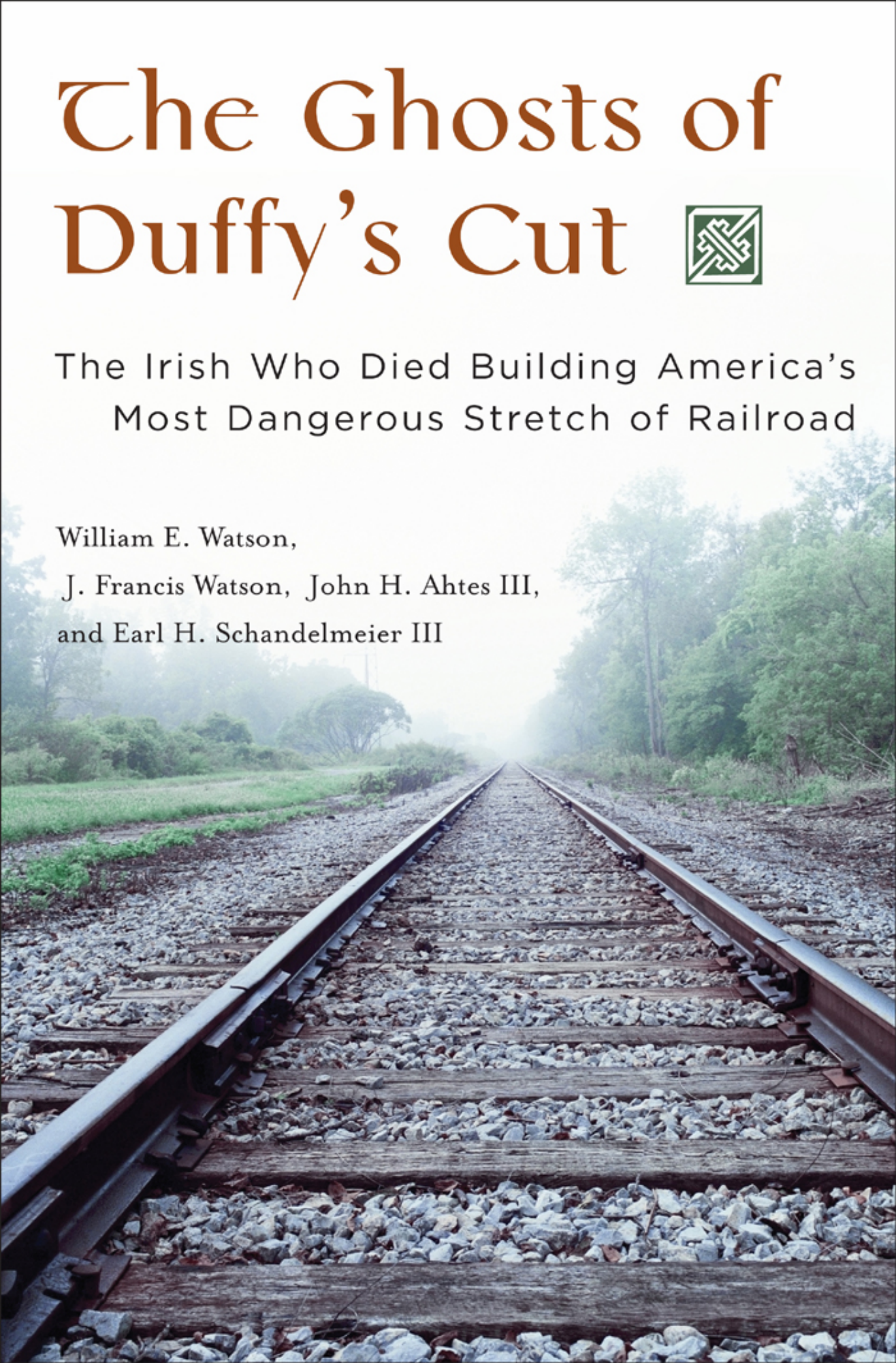
The Ghosts of Duffy's Cut

The Irish Who Died Building America's Most Dangerous Stretch of Railroad

William E. Watson,
J. Francis Watson, John H. Ahtes III,
and Earl H. Schandelmeier III



THE GHOSTS OF DUFFY'S CUT

The Irish Who Died Building America's Most Dangerous Stretch of Railroad

William E. Watson, J. Francis Watson,
John H. Ahtes III, and Earl H. Schandelmeier III

PRAEGER

Westport, Connecticut
London

Library of Congress Cataloging-in-Publication Data

The ghosts of Duffy's Cut : the Irish who died building America's most dangerous stretch of railroad / William E. Watson . . . [et al.].
p. cm.
Includes bibliographical references and index.
ISBN 0–275–98727–2 (alk. paper)
1. Irish Americans—Pennsylvania—Malvern Region—History—19th century. 2. Duffy's Cut Site (Malvern, Pa.) 3. Malvern Region (Pa.)—History—19th century. 4. Malvern Region (Pa.)—Antiquities. 5. Alien labor, Irish—Pennsylvania—Malvern Region—History—19th century. 6. Cholera—Pennsylvania—Malvern Region—History—19th century. 7. Epidemics—Pennsylvania—Malvern Region—History—19th century. 8. Railroad construction workers—Pennsylvania—Malvern Region—History—19th century. 9. Columbia-Philadelphia Railroad—History. 10. Ghost stories, American—Pennsylvania—Malvern Region. I. Watson, William E.
F159.M27G47 2006
974.8'130049162—dc22 2006008916

British Library Cataloguing in Publication Data is available.

Library of Congress Catalog Card Number: 2006008916
ISBN: 0–275–98727–2

First published in 2006

Praeger Publishers, 88 Post Road West, Westport, CT 06881
An imprint of Greenwood Publishing Group, Inc.
www.praeger.com

Printed in the United States of America

The paper used in this book complies with the Permanent Paper Standard issued by the National Information Standards Organization (Z39.48–1984).

