




Guidebook To The Pittsburgh Region

Compiled by the Three Rivers Chapter
Society For Industrial Archeology
XXII Annual Conference
Pittsburgh, Pennsylvania
June 1993

Christopher H. Marston, Editor

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PREFACE AND ACKNOWLEDGEMENTS

The impetus for the creation of this publication came when Christine Davis volunteered the fledgling Three Rivers Chapter to host the 1993 Annual SIA Conference in Pittsburgh. As members began to digest this responsibility, it wasn't until February, 1992, that the ball got rolling in the planning process. At a meeting in the unheated hall of the Teutonia Club I raised my hand to assume responsibility of the publications for the conference, not realizing that I would be organizing the entire event. In retrospect, the guidebook became the main catalyst in steering the direction of the entire conference.

I received support for this publication early on, as Billy Joe Peyton of the Institute for the History of Technology and Industrial Archeology at West Virginia University (IHTIA) not only promised use of their desktop publishing services, but also financial support. I also interested Augie Carlino of the Steel Industry Heritage Corporation (SIHC) in underwriting a large portion of the printing costs.

A comprehensive survey of all the industrial sites in the region would have been impossible to complete in a twelve-month period. Thus, the sites described in the guidebook are limited to those on the tours, which were volunteered early on by the core members of the Three Rivers Chapter. The general format for each chapter begins with an introduction outlining the historical context of the tour's theme. A short description of each site follows, complete with image. The quest for photos became an endless search, extending up to the final deadline. From the beginning, however, I strove to achieve a strong visual quality in this publication. Work under the above guidelines proceeded despite a variety of limitations: time, inexperience, missed deadlines, other conference arrangements, and personal matters, such as an expecting wife.

This conference could not have happened without support early on from the following tour leaders and contributors: Richard O'Connor on glass, Joel Sabadasz on steel, George Danko on robotics, J.K. Folmar on the Mid-Monongahela region, Christine Davis on the Allegheny Valley, and Mark Brown on bridges. We also had interest from others across the state: Fred Quivik on the Connelsville Coke Region and Rich Wagner and Rich Dochter on Pittsburgh's breweries. Others joined in later: Walter Kidney on the walking tour and Jim Alexander on the AIHP Tour. Finally, Matt Kierstead succeeded in landing a bonus steel tour: Wheeling-Pittsburgh.

Besides those mentioned above, many others helped in putting this guidebook together. Ted Muller lended advice early on and agreed to write the introduction. Christine Jones did an exceptional job laying out the guidebook, with assistance from Rena Taft at IHTIA. Mark Pierson drafted the logo used on the cover, with graphics by Andrew Wilson of Karen Scofield Design. Photos were provided in part by Randy Harris of SIHC; Al Tannler of the Pittsburgh History & Landmarks Foundation; the Pennsylvania Room at the Carnegie Library of Pittsburgh; and John Thomson at the Archives of Industrial Society, Hillman Library. Special thanks to Ed Moskala, intern from Carlow College. Finally, my wife Julia and daughter Grace were very understanding throughout this project, especially since Julia was nearly two weeks late as the printing deadline approached. Haines Peirce Marston was born 14 May 1993, four days before this publication went to print.

Christopher H. Marston
May 1993

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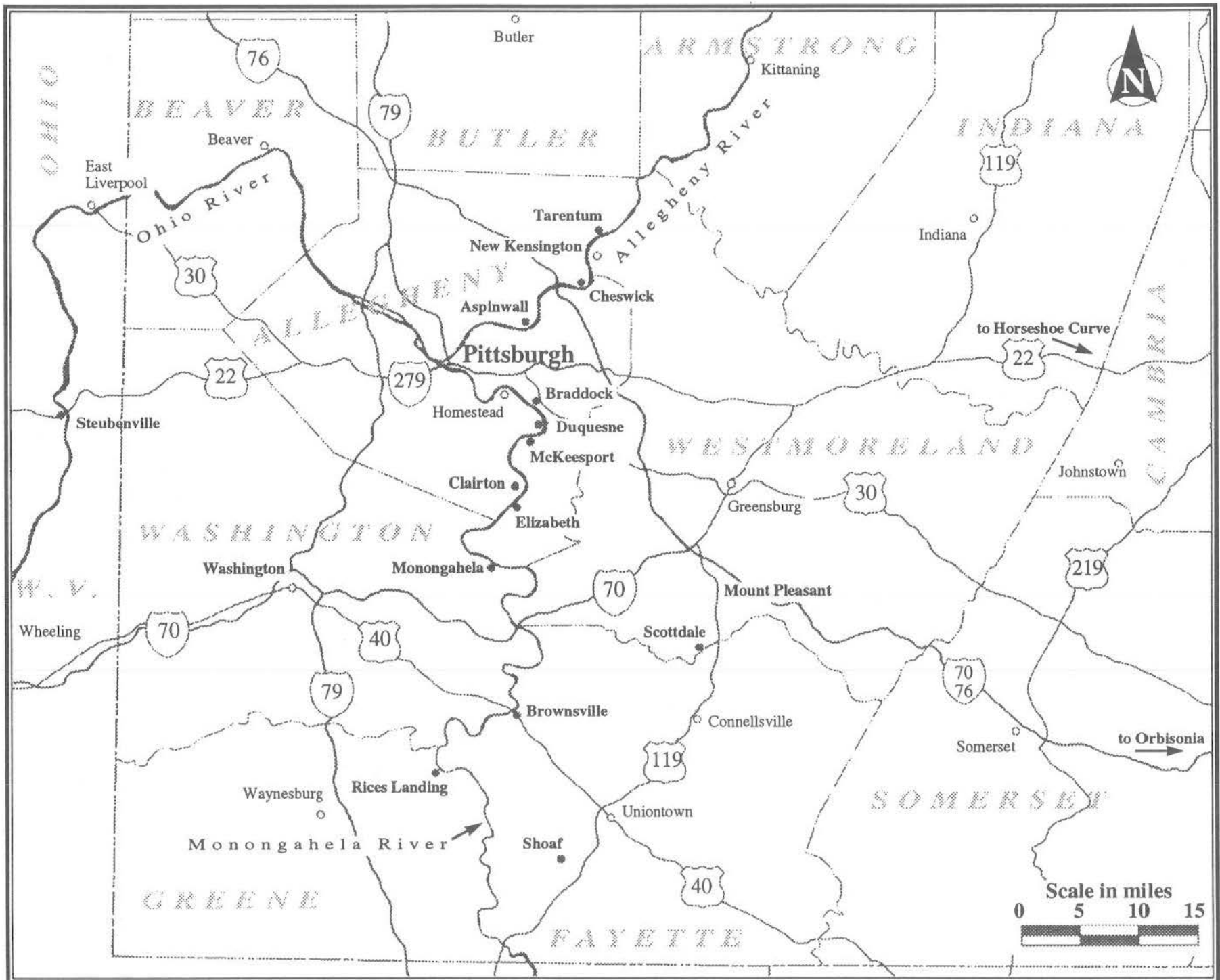
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The Pittsburgh Region



Map of Pittsburgh Region (Tour stops are bold)

INTRODUCTION: THE FORMATION OF THE PITTSBURGH REGION

by Edward K. Muller

"Below us lay Pittsburg, the huge, smoldering, roaring monster, flecking the uniform gray of its background with white puffs of steam... A shimmering silver river, spanned by many bridges, threads its way between two great rocky promontories and loses itself in an exquisite distance of gray mist faintly flushed with an opalescent pink, where the forest of mammoth stacks is belching clouds of smoke and iron-ore dust, sending great banks of rose-colored smoke soaring, tumbling, and rolling upward in phantasmagoric shapes... A great veil of smoke stretches out for miles and moves majestically over the valley like a funeral pall that threatens to obscure everything. It is not unlike some vast, ghostly flood-tide coming in from the gray, invisible country beyond, beneath which the river, the factories and bridges, the city itself, are soon submerged. Through the shroud of smoke loom gigantic shadows of the mighty promontories; a long shaft of fine golden sunlight sifts across the valley where a galaxy of lights flicker and die away like will-o-wisps in the envelopment of the night;... and Pittsburg begins her night."
(*Harper's Monthly*, 1908)

Like many writing for popular magazines at the turn of the twentieth century, Charles Henry White described for his *Harper's Monthly* readers the awesome industrial power and energy of Pittsburgh's steel mills in surreal terms. For White and other writers, the mills of Pittsburgh symbolized the nation's march to world industrial leadership, driven by a second industrial revolution. Great new durable goods industries arose in the second half of the nineteenth century, which were characterized by high capitalization requirements, modern managerial practices, mechanized mass production, and vertical integration of formerly disparate processes. As new corporate organizations were created and larger and larger plants constructed, specific industries such as iron and steel concentrated in and around particular cities, spawned numerous allied, small specialized firms, and together formed industrial complexes spread over an expanding metropolitan region.

The iron and steel industrial complex that emerged after the Civil War in southwestern Pennsylvania created just such a metropolitan industrial region. Several huge integrated steel works, dozens of smaller iron and steel plants, and hundreds of specialized foundries, machine shops and fabricators spread out from the original core of Pittsburgh for more than 30 miles along the three rivers. They were linked together to the essential nearby coal and coke industrial complex by the rivers and a web of railroads, as well as by the capital resources concentrated in the city's downtown. Other smaller, but important durable goods industries, including electrical equipment, aluminum, glass and railroad equipment, joined the steel and mining complexes that provided the structure of the industrial region.

Eighty-five years have passed since White marvelled at the industrial spectacle before him. The sweeping transformation of the American economy in the late twentieth century closed the region's mines, mills, and factories, vastly curtailed river and rail traffic, and even led to the demise of many seemingly invulnerable corporate headquarters. Yet, much of the physical fabric of the region's industrial era landscape endures throughout southwestern Pennsylvania.

For the first half of the nineteenth century, most manufacturing activity clustered in the bustling commercial city of Pittsburgh. While iron furnaces in the front ridges of the Allegheny Mountains, salt works in the Kiskiminetas River Valley, shipbuilding along the Monongahela River, mines, potteries, distilleries, and rural services like saddlers and smithies emerged in the region, the markets and wharves of Pittsburgh astride the Ohio River corridor to the rapidly developing west offered the best opportunities and access to capital for industrial development. Pittsburgh's numerous artisan shops, resource processors, shipyards, transportation services, and provisioners reflected the typical, diverse manufactures of American commercial cities. Nevertheless, by

midcentury glass works, iron foundries, and rolling mills distinguished the city from other western urban centers. Pig iron shipped to the city from regional furnaces or from central Pennsylvania by river or the Pennsylvania Main Line Canal was cast into boilers, agricultural implements, tools and stoves, or puddled and rolled into merchant bar for shipment to western markets and for cutting at local naileries. Coal from as close as Mt. Washington across from the Monongahela Wharf or Minersville in today's Hill District fueled the two dozen rolling mills, nearly as many foundries, and 16 glass houses, which lined the city's riverfronts as well as those of the adjacent boroughs across the rivers, (today's North and South Sides). With nearly 80,000 people in 1850, the urban cluster around the junction of the rivers had grown to the eighth largest in the nation and earned the reputation as a manufacturing center.

Despite their prosperity Pittsburgh's ironmasters faced rapidly changing market conditions in the 1850s. The arrival of the Pennsylvania Railroad in 1852 allowed eastern producers access to Pittsburgh's once secure western markets. Further, the dependence on charcoal furnaces for pig iron, the growing importance of rail and railroad equipment markets, and the experimentation with new technologies by competitors, notably Cambria Iron in Johnstown, further threatened the city's customary success. Ironmasters turned to local merchants for the capital required to expand production, adopt new technologies, and build blast furnaces that could feed the local industry's burgeoning appetite for pig iron. Between the 1850s and the 1880s the city's pig iron, wrought iron, and crucible steel production mushroomed. By the mid-1880s, Pittsburgh led the nation in pig iron output. Forty-nine mills operated in and around the city, two-thirds of which still made puddled iron, and a dozen crucible works produced steel.

However, the expansion of the iron industry also contained the seeds of change, which were transforming the industry and the region by the 1880s. While Benjamin Jones and James Laughlin at their American Iron Works (later J & L) situated along the Monongahela River and Andrew Carnegie and his partners at their iron plants along the Allegheny River (in today's Strip District) moved toward integrated iron production with blast furnaces, puddling furnaces and rolling mills, they each also experimented with Bessemer converters for making

large amounts of steel, especially for rolling steel rails. Jones began Bessemer production first in Pittsburgh, but eventually closed down his converters for inefficiencies. In contrast, Carnegie built the enormously successful Edgar Thomson (E.T.) Bessemer rail mill at Braddock in 1875. Integrating E.T. from blast furnaces to finished steel rails, Carnegie achieved unprecedented production records and efficiencies. He adopted meticulous cost accounting techniques, hard-driving of his furnaces, and through-put production. Steel soon replaced iron as the principal product in the region's industry. More Bessemer works were erected in the 1880s, while open hearth furnaces rapidly replaced puddling furnaces in operations such as the production of structural shapes for which Bessemer steel was less well suited. Although nearly half of the district's works as late as 1894 produced wrought iron, iron mills were waning; by the turn of the century, steel predominated with Bessemer, open hearth, crucible and even blister works. In 1900 the Pittsburgh area produced 40 percent of the nation's steel.

The tremendous growth of iron and steel production in Pittsburgh after 1860 depended on the compositional and cost advantages of coke made in the nearby Connellsville district (see map, chapter VI). During the 1840s and 1850s a few regional producers made coke from the primitive combustion of piles of coal or in the few earliest beehive ovens, but they failed to find adequate markets to sustain production and attract investment. The development of blast furnaces in Pittsburgh beginning in 1859 stimulated local investors to buy up coal lands, open mines, and build beehive coke works in Fayette County in the 1860s and Westmoreland County in the 1870s. Partnerships fluidly formed, changed, and collapsed during these early years of the coke industry, especially during the bitter depression of the mid-1870s. Backed financially by Pittsburgh's Judge Thomas Mellon, Henry Clay Frick expanded his land holdings and beehive oven capacity in anticipation of the explosive post-depression demand that unfolded at the end of the decade. Over the next 30 years several hundred bituminous coal mines, beehive oven plants, and company "patch" towns transformed the rural landscape of first the Connellsville district and then more broadly the hills and hollows west and north of the original area. Tall coal tipples, banks of brick ovens, coomb piles, railroad tracks, small fanhouses and

powerhouses, linear or rectangular gridded communities of identical frame duplexes, and the everpresent company stores intruded on the fields, barns, farmhouses and crossroad hamlets of the agricultural countryside.

At its peak in the early twentieth century 30,000 to 40,000 ovens poured smoke and gases into the air. Branch railroads lined the numerous hollows, tying the mines and ovens to the Monongahela River or the main trunk lines that led to the Pittsburgh district's blast furnaces. Merging with Carnegie's enormous capital resources in the 1880s, the H.C. Frick Coal and Coke Company of Connellsville staked out an enormous empire in the coal fields; other consolidations led to the formation of several large coal companies, headquartered largely in Connellsville, Uniontown, Greensburg and, of course, Pittsburgh, although capital from New York, Philadelphia and other cities found its way into the region. This complex of coal mines and coke works spawned many related manufacturing activities. By the 1880s, local forges, foundries and machine shops turned out and repaired mining tools and equipment, mining cars, axles, and wheels, steam engines, blowers, hoists and a variety of miscellaneous products.

Even before World War I, the intense development of the Connellsville district had begun to deplete the coal resources, and a few mines already closed down. The introduction of by-product coke ovens adjacent to the iron and steel mills in the twentieth century's second decade led to the demise of the beehive oven industry. Beehive production peaked around 1910 and a decade later by-product coke output surpassed it. Although by-product oven technology had been available before 1900, most local coke producers stuck with their profitable beehive ovens rather than undertake large new investments. However, the by-product oven's superior efficiency in coke production and ability to recapture gases for both use as fuel sources and resale as industrial chemicals led to its adoption, especially by the steel companies themselves. The commencement of the huge U. S. Steel Clairton by-product plant in 1918 signified the transition. Coal was transported directly to the centralized by-product plants, and gases were piped from the ovens to nearby steel mills for energy sources in the many reheating processes. Pipes snaked along the Monongahela River and awkwardly up

and over steep hills, providing another linkage among the diffuse parts of the sprawling iron and steel complex.

The new location of coke production completed the spatial convergence of these two industrial complexes of southwestern Pennsylvania, which had been bound by water, rail and capital for decades. The by-product plants and westward drift of mining activity into the upper Monongahela valley brought the coal and coke complex cityward to meet the outwardly spreading iron and steel industry. Years before the erection of integrated steel works, some ironmasters selected floodplain sites a few miles upriver from the City of Pittsburgh at Etna and Sharpsburg on the Allegheny and at Hazelwood on the Monongahela. A few mills also existed at scattered sites throughout the larger region at places like Brady's Bend and Apollo in Armstrong County or McKeesport in southern Allegheny County. However, the astonishing success of Carnegie's E. T. Works in Braddock triggered the decentralization of heavy industry to greenfield sites throughout southwestern Pennsylvania. Between the 1880s and the 1920s, steel producers developed sites primarily along the three rivers as well as in major tributary valleys like the Beaver and Kiskiminetas rivers, and Chartiers Creek. Some companies bought property for relocation outside of the city in order to expand and construct modern production facilities, while others were lured by speculative industrial real estate development. Within years of E. T.'s opening, several Carnegie competitors (in some cases enemies) and unhappy customers purchased a site across the river from Braddock in the budding suburb of Homestead and built a Bessemer steel rail mill. When Carnegie bought them out in the early 1880s, they tried again at the end of the decade a few miles upriver at Duquesne. He purchased this challenger as well, and retrofitted both the Homestead and Duquesne works to lay the foundations of Carnegie Steel's, and later U. S. Steel's extensive multi-plant Monongahela Valley operation. Examples of relocation include Apollo Iron and Steel, which in 1895 bought a farm along the Kiskiminetas River about 30 miles northeast of Pittsburgh and constructed a new sheet mill and the impressive, Olmsted-designed company town of Vandergrift, or J & L which built a mammoth integrated works and adjacent town 15 years later at Aliquippa several miles down the Ohio River from Pittsburgh.

While Apollo Iron and Steel and J & L among many others acted as their own developers, some investors established industrial real estate ventures. In 1894, for example, several Pittsburgh businessmen purchased 211 acres of floodplain along the Monongahela River approximately 30 miles south of the city. Three years later they attracted William Donner of Indiana with free land and a cash grant to erect a tin mill at their development. Soon they were subdividing parcels for workers' homes and negotiating with other manufacturers. They named their speculative industrial town for Essen, Germany, calling it Monessen. Within a decade, Donner's tin mill was joined by a foundry, steel hoop mill, steel wire and fence company, and the fully integrated steel works of the Pittsburgh Steel Company. By 1920, Monessen housed more than 18,000 residents.

Monessen represents not only the spread of the steel industry in southwestern Pennsylvania, but also the diversity of manufacturing that comprised the region's iron and steel industrial complex. While the basic and alloy steel producers turned out semi-finished structural shapes, plates, sheets, and bars, along with finished products, a vast array of smaller firms specialized as suppliers, servicers, and customers to them and produced finished goods themselves. Dozens of companies made pipes, tubing, valves, plumbing supplies, and hardware. Others manufactured wire, fencing, hoops, boilers, tanks, tools, nails, bolts, and nuts. Over 100 foundries fashioned mining equipment, steel-making machinery (most notably Mackintosh-Hemphill on the South Side and Mesta Machine Company in West Homestead) as well as custom castings. Nearly as many machine shops built and repaired engines, custom-tooled machinery, and metal parts. Scrap metal dealers, model and pattern-makers, steel construction engineers and fabricators such as American Bridge, refractory brick works, and steel product distributors reveal the specialized niches that such a large industrial complex fostered.

The second industrial revolution in southwestern Pennsylvania was, however, not limited to the iron and steel industry. Other major industries also originated in Pittsburgh or were drawn to the area by the abundant venture capital, adopted mechanized through put processes, and eventually moved to larger sites in the region. Glass-making began locally in the last decade of the eighteenth century, and by the middle nineteenth century glass houses making tableware, containers, and window glass operated at several

regional towns, including Pittsburgh. In the ensuing decades local glass-making took on national significance; by the 1880s approximately 50 Pittsburgh glass houses, many located on the South Side, produced a quarter of the nation's glass. Like wrought iron production, glass-making had been a highly skilled, traditionally organized affair until the end of the century when the adoption of new technologies and mass production, the switch to natural gas for fuel, and extensive corporate consolidations encouraged producers to leave the city's cramped, expensive quarters and build modern factories near the sources of gas at places like Glassport, Belle Vernon, Mt. Pleasant, Arnold, Creighton, Ford City, and notably Jeannette. In 1888 Pittsburgh glass manufacturers H. Sellers McKee and James Chambers purchased some farms near the Pennsylvania Railroad main line in Westmoreland County several miles east of the city, built fully integrated, continuous process window glass and tableware factories, and developed the small industrial city of Jeannette. A few years earlier James Ford erected the first plate glass factory at Creighton up the Allegheny River to lay the foundations for the Pittsburgh Plate Glass Company (PPG).

