A Brief Overview of the Main Line of Public Works, and its Successor, the Pennsylvania Railroad, from 1827 to the 1890s

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Preface

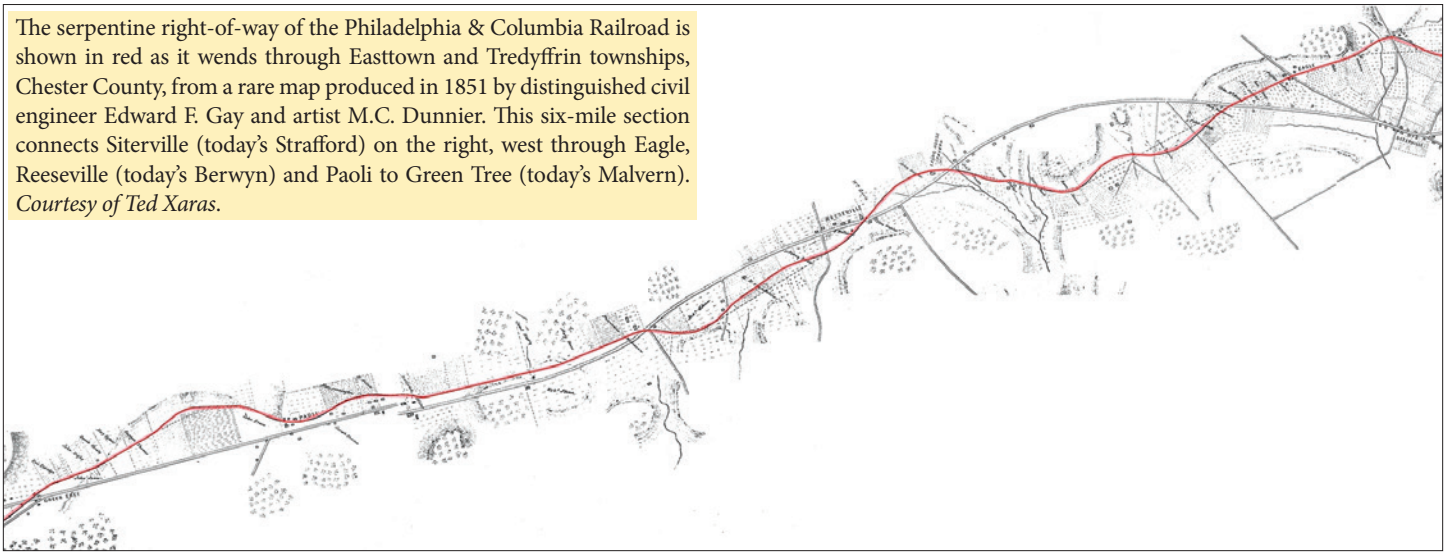
For almost two decades, my colleague Mike Bertram and I have conducted detailed research on diverse historical subjects within Tredyffrin and Easttown townships, Chester County. Neither of us are originally from Pennsylvania, so our local research never begins with assumptions. We are never shy about asking even the "dumb questions" as we seek to well-document a better understanding of the history of this historic area.

Railroads have played such an important role in helping to develop what we know as the "Philadelphia Main Line." Because so much has been written on this subject by so many, it could be assumed that there is little more to add. Yet Mike and I would disagree with that assumption, especially with regard to the background and development of the six-mile stretch of main line track from Strafford station—located on the border between Chester and Delaware counties—west to the former Green Tree station, slightly beyond Paoli. The time period for our research is some 70 years—beginning in 1827 when the first track surveys were conducted for what became Pennsylvania's Main Line of Public Works, and continuing through the 1890s when the Pennsylvania Railroad's four-track "super highway" finally passed though Paoli.