10 9 8 7 6 5 4 3 2 1

This book is dedicated to the memory of the Duffy's Cut 57.

This page intentionally left blank

Contents

This page intentionally left blank

Preface

In the summer of 1832, 57 Irishmen arrived in the Port of Philadelphia and were brought by a fellow Irish immigrant contractor, Philip Duffy, to work on the construction of the Philadelphia and Columbia Railroad (Pennsylvania's pioneering railroad) in Chester County, some 30 miles west of Philadelphia. Within two months of their arrival, however, all of them had died from cholera in a global pandemic whose arrival in the Philadelphia area coincided with their own.

Their almost-forgotten story provides a unique set of circumstances in the history of immigration, industrialization, and epidemiology, yet it represents hundreds of similar stories of tragedy in the construction of America's industrial infrastructure that have been lost altogether. The story of Duffy's Cut was retrieved through an unusual set of circumstances, and it will be examined here for the first time through an analysis of surviving archival and archaeological evidence.

The terrible fate of the men at Duffy's Cut was the reason for the year-long delay in the opening of Pennsylvania's Main Line of Public Works. The career of the elusive contractor Philip Duffy is also substantiated here for the first time. His story is one of the rare cases in which the life of a mid-level immigrant contractor can be recreated, thereby providing an example of the impact of immigrant labor in Jacksonian America. A subsequent railroad cover-up nearly succeeded in completely erasing the memory of the men of Duffy's Cut from the historical record, but the secret Pennsylvania Railroad file on the event survived by chance in the family of two of the authors.

Folklore and bits and pieces of the story were preserved by railroaders (Patrick Doyle, Martin Clement, and Joseph Tripician), and, in 2003, the Duffy's Cut Project formed at Immaculata University for the purpose of planting this story

firmly in the historical record. To that end, the project obtained a Pennsylvania Historical Marker for the 57 anonymous victims of Duffy's Cut, which stands at the intersection of King Road and Sugartown Road in Willistown, near Malvern, Pennsylvania. This book is a collaborative effort by the principal researchers of the Duffy's Cut Project. William Watson, Frank Watson, and Earl Schandelmeier wish to thank their wives and children for their patience, and John Ahtes wishes to honor the memory of his mother, Ann Marie Ahtes (née Prendergast), who passed away during the writing of this book. Acknowledgement must be paid also to the Sisters of the Immaculate Heart of Mary at Immaculata University, and to the students who assisted in the archaeology of Duffy's Cut (Alan Dawson, Zachary Perkins, Richard Smith, Sarah McClean, Rebecca Angelo, and Patrick Frevert). Thanks also must go to fellow researcher, Chester County Park Ranger Robert McAllister; to the Chester County Emerald Society (Charles Crawford and Matthew Gordon, in particular); to Robert and Hillary Murdoch, our archaeologists; to Professor Jim Jones of West Chester University; to the Daughters of Charity; to Michael Herron of the Transportation Management Association of Chester County; to Stephen Rooke and David Farrell of Tile Films, Dublin, Ireland; to Ronald LaBarca of U.S. Radar, Inc.; to Daniel Sivilich of Battlefield Associates; to the Chester County Historical Society; and to the Pennsylvania Historical Commission.

ONE

The Genesis of the Philadelphia and Columbia Railroad

INTRODUCTION

The story of Duffy's Cut is intertwined with the story of the construction of the Philadelphia and Columbia Railroad (P&C), one of the earliest railroads built in America. No definitive study has been written on this early American railroad. This book examines the building and the significance of the most expensive and dangerous mile of the P&C, mile 59 as it was designated, and thus will help to illumine the study of this early railroad. A number of sources from the nineteenth century to the present are used in this chapter to briefly tell the story of the P&C and provide the context for the story of Duffy's Cut.

EARLY RAILROADS IN BRITAIN AND AMERICA

The precursors to railroads were created in the first half of the seventeenth century to move coal from mines in Great Britain. Wooden tracks were utilized to haul horse-drawn coal wagons. The earliest known example of this type of motive power was manufactured at Newcastle-on-Tyne. The first public railroad was the Surrey Iron Railway Company, which opened in England in 1804 and used horse power to pull loads. The first steam engine for a locomotive was built in 1804 by Cornish mine foreman and inventor Richard Trevithick. This steam engine made a trial run in Wales, traveling at the speed of five miles per hour. Nonetheless, the man often called the father of the modern railroad system was George Stephenson, an English engineer.[1] Stephenson's Locomotive No. 1—completed in 1814—pulled the first train of the Stockton and Darlington Railway in 1825. This event presaged a turning point in railroad history, when, in 1833, steam engines

replaced horses to pull passenger cars along that rail line. In 1829 Stephenson tested his Rocket, which traveled at the then amazing speed of 26 miles per hour and which won him a prize of 500 pounds in a contest sponsored by the Liverpool and Manchester Railroad Company.

