, it was much simpler and wildly more successful than other previous attempts, such as Cowles' engines. Cole kept experimenting, designing, and patenting new ideas. By the late 1880s, Cole had obtained at least four more patents: two for a lumber drier and two for a brick drier. Cole had a stroke of bad luck on the 24th of November in 1886 when he was riding on a caboose in Mobile that ran off the rails due to a switch being opened at the wrong time. Sabotage was suspected as the cause. Cole's ankle was broken and his leg injured after a heavy box fell on them, and he was laid up for several months. The next year, he sued the Mobile and Ohio Railroad for $70,000. It would appear that the case was settled out of court.

The old saying is "you can't keep a good man down," and, on the 16th of June in 1887, the *Weekly Advertiser* reported that Cole was in Wetumpka, Alabama, northeast of Montgomery, investigating forests on the Tallapoosa River. He intended to buy timber along the river and obtain the right of way to construct a pole road to carry logs to the river, whereupon he would float the logs to a sawmill he planned to locate in Montgomery.

By the mid-1890s, Cole had moved his family to Atlanta, Georgia. He patented a steering device for steamboats and received multiple patents related to boiler firebox designs. By December of 1902, he and his family had traveled to Norfolk, Virginia, on his gasoline-powered houseboat *Atlantic*, which had been fitted with a spotlight system that Cole used to catch fish at night. Though *Atlantic* was initially powered with gasoline engines when it was built in 1900, Cole had it repowered with steam, insisting that the gasoline engines were not powerful enough. While in Norfolk, he continued to receive patents related to boiler firebox design. By 1909, Cole and his family had moved back to Atlanta, and, on the 10th of February in 1909, Cole passed away at his home.

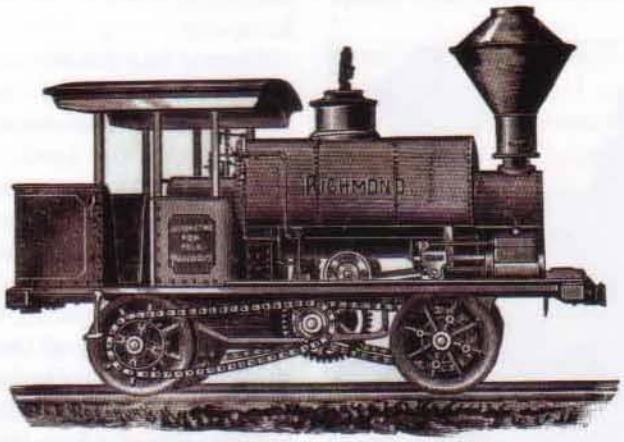
In time, much of the swampiest ground was harvested of its forests, and commercial logging operations of the South began expanding their lines to include more and larger locomotives. The market for the little pole road locomotives in the South began to wane, and they fell out of favor soon after the turn of the twentieth century. Their places were taken by larger geared locomotives more familiar to modern rail fans, such as Shay, Heisler, and Climax locomotives—or even the conventional rod style of locomotive that could haul a larger quantity of timber more efficiently.

Strangely enough, though pole road locomotives fell out of favor in the South by the early 1900s, some logging lines in the Pacific Northwest continued to use pole roads up to the days of machinery powered by gasoline. Film footage exists of gasoline trucks towing loaded log cars on pole roads, and a modified Fordson tractor still exists fitted with pole road wheels.

The value of pole road locomotives in steam logging should not be forgotten or overshadowed by the larger, more famous geared logging locomotives. For a variety of operations, pole road locomotives were a vital link between animal

Several purchasers of this Logging device have ordered second outfits.

No cross-ties necessary in building roads.



One purchaser states that the saving in using the Pole Road Locomotive, over any other kind of hauling, has been so great as to enable him to defray the cost of the whole outfit in a little over three months.

POLE ROAD LOCOMOTIVE.

Cylinder Dia. and Stroke in inches	Driver Dia. in inches.	Tank Capacity.	Weight in Working Order.	Hauling Capacity in Feet of Lumber, "board measure," up grades not exceeding 150 feet to the mile.
6½x10	24	350 gallons.	21,000 pounds.	About 5,000 feet.
7x12	30	450 "	29,000 "	6,000 to 7,000
8x12	30	600 "	31,000 "	8,000 to 10,000

We supply all the iron for building the Pole Road Cars, including Wheels, Axles, Boxes, Straps, and Bolts. **With the car irons we send a drawing showing the simplest and cheapest method of building a car.** Speed of Pole Road Locomotives from 4 to 5 miles per hour.

[23]

Here is a list of the different sizes of pole road locomotives produced by Richmond Locomotive and Machine Works. Courtesy John H. White, Jr., Railroad Reference Collection and Thomas Norrell Railroad Photographs Collection, Archives Center, National Museum of American History, Smithsonian Institution

or human power with their limitations and the tireless power of the largest steam logging engines. The pole road locomotives enabled businesses to expand their logging operations far beyond the dreams of only a few decades before.

Acknowledgments

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