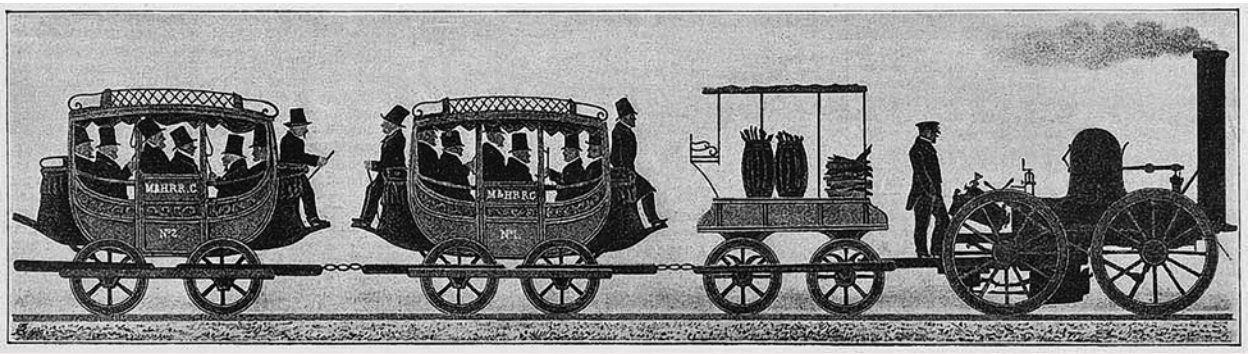
We pored through troves of often obscure transportation histories as well as the rich document collection from the archives of the Tredyffrin Easttown Historical Society; conducted hundreds of hours of deed and legal research at the Chester County Archives, Hagley Library, and other institutions; and took an amazing look into the past through a detailed study of local 19th-century newspapers housed at the Chester County Historical Society, and other sources. And we received nothing less than the most competent and cordial assistance from many of America's leading experts in the study of the Pennsylvania Railroad.

In order to better provide for our readers a perspective of the events and places in which our local railroad history occurred, I prepared the following "Brief History" of the Main Line of Public Works, Pennsylvania's 25-year endeavor to operate a state-wide transportation network; and of its successor, the Pennsylvania Railroad. Having laid that contextual foundation, Mike and I then began our quest to examine in considerable detail seven current or former passenger stops within our Tredyffrin-Easttown area. Two of them, Paoli and Green Tree, had previously served as inns along the Lancaster Turnpike decades before the advent of railroading. Another, Eagle, was added soon after the Philadelphia & Columbia Railroad was organized. The remaining four stations—Berwyn, Daylesford, Devon, and Strafford—were built by the Pennsylvania Railroad after its acquisition of the Main Line of Public Works in 1857. A passenger on the present-day (SEPTA Regional Rail line) Paoli Local will stop at, or pass by, all seven locations.

Research takes time, especially when working carefully and with attention to detail, so as the stories of each station are completed, we expect to present them as serialized installments in future issues of *History Quarterly*.



The serpentine right-of-way of the Philadelphia & Columbia Railroad is shown in red as it wends through Easttown and Tredyffrin townships, Chester County, from a rare map produced in 1851 by distinguished civil engineer Edward F. Gay and artist M.C. Dunnier. This six-mile section connects Siterville (today's Strafford) on the right, west through Eagle, Reeseville (today's Berwyn) and Paoli to Green Tree (today's Malvern). *Courtesy of Ted Xaras.*



A passenger in the earliest train carriage was usually uncomfortable and occasionally faced with some danger. These first railroad passenger cars were built by carriage makers, and looked like small coaches mounted upon flanged-wheeled railroad wagons. 19th-century Berwyn historian Julius Sachse described these early cars as "somewhat like the present 'Tally-ho' four-in-hand coaches (and) drawn by two horses tandem. Seats for passengers were arranged inside as well as outside on the top of the car, with a seat for the driver at each end of the car. These cars remained in use for several years. A short time after steam became the primary motive power, however, such coaches were largely abandoned as the smoke and sparks from the engine made it impossible for passengers to ride in safety, let alone comfort, on top of the cars."

The Creation of Pennsylvania's Main Line of Public Works

The vast America that stretched west from Pittsburgh, out across the Ohio River Valley and beyond, had been attracting farmers and settlers since just after the Revolution. In 1803, the population of the new state of Ohio numbered a mere 42,000 citizens. But by 1830, Ohio had grown to almost 1,000,000. The fertility of this new land had become legendary, and its abundance of grains and other bulk foodstuffs was much sought after by the highly-populated states along the country's East Coast.