America's fascination with the railroad began early in the nineteenth century. In 1804 in Philadelphia, Oliver Evans introduced the Oruktor Amphibolos (Amphibious Digger), which consisted of a steam engine within a boat hull that was set upon four wheels. The "digger" was 30 feet long, weighed 15 tons, and was used to dredge the dockyards of Philadelphia. The engine inside the hull had a speed of five horse power. In 1812 Evans proposed building a steam powered railroad line. This same year saw the publication of another proposal to build steam powered railroads by Col. John Stevens of Hoboken, New Jersey. Stevens was a railroad advocate who proposed several rail lines, including one in New Jersey as early 1815. Although none of Stevens's proposed railroads were ever built, in 1822 Stevens set forth a proposal that foreshadowed the P&C: Stevens was the first to propose a railroad from Philadelphia to Columbia, Pennsylvania.[2]

The first railroad track in the United States was built in 1809 in Chester County, Pennsylvania, the same county in which Duffy's Cut would later be constructed between 1831 and 1833. This first track was an experimental project, only 60 yards long, constructed by John Thomson and Thomas Leiper. Soon Leiper built a rail line extending one mile. Early significant American railroads that stretched a number of miles included the Quincy Railroad in Massachusetts (1827), the Delaware and Hudson Canal Company in Pennsylvania (1828, and on which ran the Stourbridge Lion, the first locomotive in the United States), and the Camden and Amboy Railroad in New Jersey (1830). Among the early American railroads, the Baltimore and Ohio Railroad (1828) rightly has the distinction of being called the nation's first railroad.[3]

There were many motives behind the building of the early American railroads. Prior to the construction of railroads, interstate travel was typically conducted along waterways, including canals, as well as by stagecoach and Conestoga wagon. Such interstate travel could take weeks.

Enabling faster transportation of goods was, of course, one of the prime motives for building the early railroads. Canals could freeze during the winter months, and horse transportation had its limitations. The railroad was looked on as a faster, more efficient, and more reliable mode of transport than either canal or carriage. The railroads held great promise for promoting trade and commerce within the United States. In addition to the business application of the railroad, trains were also seen as a means of promoting unity among the various states of the Union. Railroads thus were understood to be a tool to help reduce isolationism within and between the states. Typical of this strand of thinking is a piece in the *American Railroad Journal* (the first railroad periodical published in the United States) from May of 1832:

> It is very gratifying to see so much enterprising spirit showing itself throughout the country for internal improvements, developing our great resources for prosperity and independence. . . . These railroads are very advantageous in times of peace—they will

> bring the states together seemingly like a neighborhood for social intercourse and good fellowship, promoting harmony and greatly *strengthening the bonds of union.*[4]

THE SIGNIFICANCE OF TRAVEL BETWEEN PHILADELPHIA AND NEW YORK

Linking New York and Philadelphia by rail was a major goal in this early period:

> The connecting link between New York and Philadelphia of the great chain of Railroads, will be of more consequence than any in the Union, and no delay will be suffered in its immediate completion. . . . If our winters should continue to be as tedious and severe as the last one, the General Government will find it necessary to interest itself for the speedy accomplishment of this route, for the better accommodation of the portage of the very ponderous Southern Mail, which has to encounter much traveling, and makes killing work for horses.[5]

Prior to the advent of the railroads, canals such as the Erie Canal in New York were looked on as possessing the greatest potential to unite the industries of the Northeast and the Western United States. In this earlier period, travel between New York and Philadelphia was possible either by carriage or a combination of carriage and steamship.

Just so, the January 18, 1830, *Philadelphia Gazette and Daily Advertiser* listed a variety of options for passengers seeking to travel from Philadelphia to New York. The U.S. Mail coach left daily at 2:30 P.M. from 28 South Third Street (opposite Congress Hall), in Philadelphia, and took 12 hours to travel to New York. The coach stopped at a number of towns along the way: Frankford and Bristol in Pennsylvania and Trenton, Princeton, Kingston, New Brunswick, Bridge Town, Elizabeth Town, Newark, and Jersey City in New Jersey. The cost of this journey was four dollars.

One of the advantages of such a mode of transport was the inclusion of a "guard" who protected not only the mail, but also offered some protection for the travelers in the coach. The company offering this accommodation was J. Reedside and Co., who promised "able Horses, good Coaches and careful Drivers." J. Reedside claimed that, "for safety and speedy conveyance," this line "is not surpassed by any in the Union." Another longer and more complicated, but nonetheless cheaper, method of transport to New York was advertised by the Citizens' Line:

> The steam boat Philadelphia, Capt. Z.W. Kellum, leaves Arch street wharf, every day, (Sundays excepted) at 12 o'clock, for Burlington, Bristol, Whitehill and Bordentown. Passengers for New York, take Coaches at Bordentown, to New Brunswick, there lodge, next morning, take the steamboat New York, Capt. G. Jenkins, and arrive in New York, by 10 o'clock.

The fare for this trip was $2.50. Although carriages, canal boats, and steamships were tested means of transportation, railroads promised the possibility of more direct and convenient transportation for both passengers and goods.[6]

POTENTIAL MILITARY USES OF THE RAILROAD RECOGNIZED

Military applications for rail transport were recognized early on. While the military use of rail communication would eventually be put to the test during the American Civil War,[7] the possibility of using railroads for such a purpose was already being considered as early as 1832:

> in times of war there is nothing that has been thought of so well calculated to afford facilities to repel invasion. Our steamboats and canal navigation are considered very valuable for that purpose: but in winter, when all the internal water communications are frozen, fatal difficulties arise in the transportation of the artillery troops and munitions of war when we have such an immense extent of Atlantic frontier to defend. We may, it is true, again be able to protect our country, as we have done from a powerful enemy without this winter Railroad accommodation, but with what enormous additional expense must it be accomplished, and how much useless hazard and sacrifice of lives and property must it incur. Instead of calling upon our citizens to form an army of 2 or 300,000 men for self defense, with the efficiency and dispatch of Railroad traveling, 40 or 50,000 men could afford equal protection, provided the Railroad should be extended with that view. . . . It would be impossible, therefore, for any successful landing to be made by a formidable foe at any material place when our forces can be brought together in such formidable bodies at such great distances, in so short a time, and in such fresh condition and high order for battle.[8]

Many and various commercial and political applications were put forth to justify the expense and effort needed to build the early railroads. Interstate rivalry became a motivating factor as well, and, indeed, played a major role in the early development of the P&C Railroad.