Like glass, the transportation equipment industry in the region began before the opening of the nineteenth century with boatbuilding and wagon-making. The construction of simple rafts and keelboats soon gave way to steamboat building and steam engine works. Long after the steamboat industry declined, barge builders such as Hillman Barge Company in Brownsville kept boatbuilding alive in the region. Just as supplying and servicing the river trade created an active regional boatbuilding industry, the ubiquity of railroads after the Civil War with endless miles of track, huge marshalling yards, terminals, and repair shops fostered a large railroad equipment industry. Indeed, the markets for rails, bridges, cars, wheels and axles played a central role in driving the expansion and transformation of the region's iron industry after the 1850s. In addition to rails and bridges, Pittsburgh district manufacturers entered the markets for locomotives, rolling stock, and equipment. Several firms made locomotives into the 1870s, though only the Pittsburgh Locomotive Works on the North Side and H.K. Porter, a maker of special narrow gauge locomotives in the Strip District, survived into the twentieth century. Schoen Pressed Steel Car Company and U.S. Steel Wheel and Axle Works, both in McKees Rocks,

and Standard Car of Butler turned out rolling stock, while many firms fashioned springs, frogs, couplings, axles, and myriad other railroad parts. George Westinghouse's Air Brake Company and his formation of the Union Switch and Signal Company in 1881 rounded out the local industry.

George Westinghouse's innovative and entrepreneurial skills branched out from transportation to electrical equipment with the establishment of his Westinghouse Electric Company in 1886. (Westinghouse also pioneered the transmission of natural gas with a line from Westmoreland County into the city). Using the capital, laboratories, personnel, and international networks of his extant firms, Westinghouse worked out the means for the transmission and delivery of alternating electrical current. Initially located in the Strip District, Westinghouse moved his operation for the manufacturing of meters, transformers, generators, motors and other equipment to East Pittsburgh in the Turtle Creek Valley (near the E. T. Works). With the relocation of the Air Brake Company to the adjacent community of Wilmerding and the construction of a foundry complex for casting electrical equipment in nearby Trafford, Westinghouse created another satellite manufacturing complex in what became known as the Electric Valley.

While Westinghouse was battling with the General Electric Company for success in electrical equipment manufacturing, Charles M. Hall and Alfred E. Hunt were developing a commercial process for making aluminum in a Strip District metallurgical laboratory. With the financial backing of the Mellons, they formed the Pittsburgh Reduction Company, established new production facilities at New Kensington a dozen miles up the Allegheny river, and created a vertically integrated corporation that was renamed the Aluminum Company of America in 1907. Alcoa had followed a path now quite familiar in Pittsburgh at the turn of the century. Technical innovations backed with local venture capital were incorporated into a mass production works built on a regional satellite site and run by a corporate management organization, which aggressively built and/or bought its way into a vertically integrated enterprise.

While the new production facilities associated with Pittsburgh's industrial growth sprang up at sites throughout southwestern Pennsylvania, the capitalists, who backed these ventures, orchestrated the creation of far flung

corporate empires, and controlled the destiny of the region's workers and industrial towns, concentrated their offices in the tiny triangle of land that was downtown Pittsburgh. Earlier in the nineteenth century, Pittsburgh's general commission and specialized merchants, rolling mill owners, and investors in western Pennsylvania's petroleum, timber, and coal resources put together sizable fortunes that underwrote the region's industrial transformation in the century's waning decades. They created private investment firms such as T. Mellon and Sons, banks, a stock exchange, and the requisite businessmen's exclusive lunch clubs. As the profits poured in and their national networks and importance grew, the Pittsburgh capitalists turned to local and national architects to design appropriately stylistic office buildings, club houses, and palatial mansions in the city's increasingly fashionable Allegheny and East End neighborhoods or in the elegant Sewickley and later Fox Chapel estate suburbs. Soon after H. H. Richardson's Allegheny Court House was completed in 1888, prominent Pittsburghers erected a small forest of skyscrapers, especially in the Fourth Avenue financial district and along corporate Grant Street. Grand railroad terminals, modern hotels, lavish theaters, and department stores completed the emergence of a classic American downtown -- vibrant, showy, dense, congested, and powerful.

By 1920 the city of Pittsburgh headquartered a vast metropolitan industrial region built around an intricate network of mines, coke plants, mills, foundries, factories, patch towns, and small industrial cities, all tied together by rivers and railroads. Blotches of urban settlement were strung out on scattered floodplains along the rivers for miles from the city like beads on a string. Rapacious industrialists transformed the once rural, agricultural countryside of southwestern Pennsylvania's hills and valleys into a smoke-laden, dirty, deforested, muddy, and brown-watered industrial landscape of astonishing wealth, gigantic and awesome industrial structures, picturesque bridges, and depressing workers' communities. While some writers like H. L. Mencken depicted the region as nothing more than "glorified railroad yards", overgrown "inhabited roundhouses", and "one great forest of smokestacks, one solid gob of grime," many Americans in the early twentieth century wondered at the prodigious power of the second industrial revolution in the Pittsburgh

district. Charles Henry White's prose was no less hyperbolic than Menckens's, but maybe more in touch with the mainstream's sentiments at the time:

"It is a spectacle never to be forgotten, but to attempt to describe the full glory of these thundering, flaming infernos is to feel the limitations of the language ... You leave with an overpowering sense of your utter insignificance, and sit speechless, gazing through your car window as titantic hills loom up in all their grandeur and race past in mighty pageant into the night, their sides and crests flaming with acres upon acres of coke furnaces, tingeing the vast rolling forms, slowly pacing across the glowing heavens with the golden splendor of some gigantic conflagration."

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The Smithfield Street Bridge and Pittsburgh's skyline of 1890.

I. HOSTS AND LANDMARKS

by Christopher H. Marston

Prior to twentieth century zoning laws, downtown Pittsburgh was a melting pot of industry and trade, surrounded by housing for both rich and poor. When the Pennsylvania Railroad entered the city in the 1850s, the tracks followed Penn Avenue and railyards sprawled out the Point. At the turn-of-the century, four major railroads had yards right in or adjacent to downtown: the Pennsy at the Point and in the Strip, the B & O at Smithfield Street along the Monongahela, the P & LE across the Smithfield Street Bridge, and the Wabash Terminal at Wood and Liberty. With an abundance of neighboring mills to serve, Pittsburgh was the leading freight crossroads in the world. As industries grew, capital concentrated and centralized in the downtown area. Fourth Avenue became known as Pittsburgh's "Wall Street," as banks and corporations built new skyscrapers. Despite these developments, it wasn't until the Wabash Terminal burned in 1946 that opportunities arose to complete the transformation of downtown's image from a smoky railyard to a modern commercial city. Public and private leaders through a comprehensive plan known as "Renaissance I" redeveloped the city's Golden Triangle, replacing railyards with Point State Park and new office buildings. In recent years, however, efforts have been made to preserve those vestiges of Pittsburgh's industrial heyday. In so doing, surviving railroad stations and warehouses have been converted from their former uses into cultural symbols for the city's future.

The creation of Station Square, the old Pittsburgh & Lake Erie Railroad station, is probably the most storied. When the SIA was last here in 1974, it was a neglected shell awaiting the city's wrecking ball. The headquarters of the Pittsburgh History & Landmarks Foundation, it is now a model of preservation and adaptive reuse. Union Station was in similar condition, but was renovated by a private developer into offices and condominiums. Its rotunda still serves as a gateway for

transportation, although buses, not trains, now pass by in greatest frequency.

The roadway of the Smithfield Street Bridge, containing the nation's oldest steel trusses, is in such a state of disrepair that it can no longer handle bus traffic and is in need of a major renovation. Proposals for a new bridge were drafted, but restoration proved to be not only the most cost effective but also the most sensible way to restore a major component of the city's skyline. By the end of 1994 a spruced up Smithfield Street Bridge will reopen, dressed in its original 1883 colors.

The city's market and produce area (and site of a few iron and steel plants), the Strip District, is undergoing its own renaissance. Entertainment spots are sprouting up along the river and inside old warehouses, and soon the Historical Society of Western Pennsylvania will be moving into the old Lake Chautauqua Ice Company Building.

Each of these sites is within walking distance of the conference hotel, the Westin William Penn. One of Henry Clay Frick's real estate investments along Grant Street, it was built from a fortune in coke and steel. The reception Thursday night will be held in another Frick legacy, the Frick Fine Arts Building on the University of Pittsburgh campus in Oakland. While the tour sites in the following chapters chronicle the continuing industrial legacy of the Pittsburgh region, these host sites speak of an industrial past with a civic-minded future.



Westin William Penn Grant & Oliver Sts. 1916

After building a series of office buildings which transformed Grant Street, Henry Clay Frick finished his last building venture, the William Penn Hotel. As Pittsburgh developed as a center of industry, it needed a showplace to accommodate the capitalists which came through town. Originally 1000 rooms, it was the most modern hotel of its era, proclaiming to be a showplace of Pittsburgh. The Pittsburgh Gazette Times proclaimed that "all cement used was made at the Universal Portland Cement Company, just outside the city. All steel was rolled at Homestead, and fabricated at Ambridge and shipped to the building by Pittsburgh concerns. All steam and water piping was made by the A. M. Byers Company... all bath tubs and bathroom fixtures were made in Pittsburgh works... there is scarcely a feature of this huge structure...that is not a product of Pittsburgh."

Expanded in 1928, the hotel added a new banquet hall in the Art Deco style, designed by Joseph Urban. The Urban Room is lined with tall panes of Carrara glass, manufactured by PPG. Hotel engineer Ludwig Dernoshek created another novelty: the original bubble machine for Lawrence Welk in 1938. Although management changes and renovations have altered the hotel since 1916, the William Penn Hotel retains a true Pittsburgh quality as one of its best addresses.

REFERENCE:

Marianne Lee, "A Grande Dame Named William Penn," *Pennsylvania Heritage Magazine*, Spring 1991.

I. Landmarks



The Chautauqua Lake Ice Company on a "clear day" in the once heavily industrialized strip district.

Chautauqua Lake Ice
Company (Historical
Society of Western
Pennsylvania)
1212 Smallman St.
1898

The site of Saturday night's dinner was formerly the Chautauqua Lake Ice Company building, and is the future home of the Historical Society of Western Pennsylvania. Built in 1898 to replace a nearly identical building destroyed by fire, it is an excellent example of transitional industrial architecture. Riveted steel columns support a masonry vaulted ceiling on the first floor and a wood-beam, "slow burning" construction system is found in the upper floors of the four-story building.

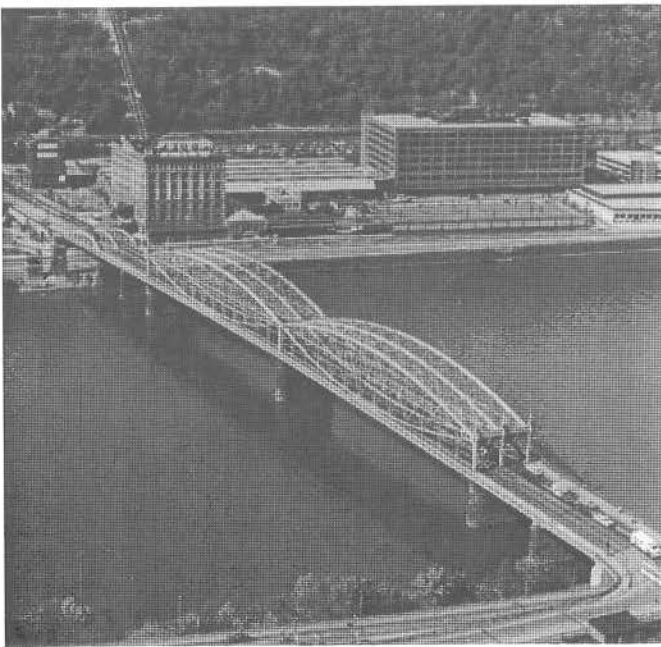
Soon after the building was completed, the Chautauqua Lake Ice Company merged with other local ice companies to form the Consolidated Ice Company. However, developments in refrigeration technology began to put ice companies out of business, and the company shifted its emphasis to merchandise storage as Consolidated Storage in 1907. In the early 1950s, the building was sold to the Adelman Lumber Company, who occupied the building until early 1993. HSWP is in the midst of a complete renovation of the structure and plans to have exhibits open by 1995.

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I. Landmarks



Pittsburgh & Lake Erie
Railroad Terminal
(now Station Square)
Smithfield & Carson Sts.
William George Burns, architect
1899-1901

Station Square, formerly the Pennsylvania & Lake Erie Railroad complex, is the oldest industrial area in the city. Coal mining operations on the site dated to the 1760s; the coal-fired O'Hara-Craig glassworks is believed to be the area's first industrial plant; and nearby the Clinton Furnace, the first coke-fired blast furnace, was blown-in in 1859 and operated nearly 70 years. The P & LE Railroad began operations on a corner of this site in 1879 and soon expanded to both sides of Smithfield Street, building a freight house in 1897. William George Burns designed a passenger station with an office building and a 700-foot train station in 1899-1901. Another office annex and warehouse were added in 1916-17.

The P & LE was a small but important coal and freight carrier operating between Youngstown and Connellsville. Known as "the Little Giant," at one time it hauled the most tonnage per mile of any line in the world. A subsidiary of the New York Central system for most of its life as a railroad, the P & LE was bought by CSX in 1992 and renamed the Three Rivers Railway. The P & LE had been in decline since the 1950s, and by the late 1960s its headquarter property, with its proximity to downtown, became a candidate for redevelopment. To avert demolition, the Pittsburgh History & Landmarks Foundation called for preservation of the site, and proposed converting it into a mixed-use commercial and entertainment complex. Station Square has since turned into a model of industrial redevelopment, and PHLF continues to promote the region's industrial legacy. The Industrial Riverwalk includes a Mesta double-acting blowing engine, a McClintock oil well replica with a Reid gas engine, a Bessemer converter, and numerous other artifacts.

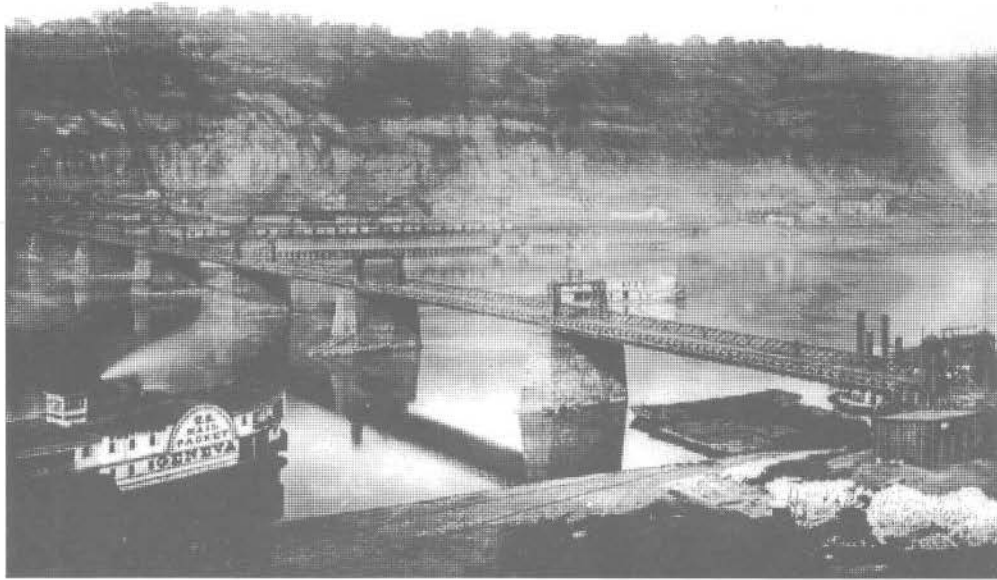
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Kidney, Walter, "Station Square: An Account; An Industrial History of Station Square," *Pittsburgh History & Landmarks Foundation*, Pittsburgh, PA, 1990.

McLean, Harold H., *Pittsburgh and Lake Erie R.R.*, Golden West Books, San Marino, CA, 1980.

I. Landmarks



Roebing's 1845 suspension bridge.

Smithfield Street Bridge
Monongahela River
Gustav Lindenthal, engineer
1881-1883; 1890-1891; 1910; 1930s

In 1881 the Monongahela Bridge Company asked Gustav Lindenthal to design a replacement for its suspension bridge. The existing bridge was designed by John A. Roebling in 1845 and was his first highway bridge. Roebling's commission came on the heels of the success of his 1844 suspension aqueduct that carried the Pennsylvania Canal over the Allegheny River at Pittsburgh. The highway bridge reused the piers of Lewis Wernwag's eight span 1500 foot 1818 Burr truss bridge which was destroyed in the Great Fire of Pittsburgh. Constructed when Pittsburgh was waking to the transition from wrought iron to steel, Lindenthal's two 360-foot lenticular or Pauli trusses are the nation's oldest major steel trusses. They are also the only lenticular trusses in this country not built by the Berlin Iron Bridge Company of New Berlin, Connecticut. A second roadway, requiring a third truss, was added upstream in 1890-91. The current steel portals replaced the original wrought-iron portals in 1916. In the 1930s the bridge received an aluminum orthotropic deck, one of the first major uses of structural aluminum in a bridge. Currently, plans are underway for a major renovation, including a new paint job using the original color scheme. The Smithfield Street Bridge is a National Historic Landmark and a National Historic Civil Engineering Landmark.

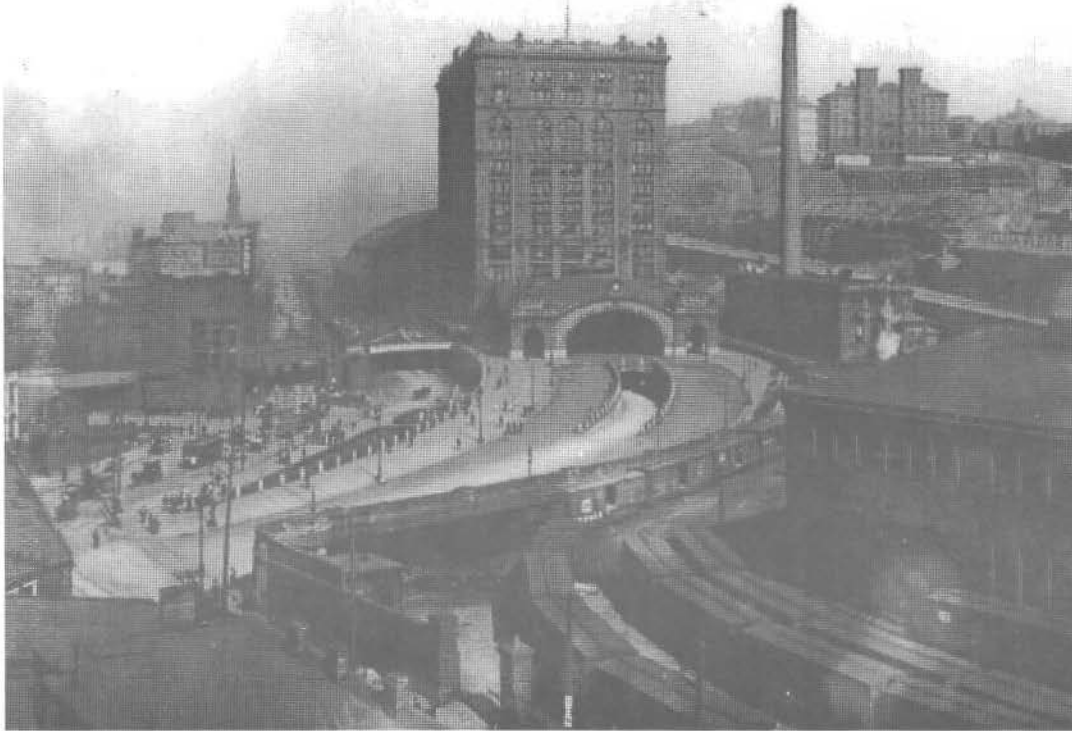
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Gustav Lindenthal, "Rebuilding of the Monongahela Bridge at Pittsburgh, Pa.," *Transactions of the American Society of Civil Engineers* 11 (Sept. 1883):

James D. Van Trump "A Trinity of Bridges: The Smithfield Street Bridge Over the Monongahela River at Pittsburgh," *The Western Pennsylvania Historical Magazine* 58, no. 4 (October 1975) 339-70.

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I. Landmarks



**Union Station
(now the Pennsylvanian)**
Grant St. & Liberty Ave.
Daniel H. Burnham & Co., architects
1898-1903

Although few visitors now enter the city by passenger rail, the Union Station of the Pennsylvania Railroad remains a symbolic gateway. The rotunda of the restored station, built as a cabstand, remains one of the city's most unique and handsome architectural artifacts. The present building is the fourth station on the site since the Pennsylvania entered Pittsburgh in 1852. The second station on the site was destroyed by the great Pittsburgh railroad riot of 1877. The fourth Union Station was commissioned by president Alexander Cassatt as a monumental urban gateway for the line's western, industrial hub. D. H. Burnham's final design is a twelve story tower over a great train shed (now demolished), but it is the rotunda which serves as the true monument. Adorned with the names of the Pennsy's four major stops-- New York, Philadelphia, Pittsburg (sic), and Chicago--it is part exposition architecture, part gateway. It still serves as a cab stand or pickup area for the renamed Pennsylvanian, now offices and condos. Buses drive by using the busway (built over derelict track) and train passengers still arrive but enter the building through the 1970s basement depot in true Amtrak fashion. Conrail freight trains still pass by on the mainline, a reminder of the past for the post-industrial city.

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II. PITTSBURGH BREWERY TOUR by Richard Wagner and Richard Dochter

With a history rich in coal, iron, steel, and manufacturing, Pittsburgh is a premier industrial city. One of its oldest industries is brewing, which dates to the pre-industrial days of the frontier and survives to this day even as other industries have been gradually replaced by a service economy. Steel workers and coal miners once slaked their thirst with beer from a multitude of brewing companies throughout the region. At the turn of the century two giants, the Pittsburgh Brewing Company and the Independent Brewing Company of Pittsburgh, merged nearly forty of these firms, although some still survived as independents. In a larger perspective, the history of the brewing industry in Pittsburgh is a microcosm illustrating developments in the U.S. brewing industry over the past two hundred years.