But how to cost-effectively transport this agricultural bounty to those who desired it, and to move passengers from east to west and back again? An individual seeking passage from Philadelphia to Pittsburgh in 1830 would expect to endure seven, dusty days in a cramped stagecoach over abominable roads. Moving cargo by wagon across the mountainous spine of the Alleghenies was extraordinarily time-consuming, unpredictable, sometimes dangerous and always expensive. In order to seriously compete with its aggressive neighbors, Pennsylvania began to question which alternatives would best provide both reliable and affordable transportation across the Commonwealth.

And its neighbor to the north, New York State, was indeed aggressive, and had created a most innovative transportation system–albeit the focus of much criticism and mirth during its construction beginning in 1817. But when the Erie Canal across New York finally opened in 1825, this truly revolutionary commercial route to the "West" created transportation options previously unimagined. Wending its way across 363 miles, the Canal connected the Hudson River at Albany (thereby allowing clear passage south to New York City and the Atlantic) west to Buffalo on Lake Erie and the inland ocean of the Great Lakes. Almost overnight Philadelphia, traditionally America's largest seaport, was forced to bow in submission to New York City as vast quantities of trade now poured through the new Canal.

Yet Pennsylvania's legislature struggled for alternatives. In 1824, a year before the opening of the Erie Canal, the state's Governor John Shulze had created a Board of Canal Commissioners, charging them with establishing "a navigable communication between the eastern and western waters of the State and Lake Erie." [1] The Commissioners in turn issued orders to scour the landscape for the best viable route across the Commonwealth by which a series of canals could connect Chester and Lancaster Counties in the east with Pittsburgh to the west.[2]

Three years were to pass before, in the summer and fall of 1827, Major John A. Wilson of the U.S. Corps of Topographical Engineers was commissioned, on behalf of the Commissioners, to conduct a topographical survey to locate the best canal route between Philadelphia and the Susquehanna River in Lancaster County. Wilson's detailed report, however, perplexed the Commissioners by emphatically stating that the terrain between these divergent points was, on several counts, unsuitable [3] for the canal demanded by the Board. The Commission hesitantly acknowledged that, perhaps, some kind of railroad might have to be built to link Philadelphia with the canal basin at Columbia for a continuation across the Commonwealth. Thus, by March of 1828, the final plan for a state-built and operated "Main Line of Public Works" dictated that, in addition to 413 miles of canals to be dug across central and western Pennsylvania, there should also be created a "railroad from Philadelphia through the City of Lancaster to Columbia" and also, "a railroad across the Allegheny Mountains" (later to be called the Allegheny Portage Railroad).[4] Major Wilson was soon commissioned to lead a second survey to lay out the most advantageous route for the railroad west from Philadelphia to the Susquehanna.

The Beginnings of the Columbia & Philadelphia Railroad

It is generally agreed that England gave birth to the steam locomotive. The English inventor and builder George Stephenson created his first steam locomotive in 1814, with a

The first cars of the Columbia Railroad passed over the new, single-track road on October 18, 1832, from the head of the Belmont Inclined Plane to the intersection of the West Chester Railroad at the Green Tree Hotel in what is now Malvern. Each train carried the United States mail and thirty passengers, was drawn by two horses, and replaced the Lancaster mail coach between these points. On February 6, 1834, the Canal Collector in Paoli began to enforce the following order: "You are hereby informed that the proprietors or agents of cars will not be allowed to use two horses abreast upon the Columbia & Philadelphia Railway. This method of propelling cars is injurious to the railway and you will therefore consider it a part of your duty to enforce the law in case the above rule should be violated." *Courtesy of the American Canal and Transportation Center.*