THE ESTABLISHMENT OF THE PHILADELPHIA AND COLUMBIA RAILROAD

"Traffic upon the main line of State works was formally opened in the presence of the Governor and the members of the Legislature on the 16th of April, 1834."[9] This matter-of-fact statement, written in a nineteenth-century history of the railroad in Pennsylvania, bears witness to what was, in reality, a long and convoluted development. The story of the construction of the P&C is part and parcel of what was the crucial period in the history of railroad development in the United States. The genesis of the P&C can be found in an 1823 act of the Pennsylvania legislature that sought to build the first railroad in that state.[10] Thomas F. Gordon's 1832 *A Gazetteer of the State of Pennsylvania* listed the various legislative acts authorizing the building of Pennsylvania's railroads up to 1832.[11] Topping this list as the first railroad authorized in the state of Pennsylvania is the "Philadelphia and Columbia Rail Road."[12] The counties through which this railroad would run were Philadelphia, Delaware, Chester, and Lancaster.

The man originally authorized to supervise this project was John Stevens of Hoboken, New Jersey. The funding for this rail line was to come from private

sources, including the well known Philadelphia financier Stephen Girard. John Stevens was seen as a man "in advance of the age in which he lived," even though his proposed Pennsylvania railroad line was never built.[13]

On April 11 of 1825, the board of Canal Commissioners was established, and in 1826 the first steps were taken to build a statewide "Pennsylvania Canal," or, really, a system of canals that would connect Philadelphia and Pittsburgh.[14] The Commonwealth of Pennsylvania was to provide $300,000 for the funding of this project. Within a year of this commitment on the part of the legislature to build a Pennsylvania Canal, a provision was added to include a series of railroads connecting the various stretches of canal.[15] This provision for the building of railroads would soon give rise to meetings for the purposes of investigating the possibilities of building railroads around the commonwealth. Those who recognized the potential of a railroad between Columbia and Philadelphia organized to lay the foundation of what would soon become an essential part of "internal improvements" in the state of Pennsylvania. The November 2, 1825, West Chester newspaper *American Republican* reported on the October 8, 1825, meeting at the Inn of Joseph Jeffries at Columbia, Pennsylvania:

> for the purpose of taking into consideration the advantages of uniting the trade of the Susquehanna with the city of Philadelphia, by a rail-way, commencing at the borough of Columbia, WM. P. Beatty, Esq. was chosen chairman, and John Barber, Esq. Secretary.[16]

John Barber eventually became the superintendent of the P&C and had a role to play in the story of Duffy's Cut. On May 18, 1831, Barber signed the Article of Agreement between Philip Duffy and the Commonwealth of Pennsylvania for mile 59 of the P&C, which became known as Duffy's Cut. The October 8, 1825, meeting, at which Barber was chosen as secretary, proposed a resolution that would forever change the state of Pennsylvania. Reflecting the general consensus on the potential that railroads possessed, the participants at this meeting noted that:

> we view with great satisfaction the efforts which have been made . . . by our fellow citizens in Philadelphia, to obtain correct information and to enlighten the public mind, concerning the utility of rail-roads. Although the subject is new to us, yet when we consider that rail ways have long been extensively used in England;—that they can be made for about one-third of the cost of canals—that an immense capital has recently been subscribed in that country for the construction of several new ones—and that there appears to be but one opinion among their ablest engineers, as to the relative advantages of rail-ways and canals, and this in favor of the former.[17]

Called the Main Line of Public Works, this canal/rail system epitomized the confidence of Pennsylvanians at the height of the American industrial revolution. Moved to action by the opening of the Erie Canal in New York in 1825, Pennsylvania had sought its place within the ever-expanding commercial interests along the western frontier of the American continent. Recognizing the economic growth that such canal/rail transportation might make possible was one

of the most decisive actions taken by the Pennsylvania legislature in the years 1825–1827.[18]

In 1827 the Pennsylvania Canal Commissioners sent forth teams to survey various areas within the commonwealth.[19] Among those employed in these surveys was Major John Wilson, whose son William Hasell Wilson accompanied his father and later wrote a personal reflection on the expedition.[20] Although not intended as a scholarly or complete account of the survey in which he took part, William Hasell Wilson's reflections offer an important firsthand impression of the particular stretch of ground that soon made up that part of the Philadelphia and Columbia Railroad line known as Duffy's Cut.

THE SURVEY

In June of 1827, the survey team under Major John Wilson started its work in the Chester Valley. They began "at Valley Forge on the Schuylkill river, about twenty-four miles from Philadelphia, and continued westward along the 'Great Valley' of Chester county."[21] John Wilson's professional team seems to have been made up of between seven and eight men, including a surveyor, a leveler, a rodman, two chainmen, and one or two axe men.[22] Among the two chainmen who took part in Major Wilson's survey of the area that included Duffy's Cut was the later president of the Pennsylvania Railroad Company, J. Edgar Thomson.[23] William Hasell Wilson accompanied his father's expedition as a "volunteer."[24] He soon took an active part in the work of surveying the Chester Valley area. Thus occupied, he made some interesting observations about this part of Pennsylvania:

> The country through which we passed was one of the finest agricultural regions in the United States, thickly settled with an intelligent population, and picturesque in its features. To one accustomed as I had been to a city life, or the flat, uninteresting country of the southern seaboard, the excursion was a source of continued enjoyment.[25]

After a month to a month and a half of work, the party summed up its preliminary survey results for this area at Gap, Pennsylvania. Major Wilson determined that indeed this terrain was more fitted for rail transport than for canal, and this report was conveyed to the Canal Commission.[26] In August of 1827, the team moved on to survey the proposed canal link between Harrisburg and Columbia and then worked on a survey of the proposed rail link between Columbia and Gap. In his reflections on this work in the summer and fall of 1827, W.H. Wilson noted something interesting in light of the Duffy's Cut tragedy of 1832.