The first record of commercial brewing in Pittsburgh dates to the brewery established by George Shiras at the Point, where the Monongahela and Allegheny rivers merge to form the Ohio. The British had brewed their own beer at Fort Pitt, but Shiras is considered to be the first commercial operation. The settlement of Pittsburgh at the time consisted of 225 houses and had a population of about 800. By 1803 there were two breweries making British style ale for the population of 1500 who inhabited the city. By 1810 there were five breweries in operation. At this time the methods employed for beer making did not differ significantly from those used for hundreds of years in Europe.

It is interesting that Pittsburgh even became a brewing center considering the preference and prevalence of distilled spirits in the region, as evidenced by the nearby Whiskey Rebellion of 1794. The growing immigrant population increased the influence of beer in the culture. Early brewers produced only several hundred barrels of beer annually in small breweries adjacent to their homes, and frequently ran saloons to distribute their product. The most successful brewers outgrew their humble beginnings and moved where they could erect large plant complexes and add modern, labor-saving equipment. It was even possible for a brewer to establish a chain of hotels or saloons as an exclusive outlet for his product.

Lager beer was introduced to America in 1840 by German immigrants. Brewed differently from British ales by use of a bottom rather than a top fermenting yeast, American lager beer became an entirely new form of beer. Furthermore, American brewers were not confined to the German Purity Law of 1516 which mandated that beer contain only water, malt, hops, and yeast. New world brewers began adding less expensive adjuncts such as corn and rice to their malt, producing lighter, effervescent beverages which have captured the palates of Americans ever since.

Following the Civil War, the art of brewing changed significantly. Mechanical refrigeration, common by the 1880s, together with Pasteur's experiments three decades earlier, furthered the development of a clean and consistent product. Innumerable machines and devices transformed grinding, mashing, cooking, pumping, and cooling processes, while new materials improved the construction of tanks, tubes, and pipes, etc. These technological advancements made it easier and more profitable to produce greater quantities of beer.

As brewery operations expanded in the latter part of the nineteenth century, the number of breweries declined. The largest and most efficient plants had a competitive edge, especially in their ability to buy raw materials cheaper and ship their product to more distant markets. While Pittsburgh's growing working class increased the demand for beer, market forces caused a decline in the number of breweries in the region. The number of brewers continues to shrink nationwide, in part the result of recent improvements in packaging and advertising.

As in other industries, corporate giants are giving way to flexible, small scale producers able to exploit niches in the marketplace. The recently opened Allegheny Brewery and Pub is a very different sort of brewery from those that closed in the last fifty years, but not entirely unlike many in the Deutschtown section of Allegheny City one hundred years ago. This brewery has just expanded and is beginning to increase its production to supply accounts throughout the city. The story has come full circle, as the new brewery makes about the same amount of beer as the old Eberhardt & Ober Brewery did in the last century.

II. Brewery Tour



VIEW OF THE DUQUESNE BREWERY COMPANY, PITTSBURGH, PENNSYLVANIA

Duquesne Brewery
21st & Mary Sts.
1899

The Duquesne Brewing Company was formed in 1899, the same year that twenty local brewing companies formed the "combine" known as the Pittsburgh Brewing Company. In 1905 the rival Duquesne Brewing Company consolidated sixteen firms into the Independent Brewing Company of Pittsburgh. The company's peak year of production was 1961, when it sold 1,700,000 barrels of beer.

On the application for designation as a historic building the architecture of the new brew house (1950) is described as "Art-Moderne," while the original brew house (1899) is listed as "clumsy Romanesque." The brewery was acquired by C. Schmidt & Son of Philadelphia in 1971 following a long strike in 1970, and the Duke label was subsequently boycotted in the area.

II. Brewery Tour

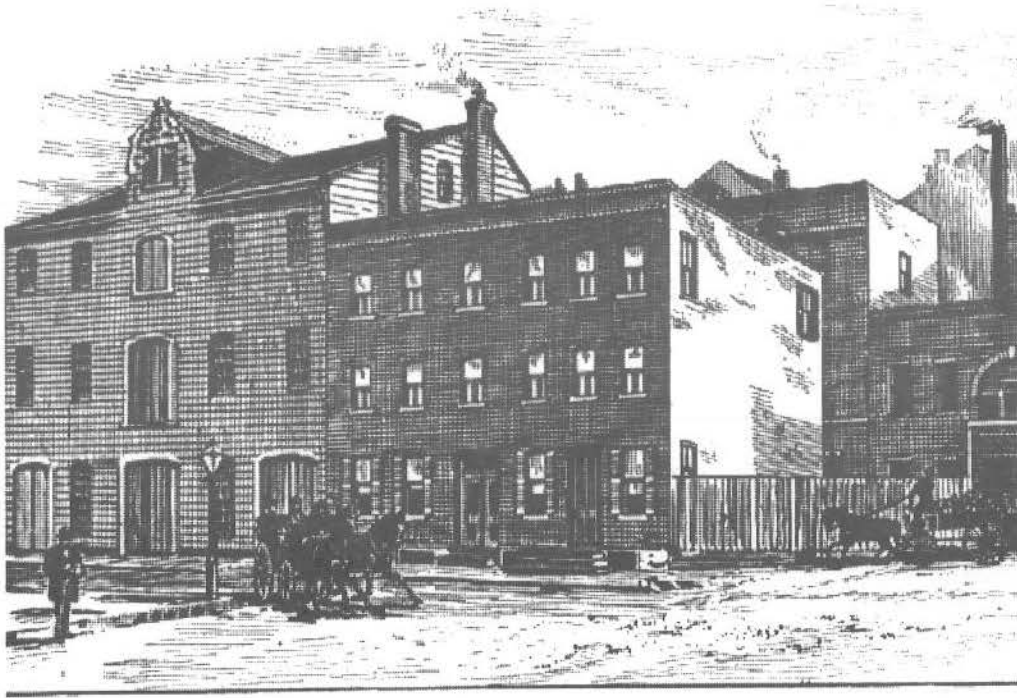


Christian Moerlein
Company Beer Warehouse
S. 20th & Sidney Sts.
ca.1915

"A handsome commercial building, taking a full block. The urbanity is typical of the Eclectic period, and the bright red brick with raked-out mortar joints suggests a date around 1915. Such a surface indeed is often found in houses of the time. The brickwork is laid in a direction different from its predecessor. Someone took care over this building, plain as it may seem at first. The ground floor windows have the so-called Florentine tracery, Early Renaissance in origin, popular in the 1850's, rare in the early twentieth century." (Walter Kidney, *Landmark Architecture: Pittsburgh and Allegheny County*, 1985)

Constructed as a warehouse for a Cincinnati brewer, this stop on the tour emphasizes the importance of shipping beer to expand markets. The twentieth century brought widespread distribution of beers well-beyond local and even regional markets. The largest and most successful at creating national markets were the midwestern brewers of St. Louis and Milwaukee, but this was a practice begun on the eastern seaboard as soon as the railroads began providing service. It is interesting to note that the regional loyalty for Iron City Beer has prevented national brands from making inroads into the Pittsburgh market to this day.

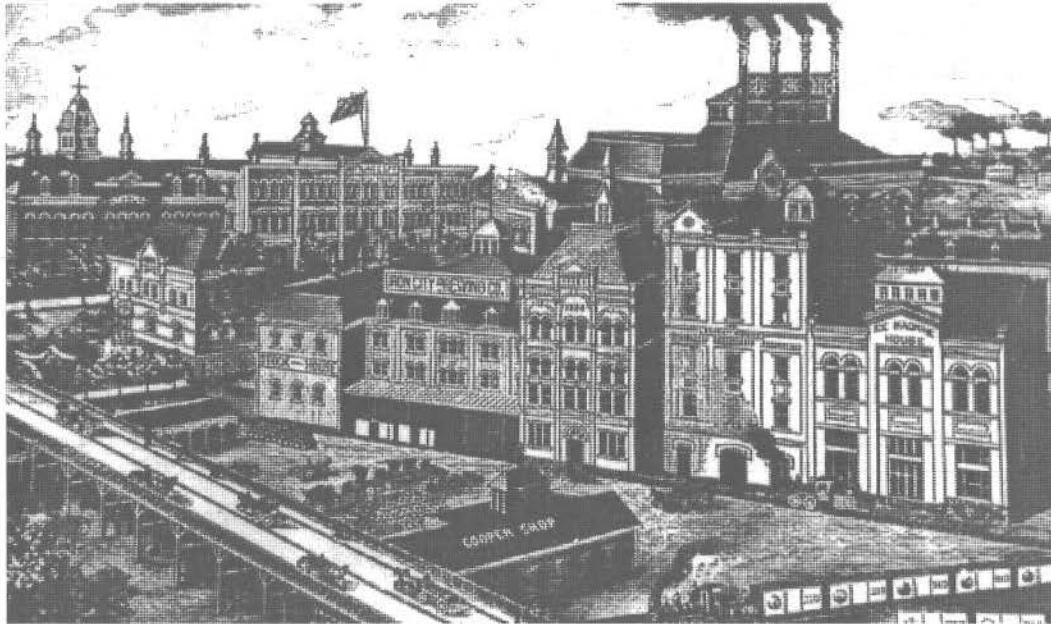
II. Brewery Tour



Wilhelm Brewery
26th & Josephine Sts.
1865

Henry Wilhelm operated this brewery from 1865 until 1882. The location of this brewery was ideal since caves could be dug into the side of the mountain. Production in 1877 was 2,270 barrels of beer. Caroline Wilhelm conducted the business as the Washington Brewery from 1882 until 1890. Edel & Seiferth purchased the brewery and ran the Washington Brewery until 1895. The business was known as John Seiferth & Bros. from 1895 until 1899. The brewery joined the "combine" that year. Pittsburgh Brewing Company closed the brewery the following year. There were at least seven other small brewing operations in this area of the South Side. Breweries of this capacity went by the wayside as technologic innovations in the areas of refrigeration, production and packaging made them obsolete. The closure of the Washington brewery by the "combine" marked the beginning of a trend which would continue until the Iron City Brewery was the only branch left in business in 1952.

II. Brewery Tour



Pittsburgh Brewing Company

3340 Liberty Ave.

1861; numerous additions

Edward Frauenheim and August Hoeffler started a brewery on 17th St. in 1861, and five years later moved operations to 34th & Liberty Sts. By 1869 the firm had become known as Fruenheim, Miller, & Co., and became Fruenheim & Vilsack in 1874. The Iron City Brewing Company was finally established in 1888 becoming the city's leading brewery by 1899, when the Pittsburgh Brewing Co. was formed. Headquartered at the Iron City Brewery, the "combine" included fourteen other breweries in the city and outlying areas.

In 1986, the Pittsburgh Brewing Company merged with the Swan Brewery Co. Ltd. of Perth, Australia. The same year the company was listed as the nation's tenth largest brewer. Subsequently the Bond Corp. Ltd. which owned Swan purchased the Heileman Brewing Company of LaCrosse, WI and Pittsburgh Brewing Company became a member of the Heileman Brewing Company. The new owners recognized the regional loyalty to the Iron City brand and let Pittsburgh Brewing Company carry on as usual, but included some Heileman products in the brewing schedule. In December, 1991 Michael Carlow of Uniontown, PA, purchased the brewery for \$30 million. Carlow had recently purchased the D.L. Clark Candy Company for \$22 million. The two firms were joined as the Pittsburgh Food and Beverage Company and employ 500 people.

II. Brewery Tour

Phoenix Brewery 24th & Smallman Sts. 1845; 1861; 1890



Wood & Hughes commenced brewing at this address in 1845, and by 1850 were producing 4,000 barrels of beer a year. The firm was known as Spencer & McKay in 1861, and five years later the brewery became Spencer & Liddell, with production expanding to 20,000 barrels of beer. In 1890, Wm. Tann, a bottler, took over and ran the firm as the Phoenix Brewery. In 1899 it was purchased by the "combine" and was operated by the Pittsburgh Brewing Company until prohibition.

Historically, there were at least nine other breweries in the downtown area, beginning in 1795 with George Shiras at the point. This brewery is one of the oldest in the city left standing. It originally produced ale and porter, adding the increasingly popular lager beer by mid-century.

II. Brewery Tour

Allegheny Brewery & Pub Troy Hill Rd. & Vinial St. 1848; 1883; 1989



Pittsburgh's newest brewing enterprise, the Allegheny Brewery & Pub is located in the old Eberhardt & Ober brewery. E & O was the last closure of the Pittsburgh Brewing Company in 1952, which left the city with only one brewery. This stop is rather unique in that a new brewery has restored an old brewery, so perhaps this is the real "phoenix" brewery on the tour!

The North Side of Pittsburgh was known as Allegheny City until 1907. The area of the brewery was in a section known as "Deushtown," and was home to at least fourteen breweries. Typically the Germans living here were merchants and businessmen rather than factory workers and laborers, and Deushtown has been compared more closely with a midwestern town rather than an eastern industrial city like Pittsburgh just across the river.

C. Eberhardt Brewery was established in 1848 on Troy Hill Road, and Eberhardt & Ober formed the Eagle Brewery in 1852 at Troy Hill Road & Vinial Street. In 1883, the firm became the Eberhardt & Ober Brewing and Malting Company, and two years later the Eberhardt & Ober Brewing Company was formed. In 1899, E & O joined the "combine," becoming part of the Pittsburgh Brewing Company. The brewery re-opened after repeal in 1933 and continued producing beer until 1952. After closing, the property was adapted to a variety of uses, including cold storage for produce as well as light manufacturing. In 1989, Tom Pastorious opened the Allegheny Brewery and Pub. Parts of the complex are rented as office space and are home to a business "incubator." Mr. Pastorious has outfitted his brewery with equipment from Germany and has recently expanded his cellar space.



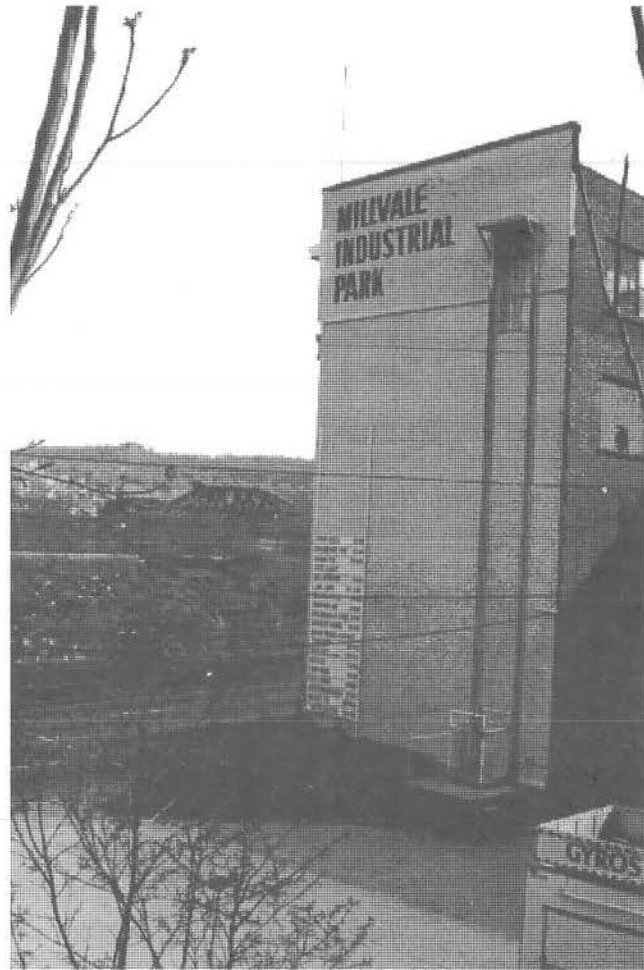
II. Brewery Tour

American Brewing Company

(Millvale Industrial Park)

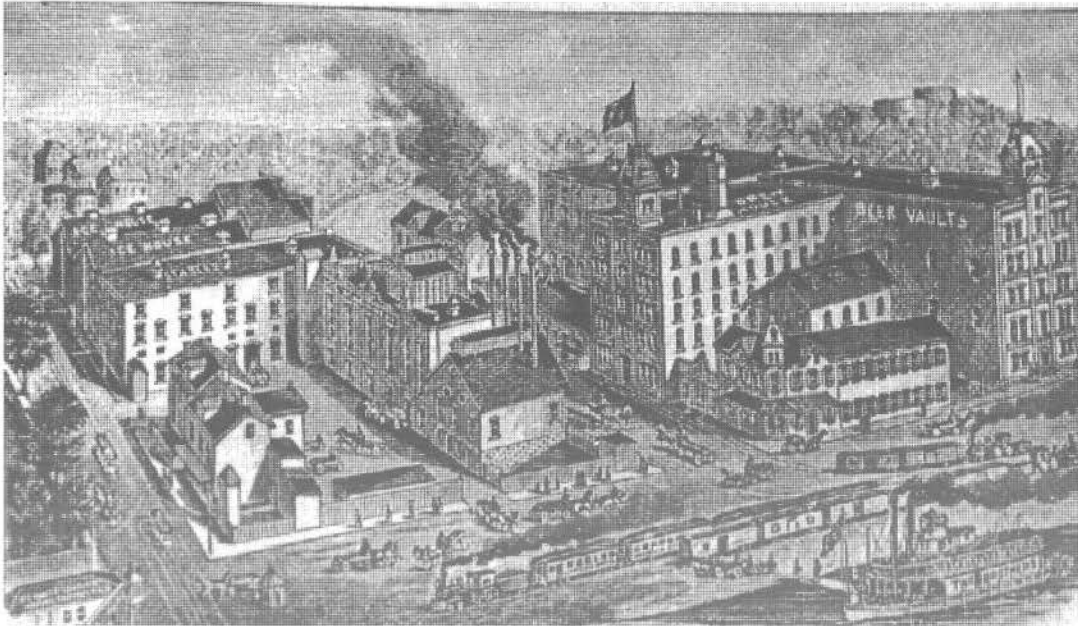
Rt. 28 & 33rd St.

1866; 1898

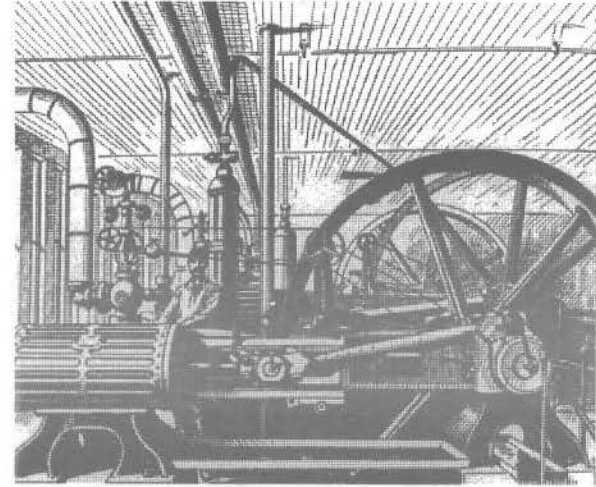


Gerst & Brother opened the Willow Grove Brewery on Butler Plank Road near Bennett Station in 1866, and by 1878 yearly production reached 1236 barrels of beer. Val Gerst became the sole owner in 1882, and sold out to Enz & Schaefer in 1885. A fire destroyed the brewery and a smaller brewery was built in its place. Michael Enz purchased the brewery in 1893, and constructed a new brewery across from the 33rd Street bridge in 1898. Two years later plans were drawn up for a new three-story stock house, mill house, and engine room. Annual capacity was increased to 70,000 as a result of these improvements. This large, modernized brewery joined with the Independent Brewing Company of Pittsburgh rather than the "combine," and remained in business until prohibition came in 1920. Reuse has been important in maintaining the property. Many buildings from the original plant complex remain and approximately 15 commercial and industrial companies utilize the space.

II. Brewery Tour



Bauerlein Brewery
Evergreen & E. Ohio Sts.
Millvale
1845; numerous additions



In 1845 Adam Bauerlein started a brewery on Penn Ave., soon moved to Liberty Ave., and finally to Bennett Station. In 1846 he sold 500 barrels of beer. From 1867 to 1898 the brewery was known alternately as: A. Bauerlein & Sons, C. Bauerlein Bro. & Co., Star Brewery, and C. Bauerlein Brewing Co. Production grew from 500 barrels in 1846 to 3000 in 1860 to 5000 in 1870. By 1880 the company was capitalized at \$500,000, and production soared to 35,000 barrels of beer in 1897. In 1898 the company became known as Pittsburgh Pure Beer Brewing Company at Evergreen Avenue and Ohio Street. The following year it joined the "combine," becoming part of the Pittsburgh Brewing Company. The firm is listed after prohibition as Keystone Mfg. & Sales Co. a.k.a. Bauerlein Brewery from 1933-34.

What is interesting about this stop is the significance of rail lines to the choice of the site. When Adam Bauerlein moved over from Pittsburgh proper to the outskirts of Millvale, there were two other breweries in the area. Currently, there is only one building left of what was an extensive plant complex. It should be noted that the Stock House was a relatively recent addition to the brewery at a time when modernization had begun to change the way breweries were built. Improvements in mechanical refrigeration and tank construction make this a "modern brewery."

II. Brewery Tour



Hoehl Brewery
504 Stanton Ave., Millvale
1863; 1884

Tucked away along a stream in Millvale is the Hoehl Brewery. When the brewery was started by Henry Hoehl in 1863 he would have dug cellars in the banks of the stream to ferment and age his beer. The walls and foundations are evident from the parking lot across the creek. Henry Hoehl, Jr. ran the business from 1884-1888 when it became known as Hoehl Brewing Company, a.k.a. H. & S. Hoehl until 1904. The home adjacent to the brewery was that of the brewmaster/owner. While brewing operations ceased in 1904, it is reported that this plant was used during prohibition to make malt extract.

This brewery is comparable in age to Wilhelm's over on the South Side, and it started at about the same time Bauerlein located at Bennett Station just down the road. It is possible that this firm did not keep pace with technological innovations of the day and became obsolete or at least noncompetitive.