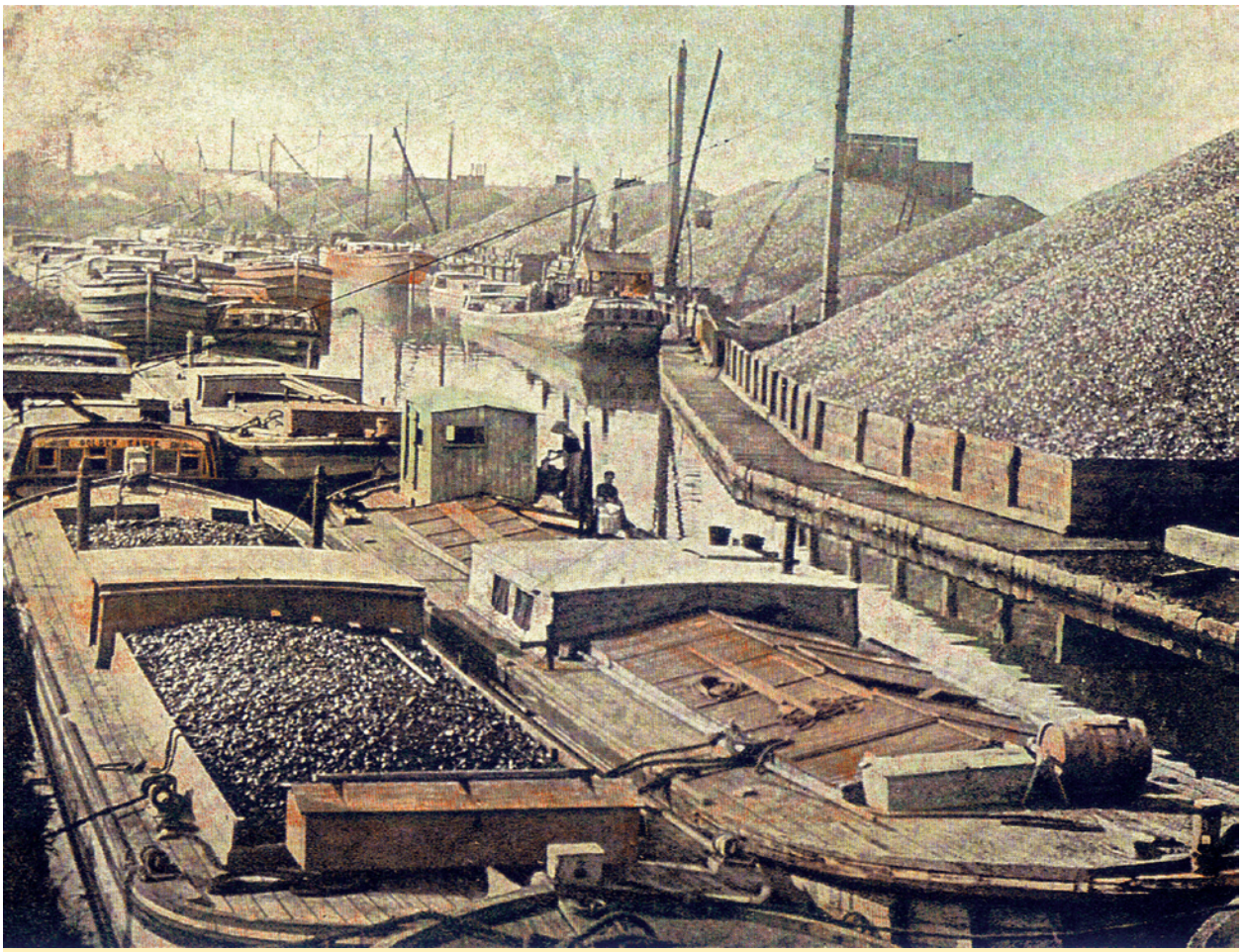
greatly improved variation soon introduced the following year. By 1825, a twenty-six-mile rail line called the Stockton and Darlington Railway had been completed across a portion of northeast England, becoming the world's first public railroad to use steam locomotives. This line successfully connected inland coal mines in County Durham with the seaside city of Stockton-on-Tees, where coal was trans-shipped onto sea-going vessels.[5]

When Major Wilson led his second survey in 1828 to establish a right-of-way for a railroad to Columbia, three years had already elapsed since the innovative launch of the steam-powered Stockton and Darlington Railway. Yet there is no indication that the planners—engineers and Commissioners alike—of this new Pennsylvania rail initiative knew of or cared a great deal about the technical potential for steam trains. Rather, all seemed content with the assumption that horses or mules would be the sole motive power for hauling railway cars. Not in their wildest dreams did the planners conceive the tremendous advances in technology which the future would bring to railroading within just a very few years.