At one point in the midst of their work between Columbia and Gap, the entire survey party was hit by an unknown "fever."[27] Although not admitting to any outbreak of disease or contagion, according to Wilson, the residents of the area reported to the survey crew that there was generally a "prevalence of chills and fever in the fall of the year." We do not know what this illness was; neither do we know what the survey party believed to be the source of their "fever." For

their part, the local residents did not seem to be concerned.[28] Nonetheless, in light of what would happen five years later along the eastern portion of the line at Duffy's Cut, it is telling that the team commissioned to do the survey was so ill that fall that they were unable to continue their work for "some weeks."

Major Wilson and his crew were in the news in Chester County the following year as they were directly involved in the continuing work of locating the line of the railroad in 1828. A legislative act of March 24, 1828, authorized the Canal Commission to, among other things, locate the route of the Philadelphia and Columbia line.[29] The May 20, 1828, edition of *American Republican* newspaper reported that Wilson and his crew (including Thomson) were occupied with the work of planning the layout of the railroad tracks around Lancaster, Pennsylvania. This crew around Lancaster was "now engaged in locating this road" (the road from Columbia to Philadelphia). The mayor, select and common council members, as well as designated citizens from Lancaster were appointed to work with Major Wilson and the railroad in an effort to enable the railroad to be placed so as to be "most advantageous to the citizens of Lancaster generally."[30]

The residents of Chester County took this news story and its account of the lobbying of Major Wilson to heart. The July 1, 1828, *American Republican* reported on a meeting that took place on June 24, 1828, in the home of S.C. Jefferis in West Chester. The purpose of this meeting was to enlist Chester County residents in the decision-making process of locating the railroad as close to West Chester as possible. There was a hope expressed that the railroad could come through the Borough of West Chester. This news article announced an upcoming public meeting on July 5, 1828, to consider options to achieve this goal. As time went on, it became clear that this dream would not become a reality. On September 16, 1828, the *American Republican* reported that

> Major Wilson's company, now engaged in locating a rail way from Columbia to Philadelphia, arrived at this place on Saturday evening last. They have determined its location as far as the Brandywine, at Coatesville; and intended spending some time in examining each side of the Valley for some distance.[31]

Despite the hopes of the citizens of West Chester, this article contained a reference to the planned route of the railroad, which lay outside and to the north of the Borough of West Chester and thus along the line that later included Duffy's Cut. There was also an interesting reference here to the manner in which the populace received Major Wilson and his party, even after the best laid plans of the citizens of West Chester to bring the railroad south through the borough came to naught:

> This is all right, to give general satisfaction; yet there is little doubt but the northern route will be adopted. We are happy to learn that the Major and his company have been received by the landholders of our county, with politeness and good humor.

THE PROGRESS OF THE PHILADELPHIA AND COLUMBIA RAILROAD

By January of 1828, the main part of the work of surveying what was to become the P&C was completed, even while, as mentioned, portions of the rail line were finalized later. On March 24, 1828, the legislature of Pennsylvania formally authorized the construction of the rail line, appropriating the large sum of $2 million for the work.[32]

The railroad construction began in March of 1828, and it was hoped that the construction could be completed within two years.[33] Grading of the track bed and bridging of the line got underway, and, by the end of December 1828, the future of the Main Line of Public Works seemed well in hand.[34] Within a year, however, the situation had changed. By December of 1829, there was concern that the Pennsylvania legislature would not support further funding of the rail line. "Apathy, and even opposition"[35] to the project became evident, and there was fear that the railroad plan might even be scrapped.[36] Concern over the seemingly slow pace of the work was partially to blame for this apathy and opposition, as well as other economic and political factors.

The January 18, 1830, *Philadelphia Gazette and Daily Advertiser* newspaper contained a number of references to the debates in the Pennsylvania legislature about the development of the railroad. Reporting on the legislative session that began on January 12, 1830, this article published the detailed auditor general's report, which included the various loans authorized for the Pennsylvania Canal and Railway. Listed in the report are the following loans (along with Auditor General David Mann's comments):

> Canal loan, per act of 1st April, 1826, re-imbursable 1st December, 1846 $300,000.00 (These loans were intended for and applied to the construction of the Pennsylvania canal)
>
> Canal loan, per act of 9th April, 1827, re-imbursable 1st December, 1850 $1,000,000.00 (These loans were intended for and applied to the construction of the Pennsylvania canal)
>
> Canal loan, per act of 24th March, 1828, re-imbursable 1st December, 1853 $2,000,000.00 (These loans were intended for and applied to the construction of the Pennsylvania canal and railroad)
>
> Canal loan, per act of 13th December, 1828, re-imbursable 1st January 1854 $800,000.00 (These loans were intended for and applied to the construction of the Pennsylvania canal and railroad)
>
> Canal loan, per act of 22nd April 1829, re-imbursable 1st December 1854 $2,200,000.00 (These loans were intended for and applied to the construction of the Pennsylvania canal and railroad)
>
> Canal loan, per resolution of the board of canal commissioners of 2nd October 1829 $106,000.00 (This loan was applied to canal and rail road purposes, but as it was not authorized by any existing law, has not yet been approved by the Legislature, and as no appropriation has been made for its payment, no notice was taken of it in the appendix to the last annual report of the auditor general) Temporary loan, per act of 17th November 1829 $40,000.00 (This loan was intended for and applied to

> the construction of the Pennsylvania canal and rail road, but as it was reported to this department since the close of the last financial year, it was not included in the last annual report).

As is evident in the auditor general's report, Pennsylvania borrowed an incredibly large amount of money to build its canal/rail link between Philadelphia and Pittsburgh. The above summary of canal and railroad funding demonstrates the seriousness of the state's commitment to these proposed "internal improvements." This funding summary also explains some of the trepidation on the part of some of the legislators. The state had taken on a tremendous debt. No appropriations were made in 1830. On March 21, 1831, the legislature directed that the work of building the railroad be completed "as soon as practicable."[37] Yet, by the spring of 1833, the P&C was not completed.[38] A number of factors contributed to the delayed completion of the P&C: "bad weather, balky contractors and labor shortages."[39] The death of the 57 men at Duffy's Cut in August 1832 also delayed completion of the railroad.