II. Brewery Tour

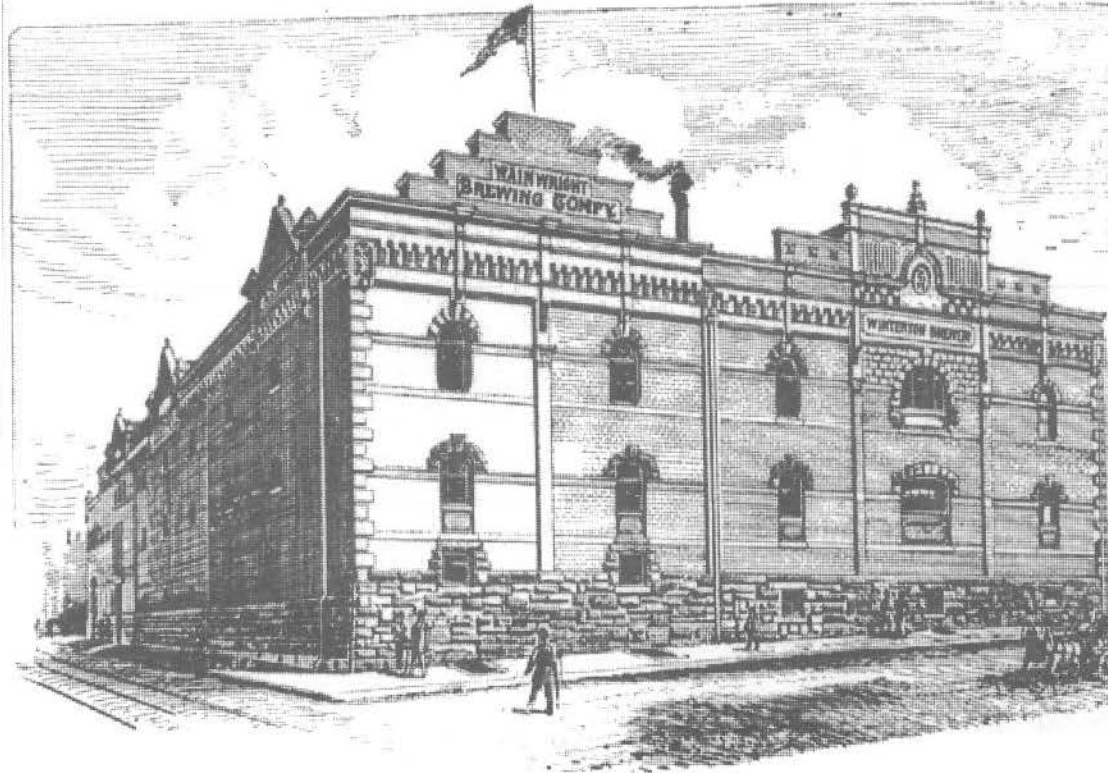


Fort Pitt Brewery
16th & Mary Sts., Sharpsburg
1906

This brewery was a late-comer to the area. Formed in 1906, the Fort Pitt Brewing Company was a "modern brewery," built with all the innovations that had occurred during the last part of the nineteenth century. Breweries became smaller and sleeker and could still brew at the same capacity of an earlier, larger nineteenth century brewery. The brewery reopened after prohibition and remained in business until 1957. Presently the Jones Brewing Company of Smithton, PA, brews the Fort Pitt label.

When prohibition came in 1920, Fort Pitt had just established itself as a significant competitor in the region's beer marketplace. Following repeal, the Fort Pitt Brewing Company was the third largest brewery in Western Pennsylvania and operated another brewery in Jeannette; together the two produced 70,000 barrels of beer in 1935. Despite losses in the thirties, the two plants made 1,200,000 barrels in 1949-50, employed 800 workers, and netted two million dollars after taxes. Lengthy steel and coal strikes in 1952 spread to the brewery, which shut down for four months. This gave out-of-town brewers the chance to move in and push their brands. In 1955 Fort Pitt lost \$924,000, and the Jeannette plant closed soon after the strike. After Fort Pitt was sold to the Gunther Brewing Company of Baltimore, MD., both breweries soon closed, victims of the "beer wars."

II. Brewery Tour



Wainwright Brewery

3615 Butler St.

1818; 1880; numerous additions

Joseph Wainwright established a brewery in 1818 on 36th Street, then known as Wainwright's Lane. The brewery produced 100 barrels of beer the first year, and by 1880 production rose to 30,000 barrels. Wainwright began producing lager beer in 1878, adding a 125,000 bushel malt house in 1881, and a \$175,000 cold storage building in 1890. The Wainwright Brewing Company was capitalized at \$600,000 in 1893, and by 1895 the brewery accounted for over 10% of Pittsburgh's 600,000 barrel production. With all the improvements and modernization, the Wainwright brewery must have been considered one of the city's finest. The company joined the "combine" and operated as the Wainwright Branch of the Pittsburgh Brewery Company in 1899 and continued in business until prohibition came in 1920. Recently the Pittsburgh Brewing Company put out a new label honoring this historic brewery, called "J.J. Wainwright's." There is nothing left of the vast complex of buildings that comprised this brewery. The office building we will see was not built as part of the Wainwright Brewery but was bought by the company and used as an office.

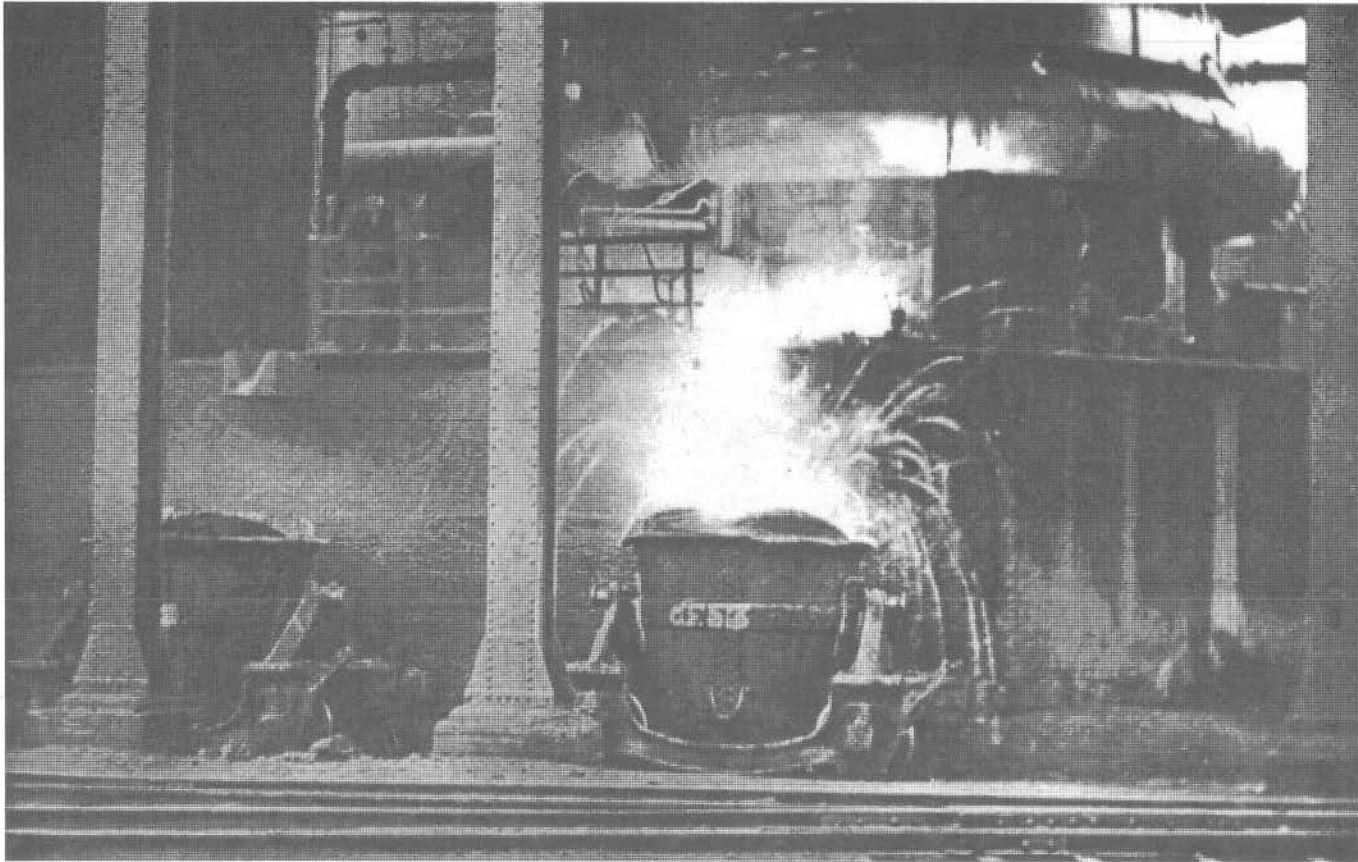
II. Brewery Tour



Hilltop Brewery
421 Brownsville Rd. Mt. Oliver
Fred Rautert, architect
1902

The Hilltop Brewing Company was formed and this brewery erected in 1902. Another example of the "modern breweries" of the first decade of the twentieth century, this brewery was built with a yearly production capacity of 25,000 barrels. The brew house was equipped with a 75-barrel brew kettle, and the plant was equipped with two 35-ton refrigerating machines and a boiler house with two 100 h.p. boilers with room for one more. The building was designed to make doubling the cellars an easy addition, with a 15-ton ice making plant next door. The cost of the building was \$88,000 and was designed by the Chicago brewery architect, Fred Rautert.

The brewery operated until prohibition and did not reopen after repeal in 1933. Built with expansion in mind, prohibition and the subsequent changes in the brewing industry must have been too great to reopen the Hilltop Brewery. The building was saved from demolition by being converted into a theater.



III. STEEL VALLEY TOUR

by Joel Sabadasz

The Carnegie Steel Company was instrumental in the development of the modern American steel industry at its Monongahela Valley steel mills during the late 19th century, through the development of new industrial mill design techniques, technological innovations, and improved business practices. The greenfield construction of the Edgar Thomson Works at Braddock in 1875, designed and built under the supervision of Alexander Holley, combined new steel-making technologies such as the Bessemer converter and automatic rolling mills within an industrial design scheme that fit the discrete steelmaking steps into a continuous flow production system.

Between 1872 and 1900 the Carnegie Steel Company established "American Practice" in blast furnace production through the introduction of "hard driving" techniques at four local facilities (Lucy Furnace, Edgar Thomson Works, Duquesne Works, and the Carrie Furnaces). Predicated upon the introduction of larger blast furnaces, more powerful blowing engines, regenerative hot blast stoves, and automatic raw materials storage, handling, and delivery systems, "hard driving" resulted in dramatic improvements in pig iron production, which rose from not more than 50 tons per day at a single furnace in 1872 to the world daily production record of 790 tons set by Carrie Furnace No. 3 in 1900.

The company also set the standard for rolling mill operation during this period by consistently employing the most productive equipment available. Between 1890 and 1900 it installed an expensive direct process for rolling rails and billets, inherited from its purchase of the Duquesne Works, at the Homestead and Edgar Thomson Works. Moreover, state-of-the-art structural mills and plate mills and an armor forging plant were installed at the Homestead Works during this period. The 48" steam-driven universal

plate mill, installed at Homestead in the late 1890s, is the only extant rolling mill from the era.

A significant factor in the company's development of modern technologies stemmed from a conscious pathbreaking policy to cut unit production costs to a bare minimum. Throughout the last quarter of the nineteenth century, production managers led by Captain William Jones and Charles Schwab worked with company accountants to analyze every facet of the production process in a relentless search to cut costs. By the turn of the century this strategy had made the Monongahela Valley mills of the Carnegie Steel Company the most productive and efficient steelmaking facilities in the world.

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- Peter Temin. *Iron and Steel in Nineteenth Century America: an Economic Inquiry*, Cambridge, 1964.
- J.E. Johnson Jr. *Blast Furnace Construction In America*, New York, 1917.
- "Modern Rolling Practice." *Iron Age*, Vol. 48, December 31, 1891.
- Mark M. Brown. "Technology and the Homestead Steel Works: 1879-1945," *Canal History and Technology Proceedings*, Vol. 11, March 14, 1992.

III. Steel Valley Tour



Camp Hill
McKeesport
1960; 1987

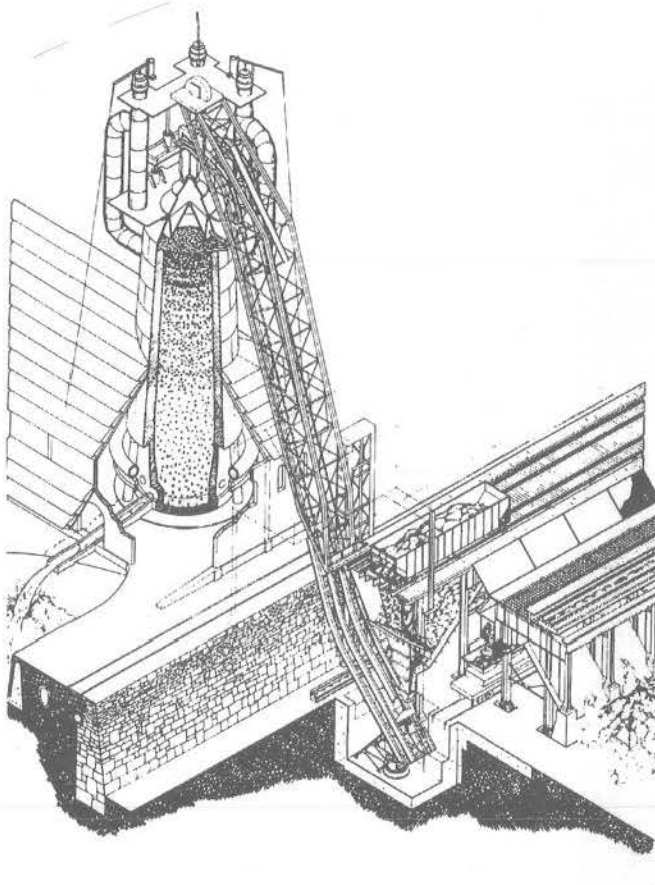
U.S. steel built the pipe rolling facilities at the Camp Hill Corporation in the early 1960's to meet demand in rapidly growing domestic pipeline market. Originally part of the United States Steel Corporation's National Tube Works, the facility employs Electric Resistance Weld technology (ERW). The ERW method, capable of producing medium diameter (8 5/8" to 20") butt-welded pipe, was initially chosen because it was a clean, no flux technology that operated faster than other butt-welding methods. Another factor influencing the decision to install the ERW method stemmed from metallurgical improvements, specifically the introduction of new high strength steels such as the thin-walled X-60 grade which could be readily adapted to the process. Because older butt-welding methods continued to use steel plate, this meant less weight per length, a definite advantage to customers. ERW pipe could also be produced in greater lengths, up to 80 feet, with more uniform walls and a smoother internal surface. When it was installed, the facility was among the industry's most advanced pipe mills, producing the longest pipe in the world. As a result of the precipitous decline of the domestic oil industry in the early 1980's, however, the mill, along with the rest of the National Tube Works, was shut down. It was reopened in December of 1987 by two former employees of USX, Al Hilleglass and Pat Campano, and given its present name. Currently the facility employs 150 men, many of them former USX employees, and produces 4000 tons of pipe per week.

REFERENCE:

"Electric Resistance Weld Pipe Mill Produces 80 ft. Lengths at National Works." *Iron and Steel Engineer*, Vol. 41, No. 9, September, 1964.

III. Steel Valley Tour

USS Duquesne Works Duquesne 1889-1984



Isometric of Blast Furnace No. 1.

Established in 1889, the Carnegie Steel Company purchased the Duquesne Works in 1890, and permanently shut down the mill in the fall of 1984. The most significant extant artifact on the site is the mill's blast furnace plant. Designed by and installed under the supervision of Marvin A. Neeland between 1895-1897, the plant was the first in the industry to employ an integrated automatic raw materials storage, handling, and delivery system consisting of an ore yard, traveling ore bridges, stocking trestle, and a hoist bucket delivery system to the top of the furnace. Blast Furnace No. 1 is the only furnace remaining which retains the essential elements of Neeland's raw materials delivery system. Other extant features of the Duquesne Works include its basic oxygen steelmaking plant, electric furnace plant, and heat treatment facilities. Constructed in 1962, the B.O.P. shop at Duquesne was U. S. Steel's first venture into oxygen steelmaking. The electric furnace plant and heat treatment facilities were originally built in 1943 by the Defense Plant Corporation as part of the national war production effort. The electric furnace plant also includes the nation's first vacuum degassing unit, installed in 1955. At present, the former Duquesne Works is being developed by the Regional Industrial Development Corporation of Allegheny County as an industrial park.

REFERENCES:

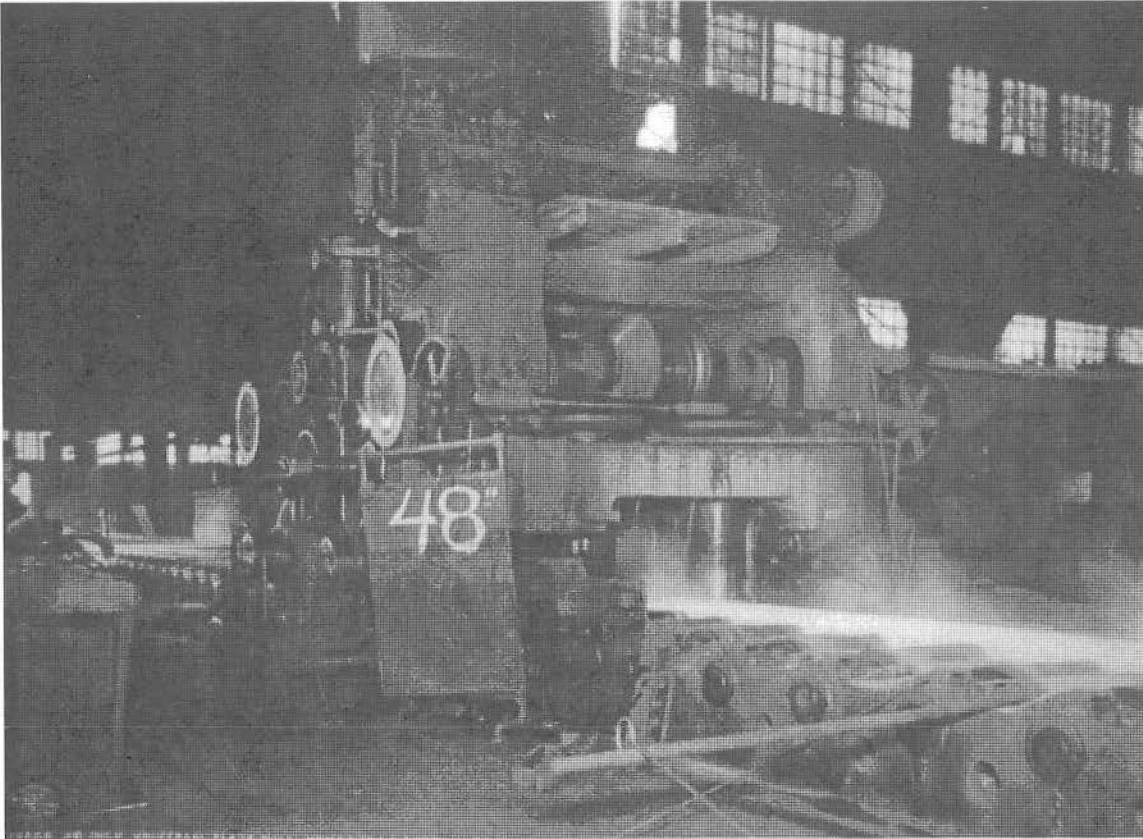
J.E. Johnson Jr. *Blast Furnace Construction in America*, New York, 1917.

"Duquesne Works to Get First U.S. Steel Oxygen Converter." *Iron and Steel Engineer*, Vol. 39, No. 9, September, 1962.

T.J. Ess. "War Time Expansion of Carnegie-Illinois Steel Corporation in the Pittsburgh District," *Iron and Steel Engineer*, Vol. 24, No. 9, September, 1947.

"Duquesne Works Installs Vacuum Casting Process." *U.S. Steel News*, Vol. 21, No. 3 July, 1956.