The Canal Commission issued construction orders late in 1828 for the creation of forty miles of single-track railway; twenty miles to be laid from Philadelphia to just west of Paoli, and another twenty miles east from the Susquehanna River town of Columbia. The new railroad was officially designated "The Philadelphia & Columbia Division of the Pennsylvania Railroad," but more commonly called in those early days the "Columbia Railroad." [6] By early 1829 the work of grading and bridging the right-of-way upon these two twenty-mile sections had begun. Progress was inhibited periodically when the Legislature failed to appropriate sufficient money for the construction. But by September 1832, the 20-mile track section from Philadelphia to Green Tree (later Malvern) was ready for operation.[7] Horse teams were the only motive power used upon these rails.

Matthias W. Baldwin of Philadelphia created his first steam locomotive in 1832, and two years later his company, Baldwin Locomotive Works (and that of his competitor William Norris and Son, also located in Philadelphia), launched the American locomotive industry. As the transportation route of the Main Line of Public Works across the Commonwealth was fast reaching completion, the innovations of Baldwin and Norris were already leading toward the eventual obsolescence of canals, and a radical redefinition of the term "railroad."

Despite the general approval by most Pennsylvanians for the creation of the Main Line of Public Works across the state, the canals were a better understood means of conveyance than any new-fangled railway during the original construction of



Construction of the canal basin at the western end of the Columbia and Philadelphia Railroad transformed the small town of Columbia into a hub for the trans-shipment of goods and people across Pennsylvania. *Courtesy of the Railroad Museum of Pennsylvania.*

the "Works." In fact, in many quarters there was strong initial opposition to the construction of the railroad sections. To counter this pressure, those sponsoring the railway projects demanded every cost reduction possible as a defensive tactic to contain this public resistance. Straightening and leveling tracks using "cuts" and "fills," and other grading techniques, were expensive, and it was ordered that these efforts should be avoided if at all possible. Thus, when a single-track right-of-way from the Schuylkill to the Susquehanna was opened in April 1834, the line generally tracked the topographical contours of the terrain, and the track undulated around the many natural hills like a giant snake. As an example, the first 33-mile section of the rail line between Philadelphia and Downingtown contained 132 curves.[8] But because the road had been intended only for the use of plodding horse-power, there seemed to have been no initial consideration of the effect of longer trains, or increased speeds, or elongated wheelbases on the equipment. The cost-cutting during construction of the Columbia resulted in curves over thirty-four percent of the trackage, the sharpest of which was more than nine degrees in a hundred feet.[9]

Yet progress was beginning to dawn. After a highly-publicized statement by the Canal Commissioners in 1831[10] revealing their unambiguous bias for canals over rail transportation, it was indeed a revolutionary step when, three years later, the Board in April 1834 placed a purchase order for twenty steam locomotives to haul trains on the Columbia & Philadelphia Railroad. In that same month, the Columbia opened for single track operation the entire 82-mile distance between the Schuylkill and Susquehanna rivers … and that following October the railroad was running double tracked operations for that entire distance. Now, along with the use of the Portage Railroad which crossed the spine of the Allegheny Mountains, the Main Line of Public Works was able to provide full connection—however disjointedly—between Philadelphia and Pittsburgh.

In November 1834, the first two steam engines ordered from the Baldwin Works were in daily use from Philadelphia to Columbia, and were able to reliably complete the journey in about eight hours.[11] And because locomotives always needed repair shops, soon after the engine order had been placed, a site for the first railroad repair shop in Pennsylvania was chosen—at a newly-laid-out town in Chester County called Parkesburg.