Despite a variety of setbacks, in the summer of 1832 a trial run was made on a 20-mile portion of the line from the incline at the Belmont Plateau in Philadelphia west to the Green Tree Inn (west of Paoli). The run was made with a locomotive engine named the Green Hawk, and, because of the continuing need to replenish the wood and water for the fuel, the round-trip of 40 miles took 11 hours to complete.[40] The portion of the P&C from Philadelphia to Intersection (Malvern) was finally opened for business in September of 1832.[41]

The mile numbers for the P&C began at Columbia, Pennsylvania, along the Susquehanna River, and ended at Philadelphia, a distance of 82 miles.[42] Utilizing horse power, that distance would take nine hours to complete. Fresh horses were changed along the route every 12 miles. The first locomotive engine used regularly on the line was called the Black Hawk.

Writing in 1889 about the building of mile 59, the area that became known as Duffy's Cut, Chester County historian Julian Sachse describes the building of the P&C:

> When the road was first projected and built the rails were of wood plated with flat iron bars or tire irons expressly imported from England. These cars both passenger and burden, were small four wheeled affairs drawn by single horse or two driven tandem.[43]

On March 31, 1834, the rail line from Lancaster to Columbia was opened. On April 16, 1834, the confident hopes that had been expressed for the completion of the railroad earlier in the 1830s were fulfilled as the rail line from Philadelphia to Columbia was opened.[44] On October 7, 1834, a second rail track between Philadelphia and Columbia was completed.

It is ironic that, while the opening of the Erie Canal in 1825 spurred Pennsylvania to move ahead with its "internal improvements," by November of 1834 the monumental progress of the Main Line of Public Works was looked on by other railroads as second to none.[45]

The entire canal/rail line connecting Philadelphia and Pittsburgh was completed in 1834. This "Main Line" consisted of the following elements: the P&C Railroad, which ran 82 miles between Philadelphia and Columbia; the eastern division of the Pennsylvania Canal, which ran 172 miles between Columbia and Hollidaysburg; the Portage Railroad, which ran 36 miles between Hollidaysburg and Johnstown; and the western division of the Pennsylvania Canal, which ran 104 miles between Johnstown and Pittsburgh.

Reflecting on this finished product in 1899, J. Elfreth Watkins noted:

> Thus fifty years after the treaty of peace with Great Britain had been ratified by the Congress of the United States, at the close of the war of the Revolution, the waters of the Atlantic Ocean and the Ohio River were, for the first time, connected by a transportation route, 395 miles long, constructed by the state of Pennsylvania at a cost of over $12,000,000.[46]

FURTHER DEVELOPMENTS ON THE P&C

In its original form, the P&C has been described as a "rail turnpike for the use of individuals and corporations, each of whom furnished and operated his or its own vehicles and animals."[47] In his 1832 *Gazetteer,* Thomas Gordon reported that "A good Pennsylvania waggon horse, will, on this railway, convey ten tons a distance of 27 miles per day with ease."[48] In the second portion of his *Gazetteer,* Gordon described the towns, cities, and municipalities throughout the state of Pennsylvania from "A" to "Z." In his treatment of the communities through which the P&C traveled, Gordon listed local industries, post offices, houses of worship, and other information he felt would be of interest to readers. Sources such as Gordon's *Gazetteer* underscored the practical consequences made possible by the advent of the railroad and inspired optimism in the future of rail travel.

Among the developments in rail travel in the early years of the P&C was the move from horse to locomotive power. Although horses were generally used to pull passenger trains in the early years of rail transport, for obvious reasons, locomotives eventually replaced animal power. In their December 1830 report on the progress of the railroad, the Canal Commissioners anticipated that "a locomotive engine with 20 tons of lading will travel the whole distance from Columbia to Philadelphia in a day of ten hours."[49] This was, of course, before the opening of the rail line. Nonetheless, the momentum to move to engine power was strong. Note the argument put forward in one early railroad survey:

> But the great advantage which rail roads possess over the other modes of transportation was never fully developed until locomotive engines, by successive improvements, attained their present power and speed, which enables them to drag vast burthens an almost unlimited distance, at a constant and rapid pace, greatly exceeding what could be attained by animal power.[50]

Between the years 1836 and 1844, the railroad came up with a unique approach to the varied use of horse and steam power. Steam engines used the line from 4:00 to 10:00 A.M. and from 5:00 to 8:00 P.M. Horses were used on the line between those times. In 1844, horse power was proscribed and steam engines were solely allowed on the rail line.[51]

With the success of the P&C, the city of Philadelphia became a major railroad city. The American Steam Carriage Company of Philadelphia, under the capable leadership of William Norris, became a significant producer of locomotive engines. Norris's engine, the Washington was the first to climb the P&C's inclined plane at Belmont in Philadelphia. Norris led the way in dispelling the popular stereotype that trains were only capable of traveling on level ground. Instructive for understanding Philadelphia's growing prominence in the railroad world is an advertisement in the November 15, 1834, edition of *American Railroad Journal*:

> The American Steam Carriage Company of Philadelphia, respectfully inform the public, and especially Railroad and Transportation Companies, that they have become sole proprietors of certain improvements in the construction of Locomotive Engines, and other railway carriages, secured to Col. Stephen H. Long, of the United States Engineers.[52]

This advertisement went on to list a variety of available engines: a six-ton engine that would travel at a speed of 15 miles per hour; a five-ton engine that would travel at 18 miles per hour; and a four-ton engine that would travel at 22½ miles an hour. These engines were compared to the best English engines, "not only [as] to their efficiency to the conveyance of burthens, but to their durability, and the cheapness and facility of their repairs."