III. Steel Valley Tour



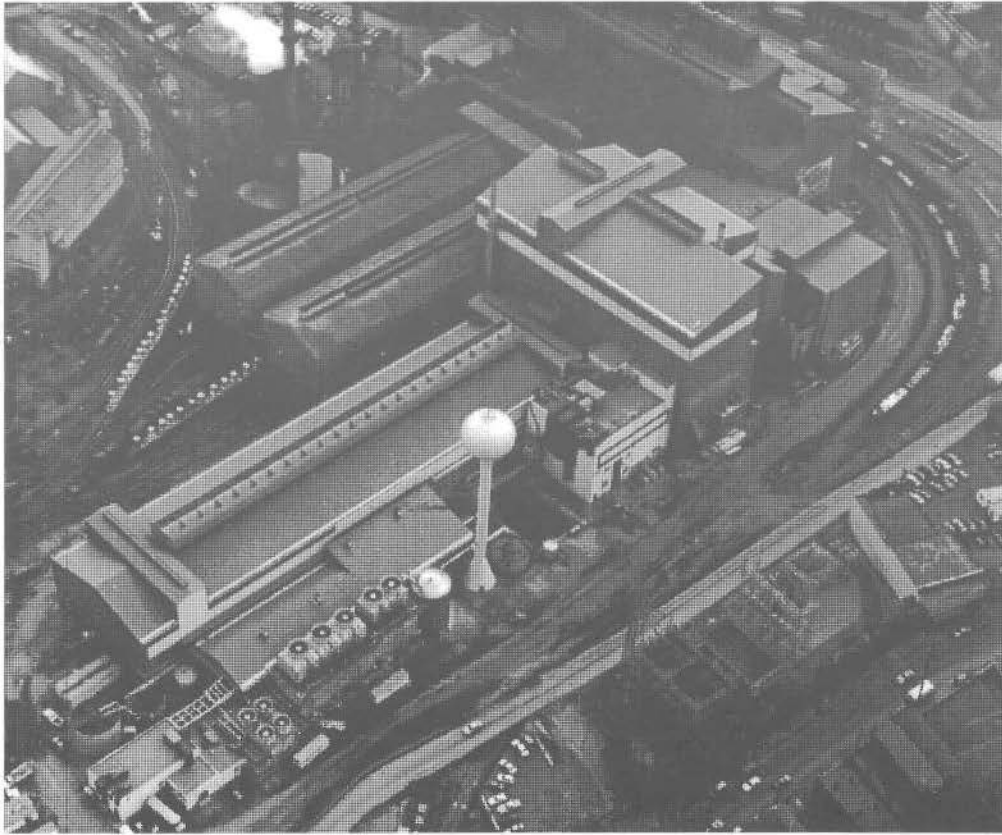
48-Inch Universal Plate Mill
USS Homestead Works;
moved to East Pittsburgh
1899-1979

Constructed by the Mackintosh-Hemphill Company, the 48-inch steam-driven universal plate mill was reputed to be the largest of its class ever built when it was installed at the Homestead Works in 1899. The only extant turn of the century rolling mill left in the Monongahela Valley, the 48-inch mill closed in 1979. However the mill was dismantled under the direction of the late Tom Rick (SIA) for the Steel Industry Heritage Corporation in 1991. He was assisted in this task by Robert Craig (SIA), who helped identify and sketch the disassembled parts. The mill is presently being stored at Keystone Commons -- the former East Pittsburgh Works of the Westinghouse Electric Company -- in preparation for reassembly at a future steel heritage center.

REFERENCE:

"The Homestead 48-inch Universal Plate Mill." *Iron Age*, Vol. 66, December 27, 1900.

III. Steel Valley Tour



USS Edgar Thomson Works
Braddock
1875; numerous additions

Braddock's Field was originally famous as the site where General Edward Braddock of the British army was defeated by the French and Indians in 1755. In 1875 the site became the location of the Edgar Thomson Works, where it became the first steel mill to employ design techniques which integrated the discrete steelmaking steps into a continuous flow process. The mill's current operating elements include a blast furnace plant, a basic oxygen steel making plant, and a continuous slab caster. The blast furnace plant consists of two operating furnaces -- No. 1 and No. 3. Blast Furnace No. 1 was constructed by the Defense Plant Corporation in 1943, while Blast Furnace No. 3, originally constructed in 1880, has recently been modernized to include one of the most up to date monitoring systems in the industry. The B.O.P. shop, built in 1972, contains significant design improvements over its counterpart at Duquesne, particularly with regard to the location of its ladle repair and teeming facilities. The continuous caster was started up in the fall of 1992. Its construction is being credited with sustaining the production of steel in the region for decades to come. The 44" Slab Mill, installed in 1939, remains extant, although operations were discontinued when the continuous caster was put into operation. Originally constructed as a Bessemer rail mill, the Edgar Thomson Works presently supplies steel slabs to the Irvin Works of USX for further processing into strip steel, which is used in the manufacture of automobiles and home appliances.

REFERENCE:

Alfred D. Chandler. *The Visible Hand: The Managerial Revolution in American Business*, Cambridge, 1977.

III. Steel Valley Tour



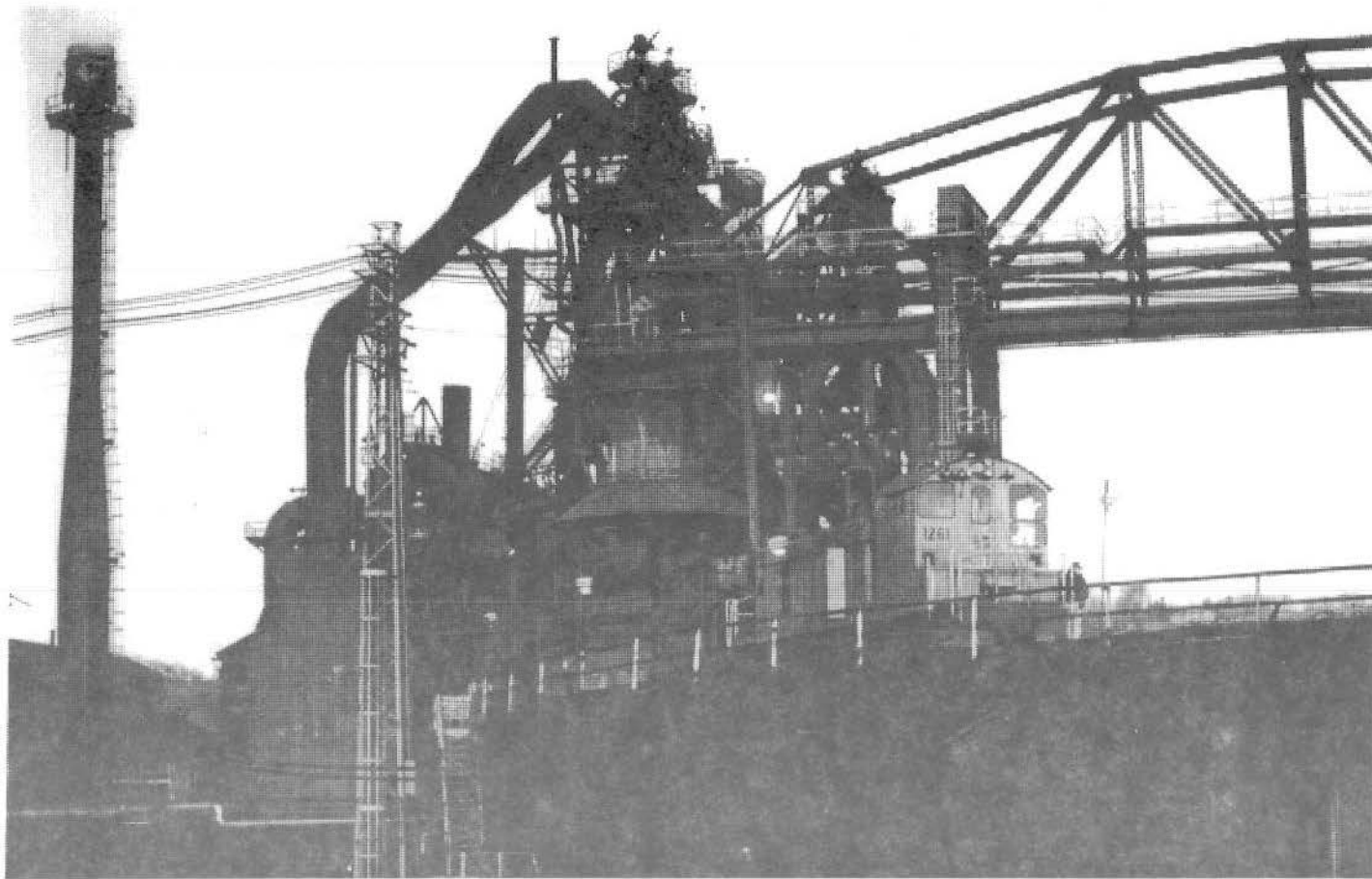
George Westinghouse Memorial Bridge
U.S. Rt. 30 (Lincoln Highway) over Turtle Creek
Vernon R. Covell, Chief Engineer,
Allegheny County Department of Works
1930-1932

In the 1920's and 1930's, Allegheny County engineers under the leadership of Vernon R. Covell designed a series of remarkable bridges including the West End, the Homestead High Level, and the spectacular 1,524 foot long George Westinghouse Memorial Bridge. Consisting of five two-rib, open-spandrel, reinforced concrete arches, the Westinghouse Bridge carries the Lincoln Highway 200 feet above the floor of Turtle Creek Valley. The size of the bridge's span and the elegance of the spandrel design plays off the dramatic scale of the nearby Westinghouse East Pittsburgh Plant and the Edgar Thomson Steel Works. When constructed, the 460 foot center span was the longest concrete arch in the United States and is contemporary with the Hoover Dam and the George Washington Bridge in New York.

REFERENCES:

Carl Condit, *American Building Art: The Twentieth Century*, New York: Oxford University Press, 1961.

"Our Greatest Concrete Arch Bridge," *Literary Digest* September 10, 1932. (abstracted from *The Engineering News-Record*)



IV. Ohio River Steel Tour by Matthew Kierstead

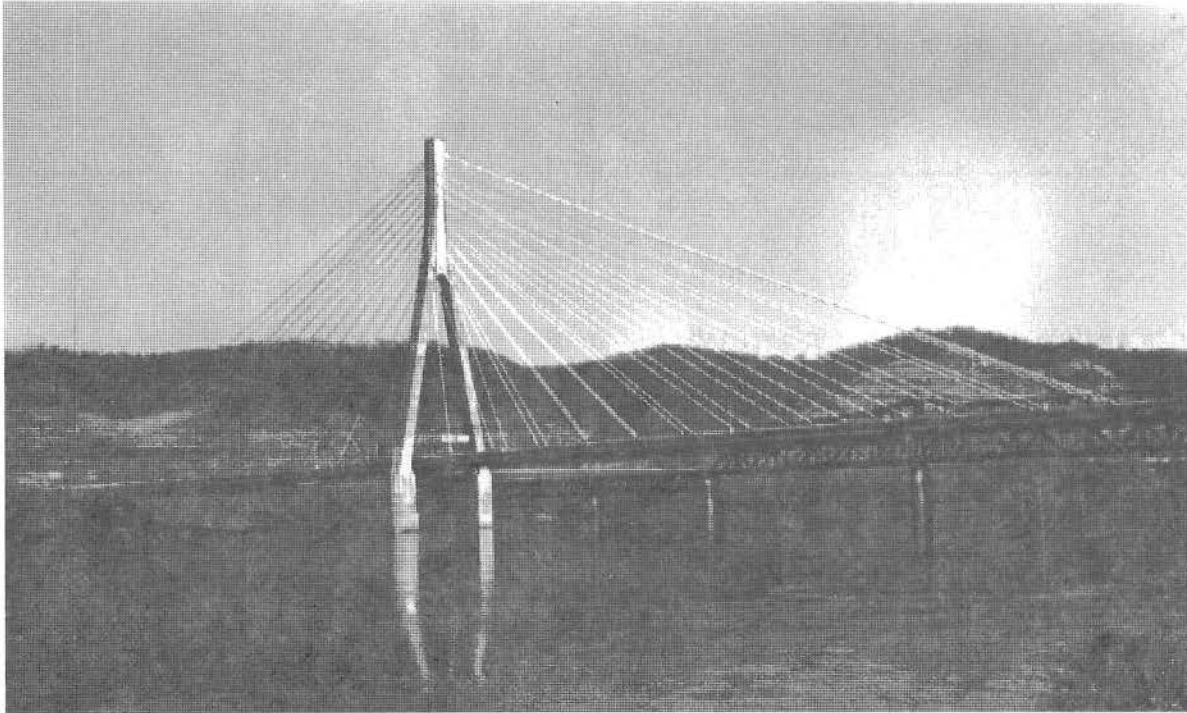
Wheeling-Pittsburgh Steel Corporation Steubenville, OH 1869; numerous additions

Iron and steel production began in the Steubenville area with the formation of the Mingo Iron Works in 1869. Ownership of the facility changed hands several times before the plant became a Carnegie-Illinois subsidiary of U.S. Steel in 1901. In 1945 the plant became part of the Wheeling Steel Corporation, which merged with Pittsburgh Steel in 1968. This fully-integrated mill contains Wheeling-Pittsburgh Steel Corporation's main iron and steelmaking facilities, as well their hot strip mill. The plant specializes in the manufacture of flat-rolled coil steel for the automotive, appliance, and construction industries.

The Steubenville facility is dispersed over three sites, divided into the North, South, and East Works. The By-Product Coking Operations and sinter plant are located at the East Works in Follansbee, WV. Coke oven batteries 1, 2, and 3 were rebuilt in the 1970's, and have an output of 40,000 tons per month. Battery 8, built by Koppers in 1976, has a monthly output of 80,000 tons of coke per month. Wheel-Pitt's blast furnace nos. 1 and 2 are located at the North Works, and furnaces 3 and 5 are located at the South Works in Mingo Junction, OH. Three remain active, producing an average of 6,000 tons of molten pig iron per day. The Basic Oxygen Furnace (BOF) shop, built in 1965, houses two 300-ton vessels capable of producing 3 million tons of raw molten steel per year. In 1978, a hot metal desulfurization slag skimmer and a ladle trim station were installed to further improve the metallurgy of the steel. The 200,000 ton per month twin-strand Continuous Caster is completely computerized, and was installed in 1983 with the assistance of Nippon Steel of Japan. The 80-inch computer-controlled Hot Strip Mill was built by Blaw-Knox in 1965. The 31,200 horsepower roughing line consists of a 45" vertical, a 2' high horizontal, and three 4-high horizontal roughing stands, and the finishing line consists of six 4-high stands of 6,000 horsepower each. The finishing line is equipped with a computerized roll screwdown movement control system for gauge thickness regulation, and a new coil box unit.

Wheeling-Pittsburgh Steel is the seventh-largest domestic integrated steelmaker. With the advanced steel making technology at this facility, Wheeling-Pittsburgh Steel manufactures flat-rolled steel stock for their coated and galvanized steel products which reflect the historic product lines of predecessor Wheeling Steel, and the West Virginia steel industry in general.

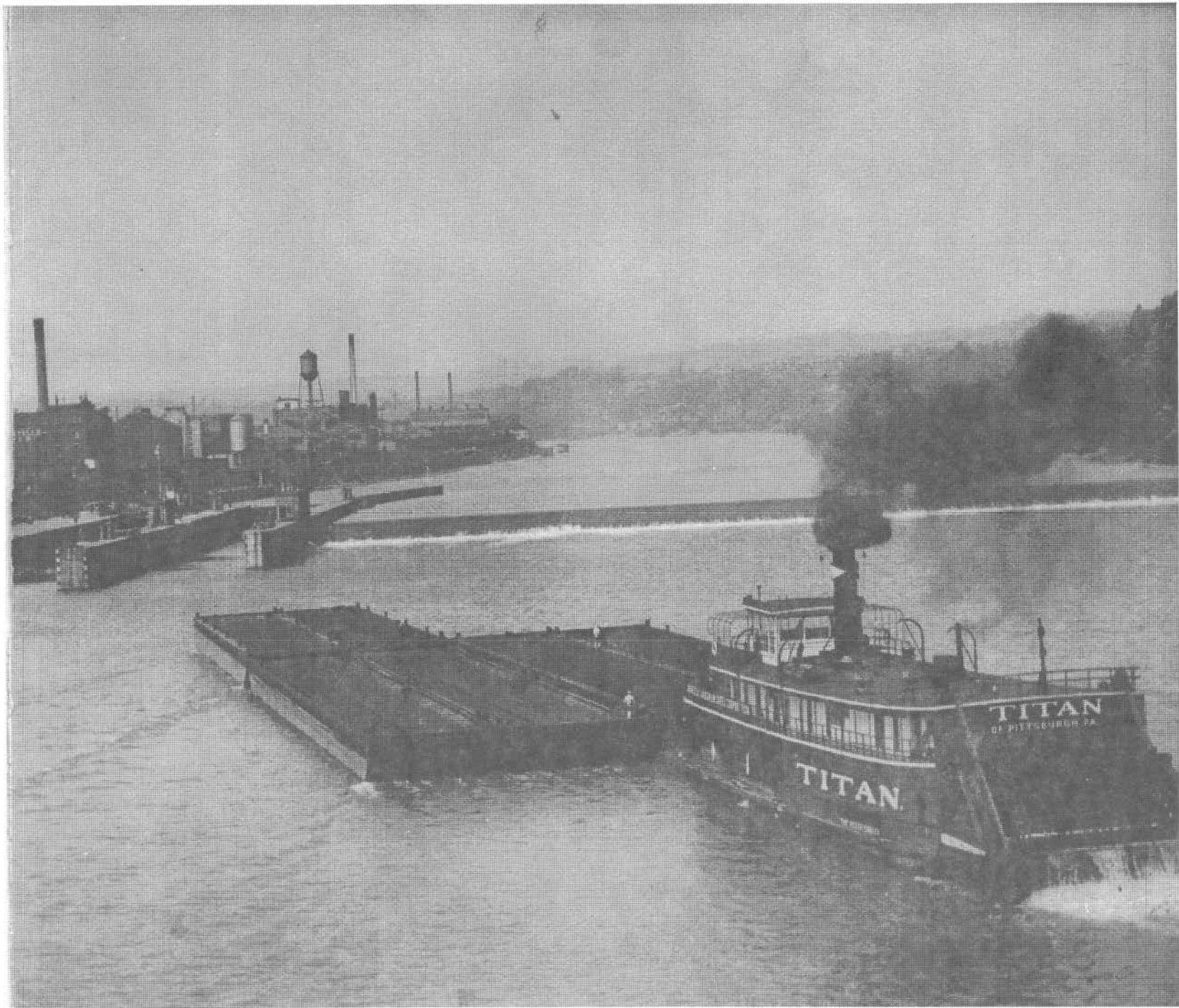
IV. Ohio River Steel Tour



**Weirton-Steubenville
Veteran's Memorial Bridge**
U.S. Rt. 22
Michael Baker, Jr. Inc., engineer
1979-83

The Weirton-Steubenville Veteran's Memorial Bridge is an asymmetrical concrete and steel cable-stayed bridge which carries U.S. Route 22 over the Ohio River between Weirton, West Virginia, and Steubenville, Ohio. The bridge measures 1,964 feet between abutments, and provides six 12-foot wide traffic lanes on a steel girder and poured concrete deck which is supported by a 360-foot inverted Y-shaped concrete tower. 26 paired cables radiate from the tower, the longest measuring 800 feet. The cables reach to the ends of the 690-foot West Virginia back span, and the 820-foot main river span, which are of floorbeam and stringer construction. The approach spans on the Ohio side of the bridge are of continuous plate girder construction. The 8 1/2" thick roadway deck is of cast-in-place reinforced concrete, and measures 40'-6" from median to parapet.

Preliminary planning for the bridge began in 1961, but site work did not begin until 1979 with the construction of the Ohio River piers. Numerous delays were experienced due to changing environmental policies, design changes, and funding problems. Construction of the superstructure began in November of 1983, and the Weirton-Steubenville Veterans's Memorial Bridge was opened to traffic on May 4, 1990.



44 *Towboat Titan approaches the old lock and dam at Brownsville, ca 1930.*

V. MID-MONONGAHELA TOUR

by J.K. Folmar & Christopher H. Marston

The Monongahela River was and is a major transportation link in the economic dynamics of Western Pennsylvania. River names such as McKeesport, Allenport, Port Vue, Grays Landing, and Rices Landing are examples of early river hopes and history. When the first white settlers came across the mountains in the early 1750s the Monongahela became a primary travel artery. The first major industry along the river was the construction of flatboats at Pittsburgh, Elizabeth, and Brownsville. Migrants and early entrepreneurs used this one-way craft for decades, well into the mid-1950s. Meanwhile, keelboats became the first packet boats for commerce and passenger trade by the 1790s. These developments made Pittsburgh the first "Gateway to the West" at the beginning of the 19th century.

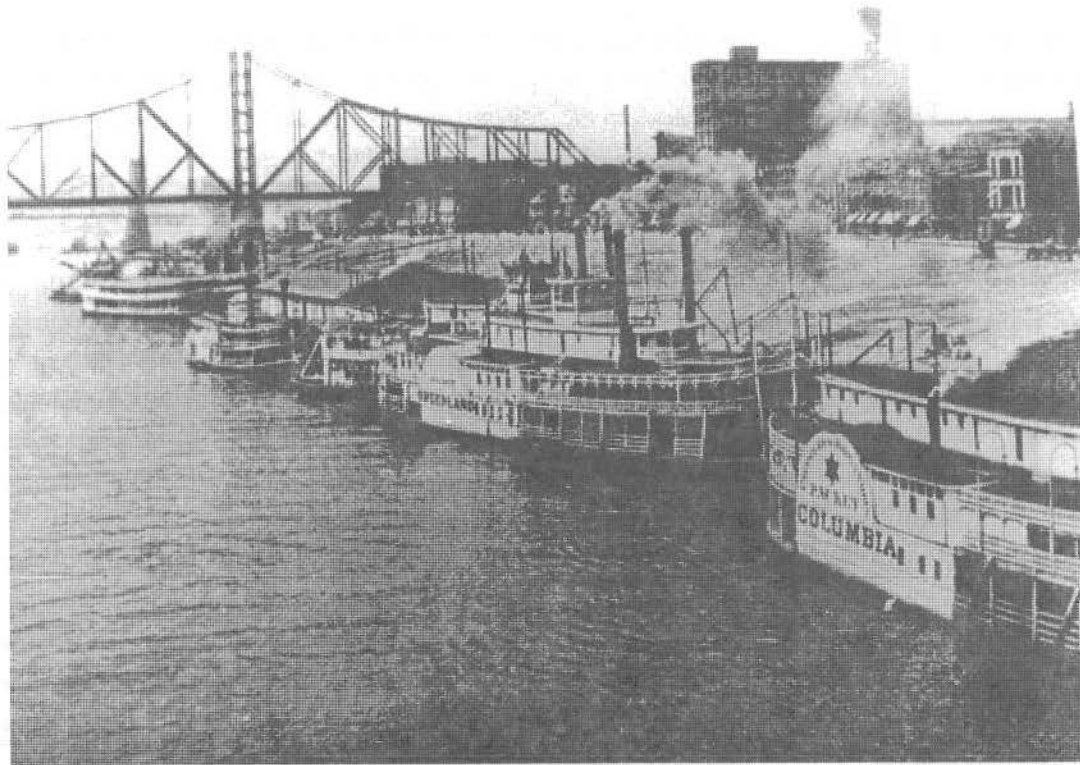
The steamboat era in the west began on the Monongahela in 1811 with the construction of the *New Orleans* by the Fulton/Roosevelt group in Pittsburgh. By 1814-15 the *Enterprise* completed the first successful round trip from Brownsville to New Orleans. As flat-bottomed steamboat technology evolved, the National Road was completed from Cumberland to Wheeling in 1818, crossing the Mon at Brownsville but bypassing Pittsburgh. There were immediate efforts to dam the Mon, and, after numerous tries, the Monongahela Navigation Company completed four dams to Brownsville (fifty miles south) in the late 1840s. Navigation to Brownsville for most of the year became a reality. The result was the most successful slackwater navigational system in the nation's history. Regular packet service would continue for the next four decades as additional dams were constructed. Elizabeth, California, and Brownsville became major steamboat construction sites.