With the commencement of double-tracked operations for the 82-mile distance between the Schuylkill and Susquehanna rivers in October 1834, the Columbia & Philadelphia now became the longest double-tracked railroad in the world.

This Main Line route thus enabled a westbound passenger to

When the Columbia & Philadelphia Railroad opened its two-track service in November 1834, 70% of the 82-mile right-of-way was laid with rails and supports as shown in this helpful image. Large rocks were cut and shaped into sleeper stones, with two holes drilled into each stone. The stones would be separated by 3-4 feet between centers, and buried so that the top surface was flush with the ground. Cast iron "chairs" were bolted to each stone, and the iron rails held in place by these "chairs." As the original means of locomotion upon the railroad presumed the use of horses to haul the cars, these blocks were both easier and less dangerous for the horses to walk upon than wooden cross-tie supports. Within several years, however, sleeper stones and "chairs" along the C&P were replaced by wooden cross-ties and iron tee rails. *Courtesy of the Allegheny Portage Railroad National Historic Site.*

depart Broad and Vine Streets in Philadelphia on a rail car and, after an anticipated delay ascending the Belmont Inclined Plane on the west side of the Schuylkill River in West Philadelphia, to continue at a maximum speed of some 10–15 miles per hour through the maze of twisting curves to the Columbia Canal Basin on the Susquehanna River. Upon arrival, our passenger would transfer to a canal boat, and settle in for the slow transit (about 2 m.p.h.) over 172 miles of the Pennsylvania Canal to Hollidaysburg, south of Altoona. He would then board a railcar of the Allegheny Portage Railroad to traverse the ten inclined planes of this innovative—though often dangerous—railway over the mountain barrier into Johnstown.[12] Then once again, our passenger would board a canal boat for the final 105 mile journey into Pittsburgh. This total trip of 395 miles across the Commonwealth was scheduled to take about 91 hours: 118 miles by rail and 277 miles by canal boat.[13] Though the average speed of the transit was a modest 4.34 miles an hour, the "Public Works" had drastically reduced the seven arduous days previously spent by a traveler crossing Pennsylvania on a dusty, bouncing stagecoach.

Some Characteristics Along the Columbia & Philadelphia Railroad

For the next 23 years (1834–57) the Columbia Railroad served Pennsylvania as the easternmost segment of its Main Line of Public Works. Because this summary is an overview rather than a detailed treatise of the Columbia & Philadelphia, let me reveal five aspects which I found particularly interesting during my research on the operations along this new rail line:

1. Evolution of the Trackage

When the first 82 miles of single track were completed between Philadelphia and Columbia in April of 1834, there were no standards as to the "right" specifications for track, track supports, and connective fittings. Railroading was just too new. So, the Canal Commissioners initially ordered the entire length of the Columbia to be used as a test bed to help create such standards. Eighteen miles of the right-of-way were initially laid with wooden cross-tie supports upon which a track base made of oak (resembling a 2" x 4" timber) was plated on its top with flat iron "strap rails." Another six miles of track were laid with large granite "sill" supports (then experimentally being used by the competing Baltimore and Ohio Railroad) upon which an oaken track base was capped with flat iron "strap rail." For the remaining 58 miles of the initial line the construction gangs sunk large stone block supports (each 18" x 18" x 12") spaced 3 to 4 feet apart between centers, onto which were attached rolled iron "edge rails." Both the "strap rails" and the "edge rails" were imported from the Ebbw Vale Iron Works in south Wales, and were secured to their stone or wooden "sleepers" by cast-iron "chairs."

Several lessons soon emerged. The flat iron "strap rails" quickly worked loose from the "chairs" affixed to each support, resulting in damaging consequences. In the early months, several trains each day were derailing. Further, the heavy stone block supports were ironically found to be overly rigid to normal track vibration, and the more elastic wooden cross-ties were soon substituted across the length of the road. Several years later, the far superior tee rails, with their broad

Continue to Part 2