These engines were advertised as being able to be fitted for all available fuels, including anthracite coal, wood, and coke. The advertisement was signed by William Norris. The linking of the names of Col. Stephen H. Long and William Norris would not have been lost on the American railroad public. Long was a well known railroad author and engineer who laid out a great number of rail lines. Another historically significant man connected with both the railroad and the city of Philadelphia was Mathias W. Baldwin, whose Baldwin Locomotive Works soon set the pace in the locomotive industry. With the success of the P&C, Philadelphia became the center of America's railroad future, and the environment was ripe for the success of railroad entrepreneurs such as Norris and Baldwin.

TRACKS AND TRAINS: DUFFY'S CUT AND THE PROGRESS OF THE RAILROAD

In his reflection on the building of mile 59, Julian Sachse wrote of how developments came to the P&C:

> It was not until about 1840 that the uncertain horse power was superseded by steam in that early day, the locomotives were the property of the state, and motive power was supplied to all applicants or owners of cars who applied for it. These locomotive

> engines light and small as they were yet proved too heavy for the primitive road bed. The wooden sills spread, rotted and broke under the extra weight while the tire irons often snapped and curled under the bootom [*sic*—this should read "bottom"] of the cars even penetrating through the bottom to the personal injury to the passengers.[53]

To remedy the above problems, Sachse wrote of the change to a "light T rail" on the southern track of the P&C. This T rail was imported from England. Portions of this light T rail have been found at Duffy's Cut among other nineteenth- and twentieth-century railroad artifacts. Items such as the T rail that have been discovered at Duffy's Cut were discarded as work was conducted along that mile of railroad since 1832.

One of the names associated with the Duffy's Cut tragedy was William B. Mitchell, general superintendent of the eastern division of the railroad. Mitchell was Duffy's immediate supervisor during the construction of mile 59. Mitchell was also responsible for getting Duffy further railroad work after Duffy's disastrous loss of 57 men to cholera in August 1832 and the year-long delay in completing this mile of track. In addition to his role as general superintendent of the eastern division, Mitchell made several major contributions to the building of the railroad, including the invention of the "Pennsylvania Edge Rail and Chair." In 1833 Mitchell created what he claimed was a "more efficient, more economical" rail that was "better adapted for the operations of locomotives."[54]

Mitchell's design for the Pennsylvania Edge Rail received the blessing of no less a personage than Col. Stephen H. Long, who sang its praises: "I have no hesitation in pronouncing the Pennsylvania Edge Rail and Chair invented by Gen. William B. Mitchell preferable to any other Edge Rail hitherto devised."[55] Mitchell's letter to the Canal Commissioners presented in great detail how his new design surpassed the rails generally used on American railroads, including the Clarence Rail and the T Edge Rail.

Mitchell's name is also connected to another interesting aspect of railroad history. In February of 1834, Mitchell wrote a memorandum that sought to address the lack of available funds to continue the work on the P&C.[56] In a February 25, 1834, letter to the Canal Commissioners, Mitchell presented the difficulties of finishing the railroad in light of the failure of a $729,000 loan to be approved and made available for the work. "I have a duty to the Canal Commissioners … and to the contractors," Mitchell wrote, as he recommended a cessation of work on the second track of the railroad. Mitchell then presented to the Canal Commissioners a draft of a memorandum to the railroad contractors ordering this work stoppage. Printed under the names of Edward F. Gay, Engineer (who had replaced Major Wilson as chief engineer in 1833), and himself, this notice read:

> Columbia Rail-Way Office
> Lancaster, February 24, 1834
>
> To the Contractor for Section No._____
>
> Sir—You will immediately, on receipt of this Notice, cease operations upon the Second Tract of your Section, both as respects the delivery of material

> and the performance of labour, for or on account of the Commonwealth, until further notice. This restriction is not intended to prohibit you from proceeding with the Second Track on your individual responsibility, (should you deem it expedient to do so), but as a measure adopted with a view of reserving funds for the immediate completion of the First Track, with which you will progress, and use your endeavor to finish as speedily as possible.

Mitchell and the Canal Commissioners were concerned with being able to complete the first track of the railroad. Without the completion of that first track, there would be no railroad. Without that first track, there would be other delays and a loss of momentum that they would have to deal with in the future, as the public would lose faith in the railroad. The railroad needed at least one track up and running. This notice, written by Mitchell, caused a great problem for railroad contractors like Philip Duffy. After the contractors received this notice, they sent a petition entitled "Columbia Railway contractors for relief" to the Canal Commissioners.

Twenty-three contractors signed this petition, listing as well the track section on which they were working. Philip Duffy was at this time working on section 29 of the railroad. Claiming financial hardship for themselves and their workers, the contractors pled that this order would bring about financial ruin to some of them, and they hoped to pressure the Canal Commission to pay them what they were owed.

It is fascinating to contemplate that these two figures of Philip Duffy and William B. Mitchell, who loomed so large in the Duffy's Cut story in 1832, were once again entwined in this particular incident in 1834. Nonetheless, this financial crisis was soon resolved, and, as mentioned, the first track of the rail line from Columbia to Philadelphia was opened on April 16, 1834. While Duffy continued to work as a contractor for the railroad, in May 1835, Mitchell resigned as superintendent and supervisor of the railroad.[57]

In his reflection on the later history of the P&C and Duffy's Cut, Sachse specified that until the entire line could be replaced with the T rail system, locomotives were used "exclusively" on the southern track, and horse drawn trains were "relegated" to the northern track. Furthermore, as the weight of trains increased, the road bed also had to be replaced between Columbia and Philadelphia.