Although the Pennsylvania Railroad arrived in Pittsburgh in 1852, three decades elapsed before a railway penetrated the valley corridor to Brownsville. By mid-century, the extraction of coal for downriver trade and the iron and steel industry came to dominate local economics. Cheap transportation and labor in the 1870-1880s led to the construction of major industrial sites on the lower Mon in Pittsburgh, Homestead, Duquesne, and McKeesport. Industrial growth of unprecedented scale continued into the 1890-1900s with mill development in mid-Mon areas such as Clairton, Donora, Monessen, and Allenport.

The federal government purchased the dams from the Monongahela Navigation Company in 1897, and has since replaced, updated, and maintained all the locks and dams on the river. The crossroads of a huge concentration of freight traffic, Pittsburgh became the leading inland port in the nation. Meanwhile, in 1900 the Monongahela Railway was formed by the Pennsylvania RR and the Pittsburgh & Lake Erie of the New York Central to serve the expanding coal fields, which had moved southwest from Fayette county to Greene County and into West Virginia. Although an essential network for the inland mines, railroads still could not match the tonnage per tow of a barge. By the 1950s, as diesel technology drove out steam-driven locomotives, diesel-powered towboats replaced the steamers. Likewise, manufacturers such as the Hillman Barge Company grew and developed steel-deck barges. HBC Barge remains the only heavy industry in Brownsville, and has survived its suppliers such as the Homestead Works.

Although the steel industry has suffered a devastating decline in the last decade, the Monongahela continues to serve the regional and the national economy. Environmentally, the river is cleaner than it has been in decades. Recreational activities are increasing. Federal, state, and local projects are being funded to preserve the area's industrial and transportation heritage, with varying degrees of success. Places like Brownsville are rediscovering their past, such as National Road-era residential areas and the 1839 cast-iron bridge. Area residence hope that tourism, together with new projects such as the Mon Valley Expressway, will eventually fill the economic void.

V. Mid-Mon Tour



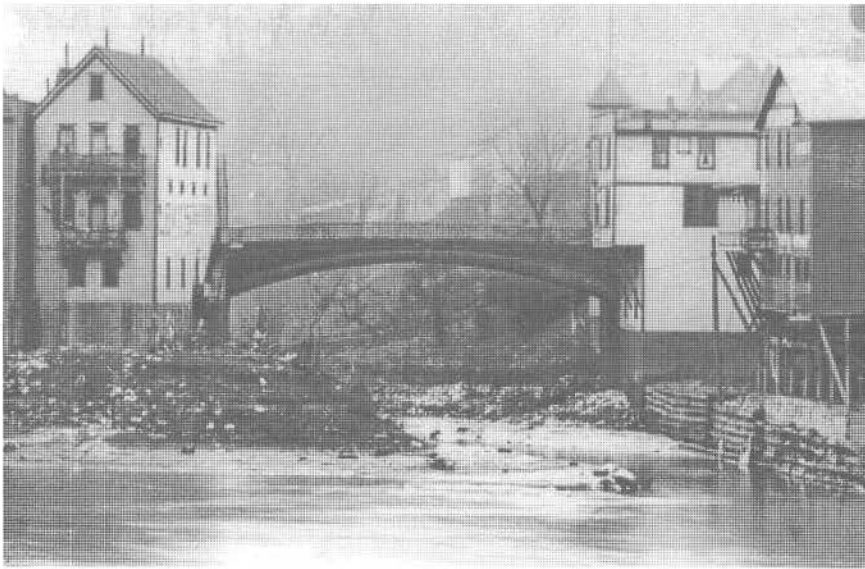
Packet Landing at downtown Pittsburgh, 1910.

Monongahela River Buffs Museum

175 Second St.

Monongahela, Washington County

This museum was founded by a unique "buffs" organization in 1978 upriver (south) at Greensboro, PA (Mile 84). A river museum was established by Ernie Gabler in one room of the "Monon Center," in a Victorian elementary school building. In 1986, the museum was moved to its present location in the town of Monongahela. It houses photos, artifacts, models, and memorabilia of the Monongahela River and its environs. A quarterly newsletter, the *Voice Of The Mon*, is published. Administered by volunteers, the museum is open to the public on Tues.-Thurs. evenings and weekend afternoons. Dues are \$5.00 per annum.



The Dunlap Creek Bridge in 1900, before alteration.

Dunlap Creek Bridge Brownsville, Fayette County 1836-39

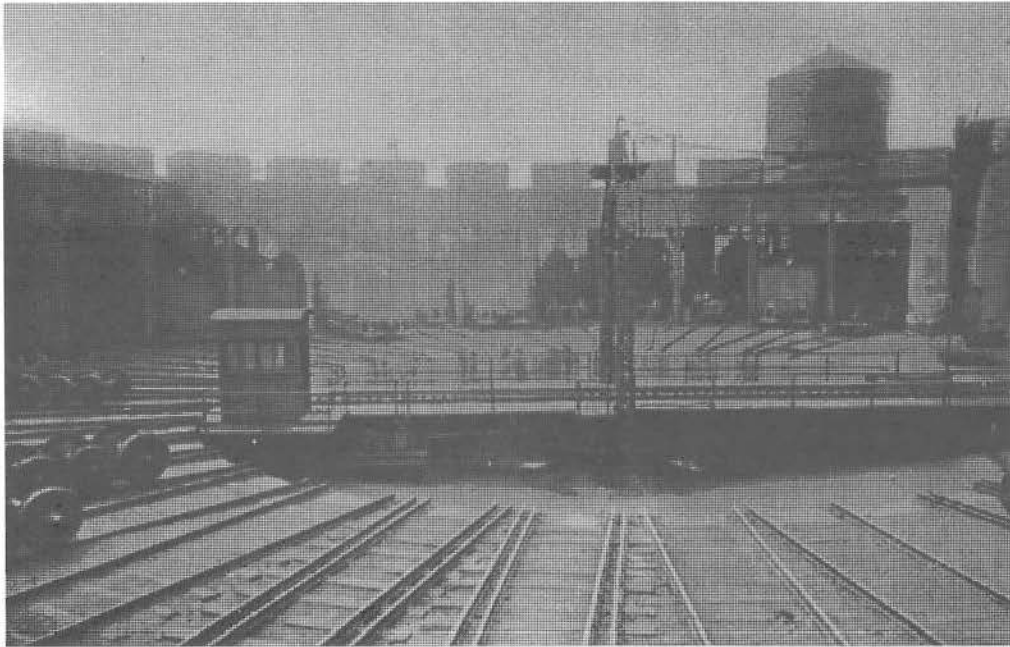
The Dunlap Creek Bridge was designed in 1834-36 as a cast-iron bridge by Captain Richard Delafield of the U. S. Army Corps of Engineers. Although three county bridges had previously spanned the site (including a Finley suspension bridge), the new bridge was to be a part of the National Road. As an important inland trade link, the route would help transform Brownsville into a thriving center of trade and industry on the Monongahela River. An early example of a federally-funded public works project, completing the small eighty-foot structure became a major headache. Delays caused by bad weather, political controversy, labor shortages, and cost overruns delayed the opening of the bridge until 1839.

The bridge was the first cast-iron arch built in the United States. Five arches composed of nine sections of elliptical tubes (voussoirs) carry the major load. A springing plate bolted to the masonry abutments acts as a skewback to support the arches at either end. The original macadam road surface lay on a series of arched floor plates bolted to one another, connected to the tubes by a lattice spandrel section. The system of tubing was a prototype for the only other cast-iron arch built in the country, Montgomery C. Meigs' 1863 aqueduct bridge in Washington, D.C.

Today the Dunlap Creek Bridge is still part of Old Route 40 through downtown Brownsville, although it is now hidden under commercial buildings and cantilever bracing added in 1922.

REFERENCES:

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- Emory Kemp, "The Fabric of Historic Bridges," *IA*, Vol 15, No. 2, 1989.
- Frances Robb, "The History of Dunlap Creek Bridge," unpublished HAER report, Homestead, PA, 1992.



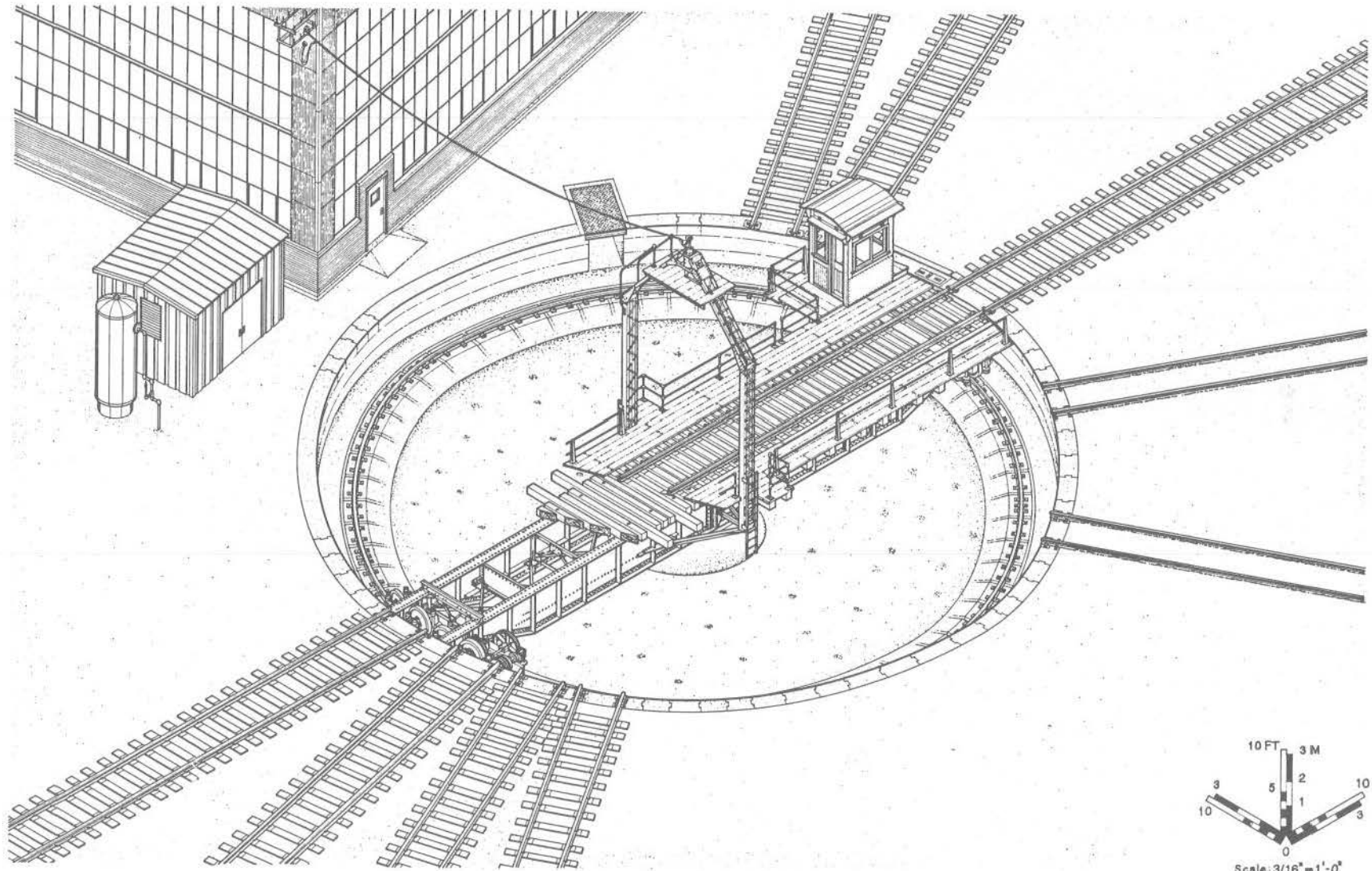
Monongahela Railway Shops
Brownsville, Fayette County
1900; 1918; 1924

The Monongahela Railway Company was organized in 1900 as joint venture between the Pennsylvania Railroad and the Pittsburgh & Lake Erie (New York Central System) to serve the coal and coke industry of the the Lower Connellsville or "Klondike" region. At its peak in the late 1920s the system maintained 180 miles of track: a mainline along the Monongahela River from Brownsville to Fairmont, WV, and several branches leading to coal and coke sites inland.

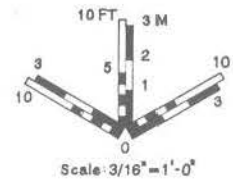
The South Brownsville Shops were the main servicing center for the railroad, built as a modern steam facility including a roundhouse, erecting shop, and coaling station. Today only the 1924 turntable remains from the roundhouse, while the 1918-24 erecting shop has lost most of its period machinery. The demolition of the site reflects the change from steam-power to diesel by the railroad. With new technology and a smaller labor force, however, the line enjoyed a resurgence in the 1980s, serving newer mines on the Waynesburg Southern branch and hauling record tonnages. Conrail purchased the Monongahela Railway outright from the now defunct P & LE in 1992, and consolidated the South Brownsville Yard with its West Brownsville and Conway Yards.

REFERENCES:

David Jardini, "Coal Road: The History of the Monongahela Railway," unpublished HAER report, Homestead, PA, 1992.
Monongahela Railway Archives



75 FOOT TWIN SPAN TURNTABLE ISOMETRIC



DES. DRAWN BY: Mark Pierson, 1992
 MONONGAHELA VALLEY
 RECORDING PROJECT
 INTERSTATE 78/PA 280/PA 281

MONONGAHELA RAILWAY COMPANY SHOPS
 WATER STREET AND SEVENTH STREET
 FAYETTE COUNTY

BROWNSVILLE

PENNSYLVANIA

SHEET

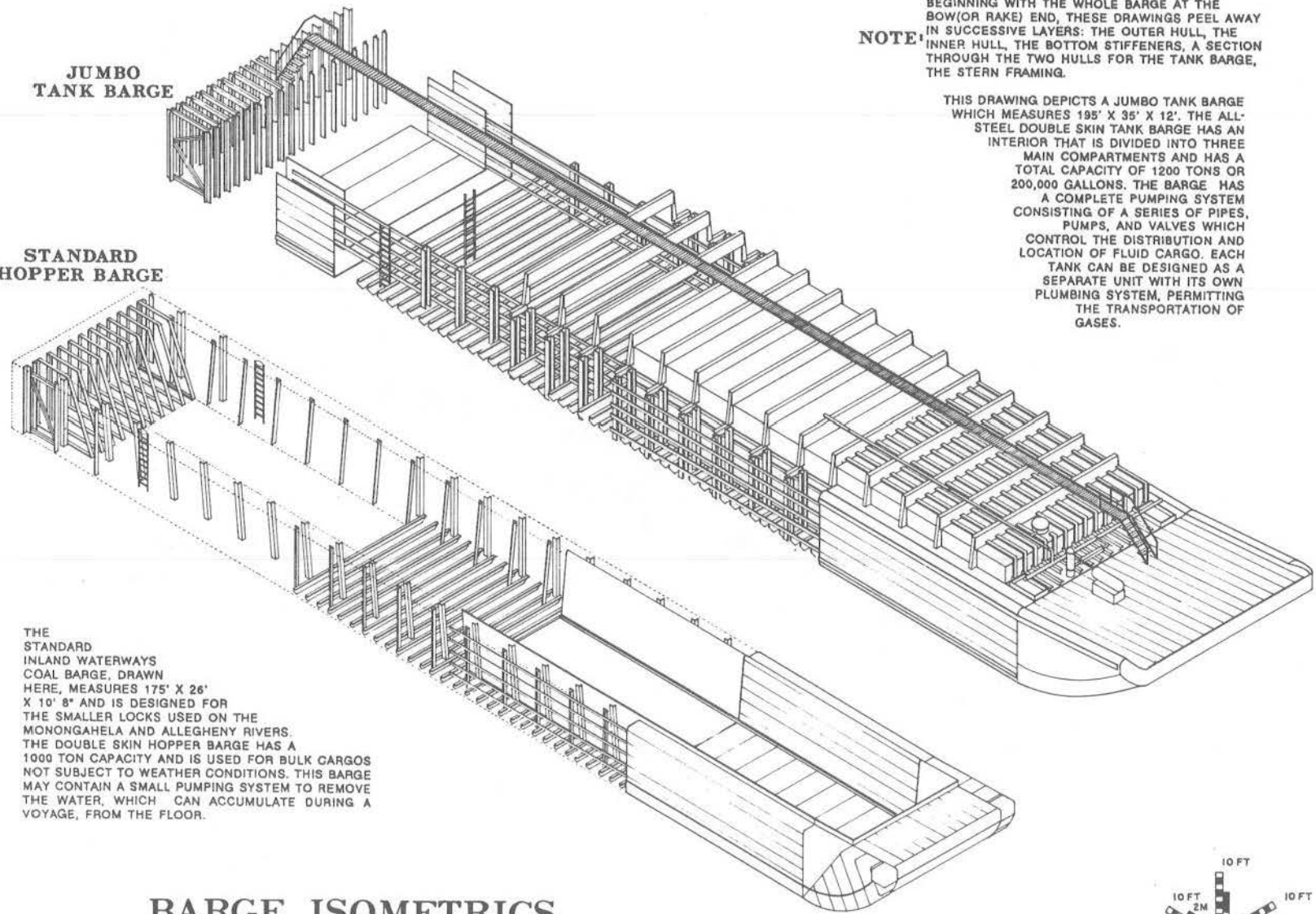
12-12

HISTORIC AMERICAN
 ENGINEERING RECORD
 PA - 218

IF REPRODUCED, PLEASE CREDIT: HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, BUREAU OF RECREATION, DATE OF THE DRAWING.

**JUMBO
TANK BARGE**

**STANDARD
HOPPER BARGE**

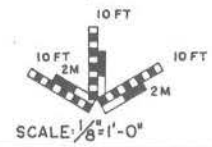


THE STANDARD INLAND WATERWAYS COAL BARGE, DRAWN HERE, MEASURES 175' X 26' X 10' 8" AND IS DESIGNED FOR THE SMALLER LOCKS USED ON THE MONONGAHELA AND ALLEGHENY RIVERS. THE DOUBLE SKIN HOPPER BARGE HAS A 1000 TON CAPACITY AND IS USED FOR BULK CARGOS NOT SUBJECT TO WEATHER CONDITIONS. THIS BARGE MAY CONTAIN A SMALL PUMPING SYSTEM TO REMOVE THE WATER, WHICH CAN ACCUMULATE DURING A VOYAGE, FROM THE FLOOR.

NOTE: BEGINNING WITH THE WHOLE BARGE AT THE BOW (OR RAKE) END, THESE DRAWINGS PEEL AWAY IN SUCCESSIVE LAYERS: THE OUTER HULL, THE INNER HULL, THE BOTTOM STIFFENERS, A SECTION THROUGH THE TWO HULLS FOR THE TANK BARGE, THE STERN FRAMING.

THIS DRAWING DEPICTS A JUMBO TANK BARGE WHICH MEASURES 195' X 35' X 12'. THE ALL-STEEL DOUBLE SKIN TANK BARGE HAS AN INTERIOR THAT IS DIVIDED INTO THREE MAIN COMPARTMENTS AND HAS A TOTAL CAPACITY OF 1200 TONS OR 200,000 GALLONS. THE BARGE HAS A COMPLETE PUMPING SYSTEM CONSISTING OF A SERIES OF PIPES, PUMPS, AND VALVES WHICH CONTROL THE DISTRIBUTION AND LOCATION OF FLUID CARGO. EACH TANK CAN BE DESIGNED AS A SEPARATE UNIT WITH ITS OWN PLUMBING SYSTEM, PERMITTING THE TRANSPORTATION OF GASES.

BARGE ISOMETRICS



DEVELOPED BY Jack Conviser, 1992
MONONGAHELA VALLEY
RECORDING PROJECT
UNIVERSITY OF PITTSBURGH, STATE COLLEGE, PA 15260

BROWNSVILLE

HILLMAN BARGE & CONSTRUCTION COMPANY
PAUL THOMAS BOULEVARD
PALETTE-COURT

PENNSYLVANIA

SHEET 2 OF 12

HISTORIC AMERICAN
ENGINEERING RECORD
PA-219

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Hillman Barge and Construction Co. (HBC Barge)

Brownsville, Fayette County

1903; 1938; numerous additions

Originally a repair shop, the Hillman Barge and Construction Company has evolved into one of the United States' four major inland waterway barge fabrication facilities. Incorporated in 1918 in Dravosburg, in 1938 the company bought H. W. Brown's boat building warehouses (ca. 1903) in South Brownsville. The operation began repairing wooden deck barges for H. J. Hillman's coal and transportation company. The principal business evolved from repair to fabrication in 1944 and production began to include towboats and steel-deck barges.

In 1952, the traditional hand welding batch process changed to a series of localized process flow patterns which were made possible with the installation of a new crane system and semi-automated equipment. Beginning in 1971, the company instituted a continuous process-flow system through the plant by integrating new automatic welding equipment with existing semi-automatic and hand operations. Currently known as HBC Barge Inc., the company was acquired by Trinity Industries Corporation of Dallas, Texas, in 1989.

REFERENCE:

Kathleen Hopkins, "Overview History of the Hillman Barge and Construction Company," unpublished HAER report, Homestead, PA, 1992.



W.A. Young & Sons
Foundry and Machine Shop
Rices Landing, Greene County
1900

In 1900 William A. Young opened a machine shop in the small village of Rices Landing near Lock & Dam No. 6 on the Monongahela River. The original structure was wood frame, two-story and housed a machine shop and pattern shop upstairs. Young soon added a back shop and a foundry with a coke-fired cupola. An old-fashioned "jack-of-all-trades", Young kept his job shop in business by serving coal mines, steamboats, and local residents as a repair shop, hardware store, and automobile mechanic.

The second-hand machinery was originally powered by a steam engine and shaft-driven belts. Later gas and electric engines served as power source; today a tractor motor is used for display purposes. The foundry closed in the 1930s but the machine shop remained open in the hands of Young's sons, Walter and Carl. During World War II, the shop ran apprentice programs attended by mostly women. The shop closed in 1965 but is now owned by the Greene County Historical Society. It remains a remarkably well-preserved example of the once common shaft-driven machine shop.

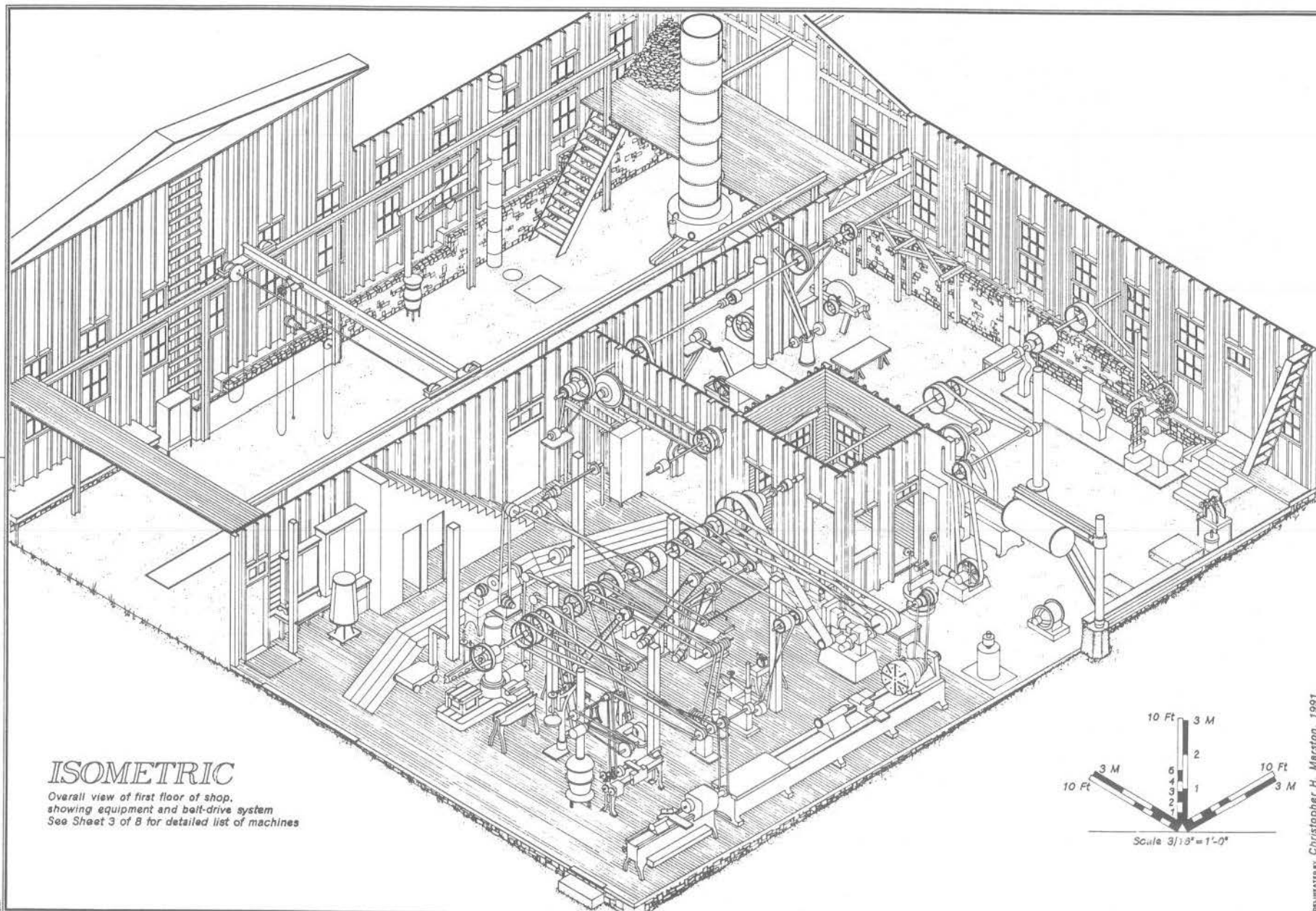
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Invoices from the W. A. Young & Sons Foundry and Machine Shop, Rices Landing, PA.

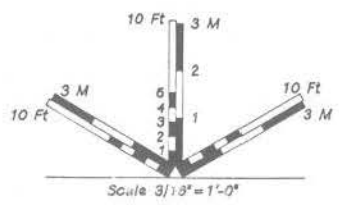
Ralph B. Roseberry, "A Brief History," privately published, Rices Landing, PA, 1982.

FINE LINE



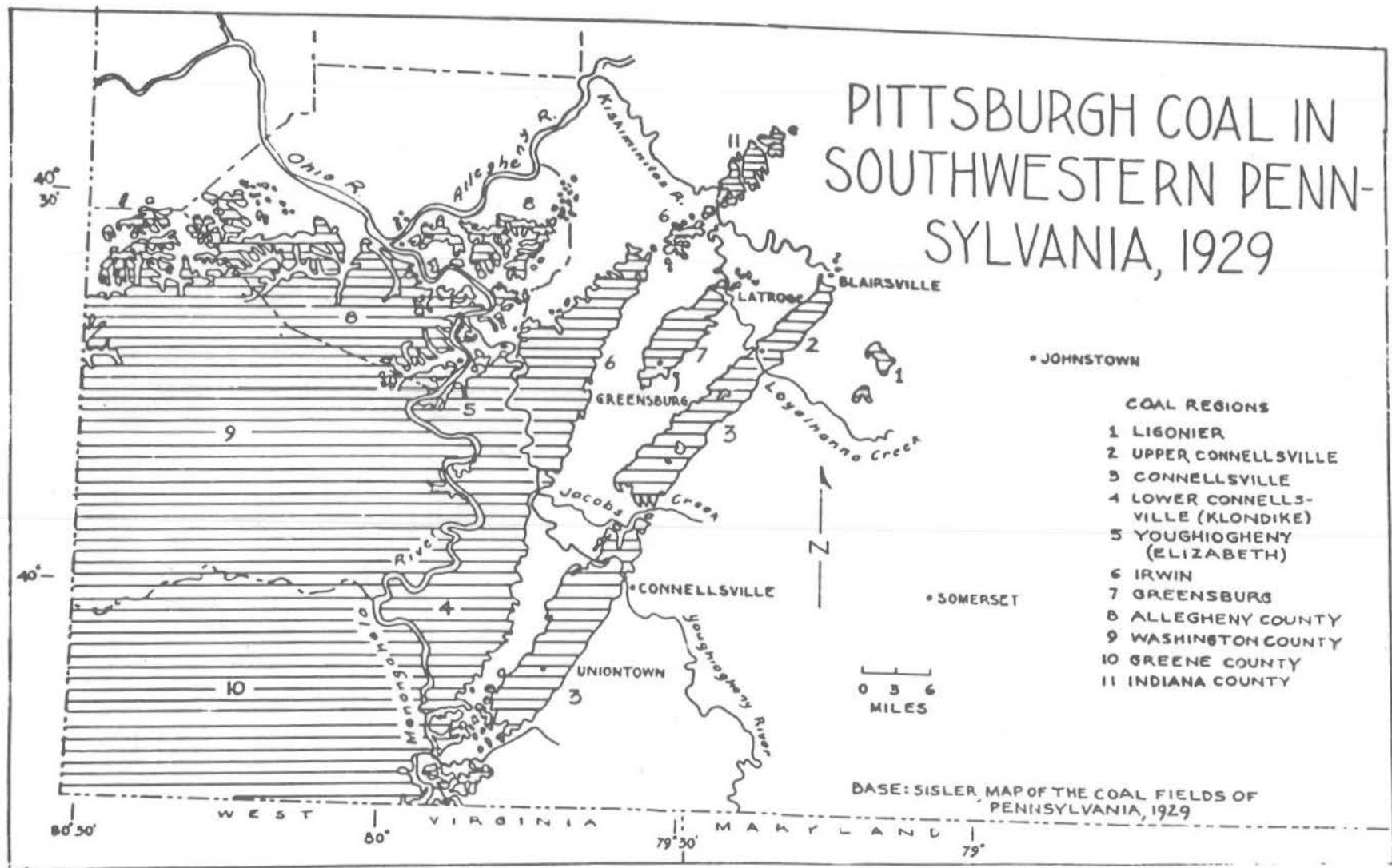
ISOMETRIC

Overall view of first floor of shop,
 showing equipment and belt-drive system
 See Sheet 3 of 8 for detailed list of machines



PENNSYLVANIA
 NATIONAL BOARD OF PROFESSIONAL ENGINEERING EXAMINERS
 PA-199
 SHEET
 B-8
 W. A. YOUNG & SONS' FOUNDRY AND MACHINE SHOP
 ON WATER STREET ALONG THE MONONGAHELA RIVER
 GREENE COUNTY
 RICES LANDING
 IF REPRODUCED, PLEASE CREDIT: HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, NAME OF ILLUSTRATOR, DATE OF THE DRAWING.
 ILLUSTRATED BY: Christopher H. Marston, 1991
 MONONGAHELA VALLEY
 RECORDING PROJECT
 UNIVERITY OF PENNSYLVANIA, PHILADELPHIA, PENNSYLVANIA

FINE LINE



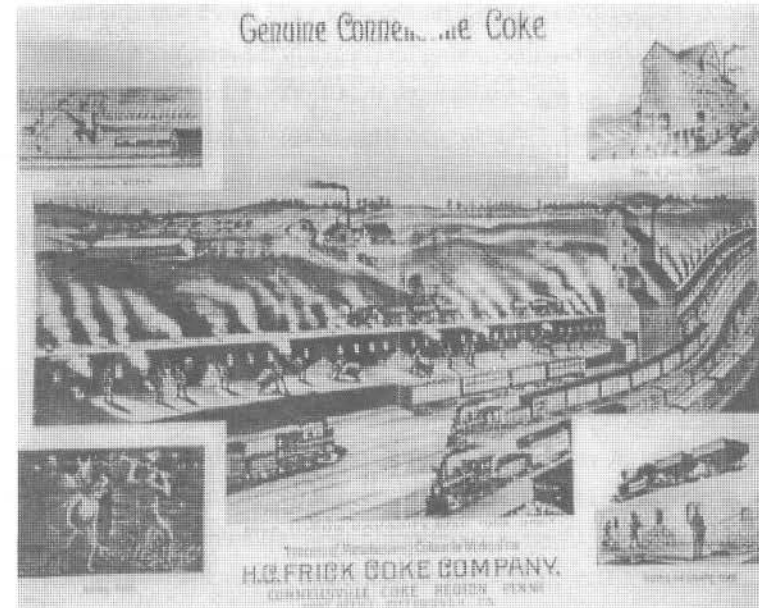
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VI. COAL & COKE TOUR by Frederic L. Quivik

Under most of western Pennsylvania are the bituminous coal seams comprising the northeastern segment of the Appalachian coal region. Through the roughly 2,800 vertical feet of coal measures (the coal seams and the intervening rock strata of sandstone, shale, clay, and limestone) are 42 distinct coal beds. The most important economically is the Pittsburgh seam. Limited in Pennsylvania to the southwestern corner of the state, the seam crops at Pittsburgh and thereby derives its name. The Pittsburgh coal extends from the southwestern corner of Pennsylvania into Maryland, Ohio, and West Virginia. Because of its thickness, nearness to surface, structure, and chemical attributes, including low contents of ash, phosphorous, and sulfur, the Pittsburgh seam has attracted miners and mine developers across its entire area and has been said to be the most important coal seam in the world.

Prior to World War I, 90% of the pig iron manufactured in the United States was made using coke manufactured from the Pittsburgh seam. Moreover, about one quarter of the fuel used by U.S. railroads came from the seam and Pittsburgh coal was used extensively to fire industrial boilers and to generate coal-gas. Coal from the Pittsburgh seam yielded so much mineral wealth that at the end of the 1930s, more value had been extracted from it than from any other single mineral deposit in the world. Mines throughout southwestern Pennsylvania produced coal from the Pittsburgh seam for domestic use or for generating steam or illuminating gas. Much of the coal was shipped out the the region by rail or by barge, providing the basis for an extensive rail network and making the Monongahela River a major transportation thoroughfare. The creation of a complex transportation infrastructure, evident in the several rail yards, locks and dams, barge manufacturers, and repair facilities along the river, transformed the Mon from a wilderness river into an industrial artery.

Although the entire Pittsburgh seam has desirable characteristics, the coal in a basin centered on Connellsville is of such special quality that it spawned a boom in coke manufacture unique in the annals of American



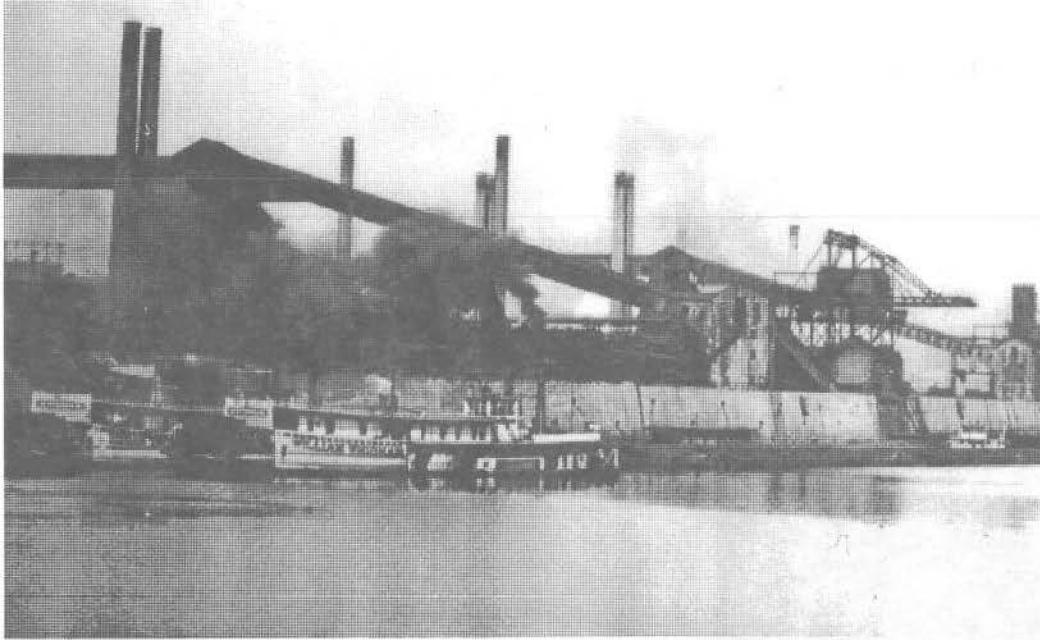
industry. The area which lies over that segment of the Pittsburgh seam has come to be known as the Connellsville coke region. When Graff, Bennett & Company built Pittsburgh's first successful blast furnace in 1859, they experimented with local coke as an alternative to charcoal, but they did not achieve success until 1860, when they tried some coke made from the Pittsburgh seam in the Connellsville area. From that point until the close of the first decade of the 20th century, the Connellsville beehive coke industry experienced phenomenal growth, paralleling the expansion of the nation's iron and steel industry. Throughout that period, the Connellsville coke region accounted for more than half the nation's total. From several dozen beehive ovens in 1860, the Connellsville coke region's capacity grew to nearly 800 ovens in 1870, over 7,000 in 1880, 16,000 in 1890, about 21,000 in 1900, and peaked at nearly 40,000 ovens in 1910.

Near the beginning of this growth period, a young entrepreneur who grew up just outside Scottdale entered the coking business and quickly became its most dominant figure. Henry Clay Frick, with the help of some partners, built his first beehive ovens in 1871. During the nationwide Depression following the Panic of 1873, Frick was able to acquire several other beehive coking properties in the area, becoming the largest operator in the region with more than 1,000 of the area's 7,500 ovens in 1880. In 1882, Frick secured a major capital infusion from an investment by Andrew Carnegie and his associates. The Carnegie interests controlled most of the stock in the newly-formed H.C. Frick Coke Company but Frick continued to run the business. As the Connellsville coke industry continued to grow during the rest of the century, the H.C. Frick Coke Company expanded as well, primarily by acquiring the plants of competitors. In 1900, 21,000 ovens operated in the Connellsville region and the Frick Company controlled more than 10,000 of them. A year later, Carnegie Steel, several other large steel companies, and the H.C. Frick Coke Company merged to form U.S. Steel, with the Frick Company continuing as a corporate entity to own and operate all of U.S. Steel's Connellsville coal mines and beehive coking works. After 1903 ownership of the other merging steel companies' Connellsville coke plants was transferred to the Frick Company, who then owned almost 17,000 of the region's 28,000 ovens. Although demand for coke continued to increase, the transition to by-product coking would have a long-term impact on Connellsville's coking industry, bringing about its permanent decline.

Early in the 20th century, U.S. Steel began erecting new by-product coke ovens at its steel mills to produce not only metallurgical coke but also to capture the smoke given off by the coking process to utilize materials such as coke-gas and chemicals contained in the smoke. By the end of World War I, U.S. Steel had 768 by-product ovens at Clairton and a national total of over 3,000 by-product ovens in operation or nearing completion. With the post-war drop in demand for steel, the corporation responded as expected by curtailing production at its beehive ovens rather than its by-product ovens, because the latter represented a much

larger capital investment which U.S. Steel did not want to lie idle. Yet the demise of beehive coking in the region did not signal a demise in coal mining. Connellsville coal was still in great demand for coking, but at distant by-product works. Thus the center of mining activity shifted away from the heart of the old coke region westward across the Monongahela River, where coal could readily be shipped by barge to Clairton and other downstream users. Today the Monongahela River remains an important transportation route for coal mined in southwestern Pennsylvania.

VI. Coal & Coke Tour



USS Clairton Works
Clairton
1916

When U.S. Steel came into being in 1901, it inherited 357 by-product coking ovens at three separate plants, none of which were in the Pittsburgh area. Acting upon the 1906 recommendations of its Coke Committee, U.S. Steel decided to build 280 new by-product coking ovens at its Joliet Works and at its new Gary, Indiana, steel making complex. Yet the corporation made no plans to install by-product works at its giant complex of Pittsburgh steel mills, having built several new beehive coking plants in the Connellsville region in 1908. The situation changed radically in 1916 when U.S. Steel began construction of the Clairton by-product coke works. With 640 ovens, the new facility became the largest by-product coking facility in the nation, supplying not only coke to the Pittsburgh mills but surplus gas as well. A 40-inch, 8 mile-long pipeline linked Clairton with U.S. Steel's Duquesne steel mill, from where smaller lines conveyed gas to Homestead and Edgar Thompson. In addition to the new ovens, U.S. Steel built 550 family dwellings and 5 boarding houses for its workers. During World War I, the federal government offered incentives to steel makers to increase by-product coking capacity, and U.S. Steel added 128 ovens to its Clairton Works, making it the largest by-product works in the world. In 1919, 1672 persons worked at Clairton, keeping the plant operating 24 hours a day. By the mid-1950s, the Clairton Works had grown to 1,567 ovens, a capacity it retains to this day.

REFERENCE:

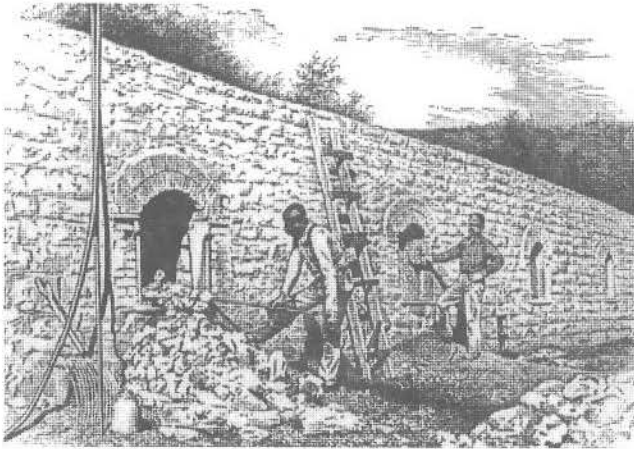
Frank F. Marquard, "Mammoth Coke Plant," *The Blast Furnace and Steel Plant* 7 (June 1919): 256-263, (July 1919): 340-342.