Other problems were discovered along the line of the P&C:

> The Columbia Railroad being one of the first built in the United States, contained most of the defects of our primitive roads. It was very crooked—some of the curves being of but six hundred and thirty-one feet radius. Its gradients, owing to the comparatively level country over which it was built and the care of the engineers who located it, were not heavy,—in no place exceeding forty-five feet per mile, and that for a very short distance, —while the uniform grade was kept at thirty feet.[58]

Fifty-seven of the 82 miles of the P&C were straight stretches of track.[59] That left 25 miles of curves along the railroad. Along the line between Philadelphia and Downingtown (33 miles west of Philadelphia) there were 132 curves "with an

aggregate length of 12 miles."[60] Mile 59 of the P&C was located along one such curve, named the Sugartown Curve. This curve continues to be used by local and regional rail lines to the present day.

Originally, inclined planes were used at both ends of the rail line—at Philadelphia and at Columbia—to help start the movement of the trains either westward or eastward. The inclined plane in Philadelphia was located at Belmont Plateau; it was 2,805 feet long and rose 187 feet.[61] The inclined plane in Columbia was 800 feet long and rose 90 feet. Eventually, with the proven ability and dependability of steam power, these inclined planes became unnecessary and were done away with.[62]

In time, the table of station stops on the P&C expanded to include the following stations: Philadelphia, Athensville (Ardmore), Whitehall (Bryn Mawr), Brookeville (Radnor), Eagle (Stratfford), Paoli, Steamboat (Glen Loch), Oakland, Downingtown, Gallagherville, Coastesville, Parkesburg, Pennington, Gap, Kinser's, Leaman's, Bird-In-Hand, Lancaster, Hempfield, Mountville, and Columbia.[63]

Several images of both horse- and locomotive-powered P&C trains are found in J. Elfreth Watkins's unpublished 1899 *History of the Pennsylvania Railroad Company.* William B. Sipes's 1875 *The Pennsylvania Railroad: Its Origin, Construction, Condition, and Connections* contains a description of the early horse cars used on the P&C: "They were built something like the old stage-coach, but larger,—the entrance-door being at the side, and the driver occupying an elevated seat in front."[64] Writing of these early passenger cars, railroad historian David Messer notes that:

> The passenger cars followed the English design, resembling three coach bodies set on a four-wheel undercarriage. These were known as "possum bellies." Because of the close clearances and sharp curves the cars were limited in width to 6'10" to 7'6," dependent on their length. Freight cars were small and of varying design, usually on four wheels, with a capacity of 3–5 tons.[65]

In 1834 the *American Railroad Journal* used an image of a Philadelphia train in its masthead. An early engine is shown with a pennant proclaiming "Philadelphia" on its funnel. The engine is shown pulling a stagecoach-style passenger car and, behind that, a flatbed car loaded with a private carriage on top. Both cars are shown loaded with passengers.

Passengers paid $3.25 for the 82-mile journey from Philadelphia to Columbia, an average of four cents per mile for the full trip.[66] A variety of companies provided the passenger transportation on the rail line, and, in turn, these companies paid the commonwealth a per-mile toll fee: one cent per mile per customer for use of the road; one cent per mile per customer for use of a locomotive (if utilized); one cent per mile per customer for each four-wheeled passenger carriage; two cents per mile per passenger for use of a locomotive with a four-wheeled carriage. These tolls were doubled for eight-wheeled passenger coaches.

Initially, the gauge of the P&C tracks was 4'8½", based on the contemporary British model.[67] The railroad tracks were placed on stone sills or sleepers.

Watkins's history contains several images of what the original P&C track layout would have looked like. In some sections of the rail line, there were stone cross-ties along with stone sills or sleepers, while in other sections wooden ties were placed between the stone sleepers or sills. The memorial wall at Duffy's Cut built in 1909 under Martin W. Clement is constructed of these stone blocks. The stone blocks had to be cut in precise dimensions: 2 feet long, 21 inches wide, and 12 inches deep.

The estimated cost per block was 53 cents,[68] but it has been asserted that, due to the political corruption rampant in the state government in the 1830s, the actual cost for each stone block was closer to $100.[69] Writing in 1842–1843, Franz Anton Ritter von Gerstner described the track structure of the P&C. There were 6 miles of strap rail on granite blocks, and 16 miles of strap rail on "longitudinal timbers."[70] The remaining track included 2 miles of "massive rails on stone blocks and stone ties" and 140 miles of "massive rails on stone blocks, between which a crosstie is laid every 15 feet."

COUNTING THE COST: THE SUCCESS OF THE P&C

Differing accounts of the costs and efficiency of the P&C exist. The 1841 *Sketch of a Railway, Judiciously Constructed Between Desirable Points* compared the variety of railroads in the United States and offered an assessment of the costs associated with the building of the P&C.[71] This work offered a harsh critique of the P&C: "In the case of the Columbia road, its mixed management by State and forwarding men, affords no tangible results to the public, with whom it is only a by-word for waste and extravagance."[72] Among the purported problems of the P&C that this study wished to bring to the attention of the railroad-going public was the fact the railway was "originally intended for horse power," which necessitated the re-laying of "much of its track."[73]

Another issue came with the regularizing of the use of locomotives: "following up the improvements in the locomotive it has become saddled with a great deal of imperfect machinery." This study stated that the total cost of building the P&C came to $3,705,500.[74] The number of "through passengers" traveling the entire length of the line in 1838 was listed in this study as 75,000 at a cost of $3.25 per passenger.[75] Ninety thousand tons of freight were listed as traveling over the P&C line in 1838, at a cost of $7.50 per ton. The income of the P&C in 1838 was listed as $943,000 ($243,500 from passengers plus $675,000 from freight plus $24,500 from the mail).

In 1842–1843 von Gerstner also compared American railroads and calculated the various costs associated with the building of the 82 miles of the P&C:

For earth-moving, etc.	$649,159
For culverts	$74,114
For bridges and viaducts	$369,750
For fencing	$65,411
For track structure	$2,181,156
For buildings and machinery	$111,787