VI. Coal & Coke Tour



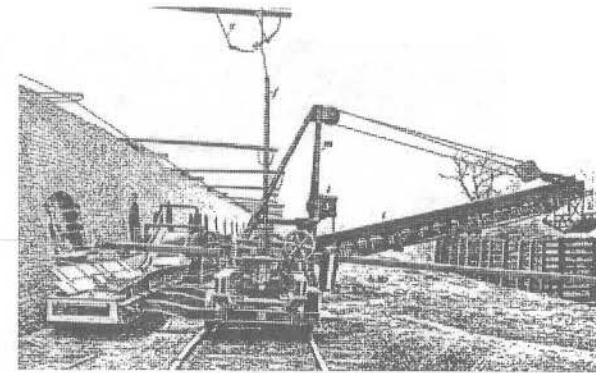
Raymond Chess Coal Company
Shoaf Pit, Fayette County
1990

This mine has been operating only about three years. Raymond Chess owns the surface and the coal in the Redstone and Sewickley seams. USX (corporate successor to U.S. Steel) owns the coal in the Pittsburgh seam and leases it to Chess. He began his mine in 1990 by digging only his own coal and a year later began extracting coal from the deeper Pittsburgh seam. Unlike some area mines, which extract coal remaining from exhausted underground mines (coal left to support the roof of the underground mine and often called "stumps and ribs"), Chess' mine extracts blocks of Pittsburgh coal which were not tapped during the era of underground mining. This mine is interesting because it will allow SIA members to see the geological configuration of coal in the Connellsville region, as the three seams are all exposed. Chess operates two draglines (one of 7-yard and one of 8-yard capacity) at the mine to remove overburden, moves and loads coal with dozers and highlifts, and hauls coal from pit to stockpile by means of two 35-ton trucks. Contractor-owned, over-the-road trucks haul coal from the stockpile to a loading facility on the Monongahela River, from where it is shipped by barge to customers. Quality of the coal from the three seams differs, so it is kept segregated so that it can be mixed at the loading facility to meet customer specifications.



Hand drawing coke at Shoaf

Shoaf Coke Works Shoaf, Fayette County 1904



Covington coke drawing machines

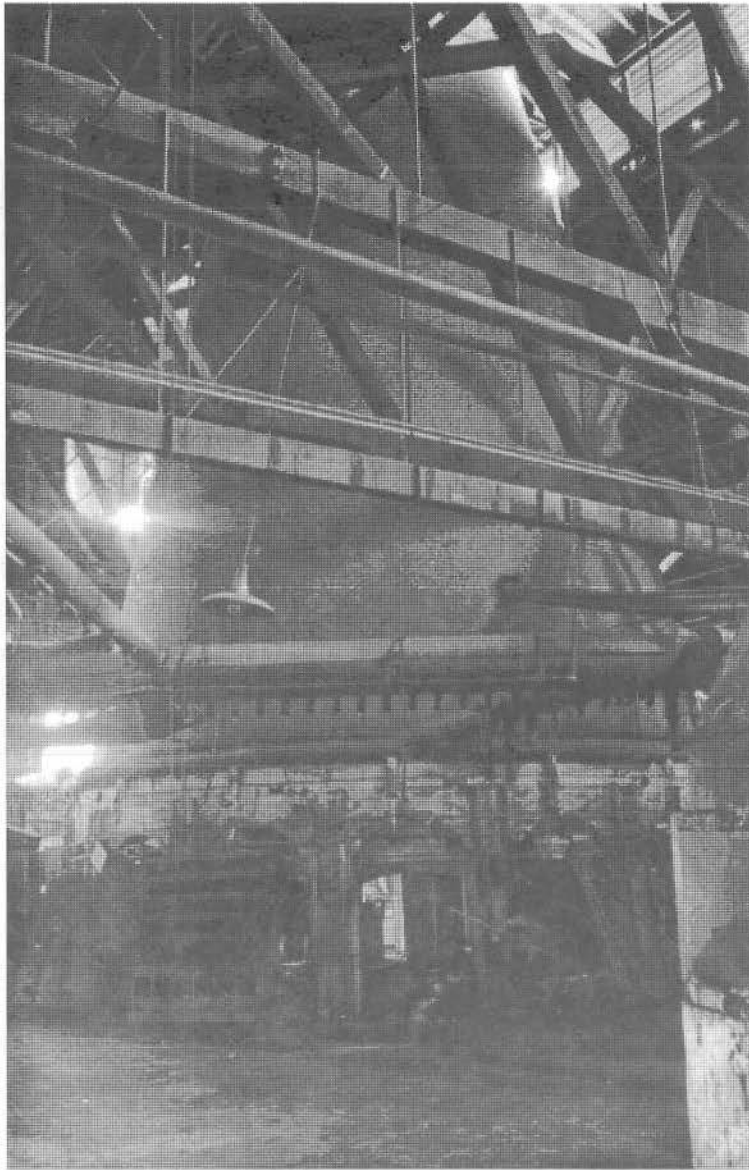
Henry Clay Frick began coking Connellsville coal near Scottdale in 1871, and his operations quickly grew into the giant H.C. Frick Coke Company, associated with Carnegie Steel. For most its history, the Frick Company increased its coke-producing capacity by purchasing the plants of other firms. That policy changed in 1904 when the company embarked on an extensive new construction program, developing the Shoaf, Bitner, and Yorkrun plants. The W.G. Wilkins Company of Pittsburgh designed all three plants for Frick, following standard 19th-century beehive-oven design and construction practices, conducive to the labor-intensive method of drawing coke from the ovens by hand. At the same time, the Frick Company was experimenting with mechanical means for extracting coke from ovens, selecting the Covington coke-drawing machine as the best suited for the region's beehive ovens. Adoption of the Covington machine obviated the need for masonry wharf walls to elevate the coke yard and facilitated the hand loading of coke into railroad cars. All subsequent Frick coking plants were built with the new configuration of ovens and railroad tracks on the same level. Thus, the Shoaf ovens represent the first of the Frick Company's 20th-century construction projects and the last of the company's ovens built according to 19th-century practices.

During World War I, by-product coking took command of the nation's supply of fuel for the steel industry, and after the war the Connellsville region's beehive coking industry went into decline. In 1926, U.S. Steel began dismantling the coke ovens at Shoaf and the facility remained idle until World War II, when several of the Connellsville region's beehive coking facilities were rehabilitated to help meet increased demand. After the Korean War, U.S. Steel again let Shoaf fall idle, selling the dilapidated facility to Max Noble in 1959. By 1965, he had rehabilitated the ovens and Shoaf was again producing beehive coke. Noble did not, however, use coal from the underground mine at Shoaf; rather, he hauled coal to the ovens from nearby surface mines he operated. Noble was forced to close the Shoaf works in 1972 for failing to meet Pennsylvania's new air quality standards, even though at the time he was experimenting with techniques that would allow him to do so. Some of his modifications to the ovens and his experimental apparatus still lie about the site.

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*16 pot glass furnace,
Westmoreland Glass Company,
Grapeville, Westmoreland County*

VII. GLASS & ROBOTICS TOUR by Richard O'Connor

Glass-making is one of western Pennsylvania's oldest and most durable manufacturing industries. In 1797, Albert Gallatin built the first factory west of the Allegheny Mountains at New Geneva, in Fayette County on the Monongahela River, while the founding of the Craig & O'Hara glass works later that year brought the industry to Pittsburgh, where it flourished throughout the nineteenth and twentieth centuries by virtue of its extensive transportation network and vast deposits of natural gas and coal. Indeed, as the twentieth century dawned, western Pennsylvania produced nearly forty percent of all domestically-made glass and had become the industry's corporate and manufacturing center.

Firms in the region produced glass of all types - containers, tableware, window and plate. In the industry's early years, manufacturers and artisans produced everything from whiskey bottles to windows in the same factories, satisfying growing demand for necessities on the trans-Appalachian frontier. As western population and markets grew, firms increasingly specialized in one type of glass or another. In the post-Civil War period, the region became the center of the nation's window and plate glass industries, and maintained a strong presence in tableware and containers as well.

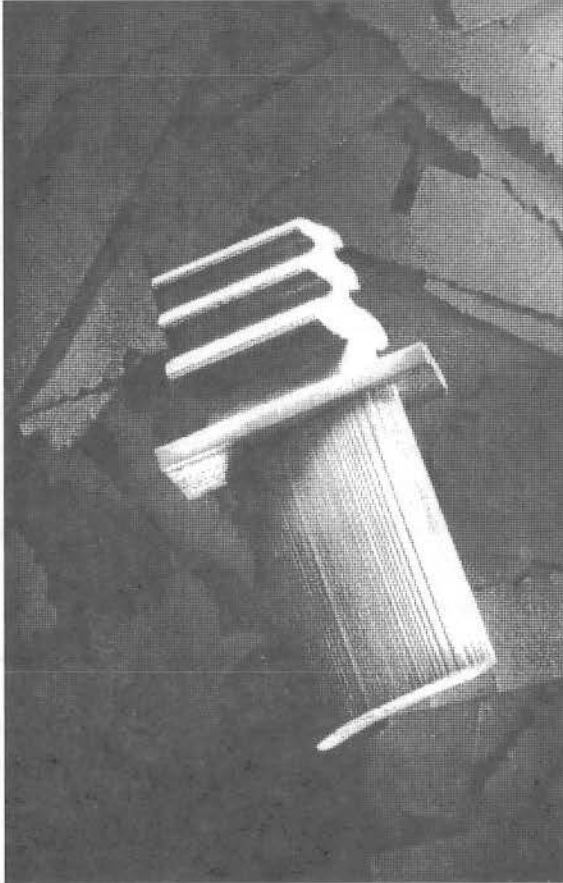
Many innovations that transformed glass production techniques originated in the Pittsburgh region. In the early 1870s, Jonathan Haley developed a mechanical, belt-driven press for tableware and containers that was adopted throughout the industry. At the Atlas Glass Works (later Hazel-Atlas) in Washington, Pa., George Beatty introduced the first jar making machinery in 1896, soon to be followed by the United States Glass Company and by the industry's largest firm - the Ball Brothers Company at Muncie, Indiana. A later generation of Pittsburgh glass mechanic Philip Arbogast's 1881 "combination pressing and blowing device," the Beatty machine finally allowed the entire article to be pressed and blown successively in the same mold. In 1904 John Lubbers, a veteran Pittsburgh-area window glass flattener, developed machinery to mechanically draw glass cylinders, displacing skilled blowers

and gatherers who were among the highest paid and most autonomous craftsmen in American industry. From its founding in the mid-1880s, industry giant Pittsburgh Plate Glass pioneered numerous innovations in plate glass production, and in the early 1960s was the first United States manufacturer to employ the float process for production of flat glass.

Although the glass industry has declined in western Pennsylvania since its peak just prior to World War I, PPG still maintains several plate glass operations in the region, including its Meadville plant. The plant of GGI in Jeannette employs the only Fourcault sheet drawing operations left in North America (state of the art technology in 1920). Moreover, the tableware and specialty glass industries continue to flourish in neighboring West Virginia.

REFERENCES:

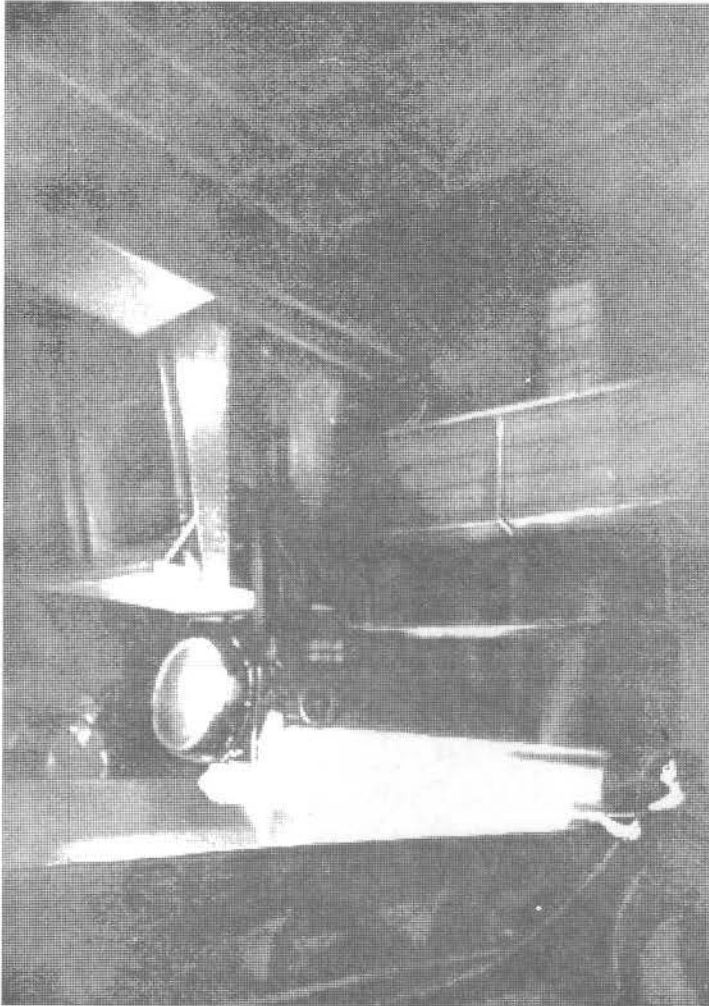
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Engineering Design Research Center 1200 Hamburg Hall (formerly Bureau of Mines Building) Carnegie-Mellon University

The Engineering Design Research Center, an Engineering Research Center awarded to Carnegie Mellon University by the National Science Foundation in 1986, performs basic research and education in the interdisciplinary field of engineering design. The Center's vision is that a scientific basis for design, based on a collection of computer based methodologies, will improve design practice. In that vein, the Center pursues interdisciplinary research, education, and industrial collaboration with a campus community of faculty, students, and staff totaling 100 people and over 40 industrial members. Within the university, EDRC integrates the expertise of more than ten disciplines in the schools of engineering, computer science, fine arts, industrial administration, and humanities to create design methodologies which utilize the latest technological advances in computing and communications.

VII. Glass Tour



Casting plate glass at PPG in the early 20th century.

PPG-Meadville Plant Meadville, Crawford County

In 1880, Civil War-era riverboat builder and operator Captain John Baptiste Ford erected the first commercially successful plate glass plant in America at Creighton, Pennsylvania, across the Allegheny River from Tarentum, approximately twenty miles upriver from Pittsburgh. Ford was attracted to western Pennsylvania's ample deposits of natural gas, coal, sand, limestone, and other minerals; its abundant river and rail transportation; and the proximity of Pittsburgh to western markets and national distribution facilities. In 1883, the company changed its name to Pittsburgh Plate Glass when the Pitcairn family- long associated with the Pennsylvania Railroad-joined the business.

Ford took advantage of the best methods and techniques of European glass makers. He imported highly skilled grinders and polishers from the Pilkington factory in England, built the largest and technologically most-sophisticated glass plants in America, and developed complex and extensive marketing strategies to sell the unique qualities of plate glass to a relatively skeptical buying public. After he departed in the 1890s, Pittsburgh Plate Glass continued to lead the industry in technological and marketing innovations.

PPG's Meadville plant, a relatively new facility, employs the float process to manufacture flat glass. The first American glass maker to utilize the process, PPG licensed the technology from Pilkington Brothers of St. Helens, England, in the early 1960s. The float glass process produces glass with the clarity and distortion-free qualities of traditional plate glass, but without the grinding and polishing required under that process.



Allegheny River bridges in 1924, just prior to the construction of the Three Sisters.

VIII. LOWER ALLEGHENY RIVER VALLEY TOUR

by Christine E. Davis

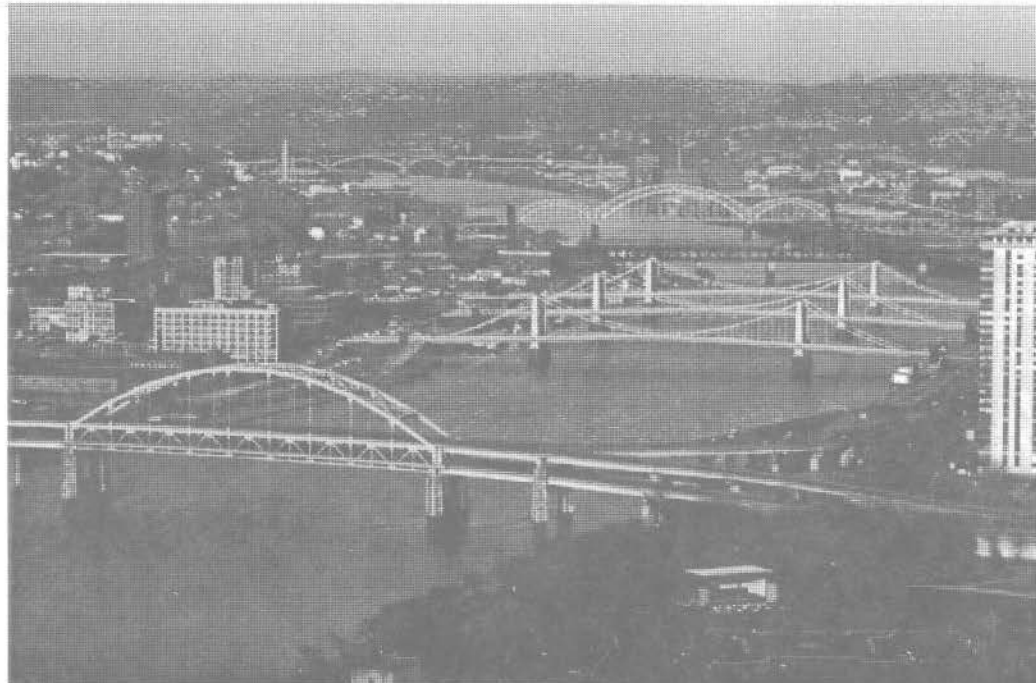
The Lower Allegheny River Valley saw the birth and development of several significant and internationally recognized Pittsburgh industries. In the early 19th century, the Pennsylvania Main Line Canal stimulated industrial development when improved riverine navigation from the Kiskimintas River to the city opened eastern trade routes. By the mid to late 19th century the river was flanked by the Pennsylvania Railroad and the Allegheny Valley Railroad, further improving transportation links. In the 1880s and early 1890s, the lower Allegheny River was internationally known as one of the finest rowing districts in the nation. Spectators lined the river banks and rode the spectator trains along both river shores to view the racing events. By 1895, the sport ceased amid a series of betting scandals.

The 1920s marked an era of innovative bridge construction throughout Allegheny County. During this period the Allegheny County Department of Public Works constructed the Sixth, Seventh, and Ninth Street Bridges

("the Three Sisters"), as well as the 16th, 31st, and 33rd Street Bridges over the Allegheny River. The Pittsburgh Municipal Art Commission determined the self-anchored suspension design of the Three Sisters.

Charles S. Davis designed the Washington Crossing Bridge at 40th Street which opened on December 24, 1924 on the 171st anniversary of George Washington's crossing of the Allegheny River at Herr's Island.

Prominent industries dominated the Allegheny River Valley including Heinz, Pittsburgh Plate Glass (PPG), and Alcoa, all of whom established state-of-the-art plants along the river. The oil, steel, and bituminous coal industries flourished. Yet, as the region's polluted rivers spawned deadly typhoid germs, solutions to the city's disastrous epidemics were founded in the Allegheny Valley through an innovative water filtration system. Today, the environmental philosophy of Rachel Carson and the recent designation of the Allegheny River as a Wild and Scenic River remain a stark contrast to the once-industrialized valley.



VIII. Allegheny Tour

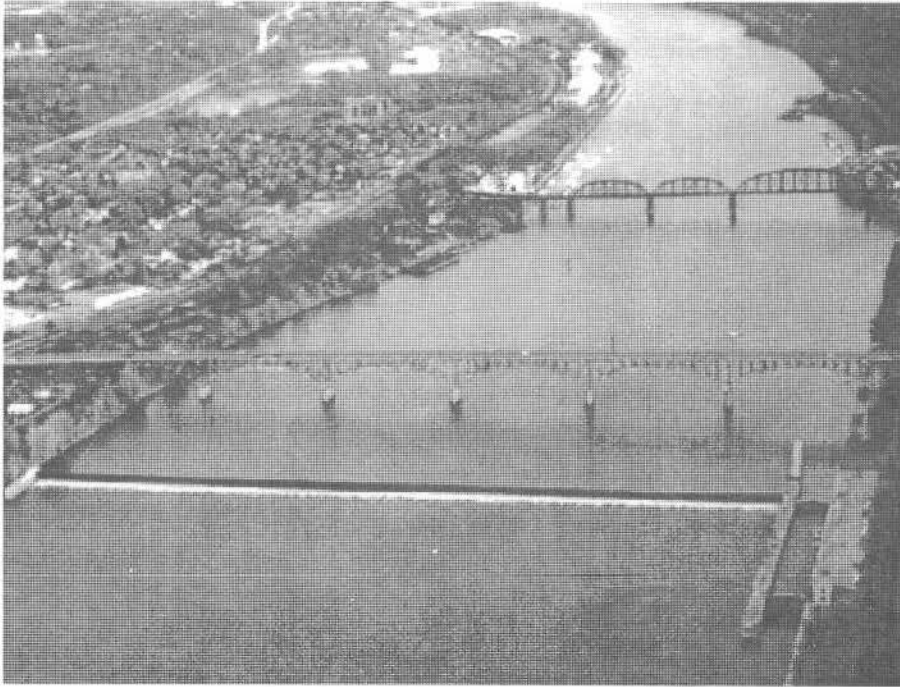


City of Pittsburgh's Water Filtration System Old Route 28, Aspinwall Allegheny River Blvd. 1905; 1913

In response to a series of typhoid fever epidemics at the turn of the century, Pittsburgh's increasingly unhealthy water system was replaced with a state-of-the-art filtration system. The polluted river water was filtered through intake and pumping stations constructed in the early twentieth century. The Ross Pumping Station, a Beaux Arts building of Roman brick and gray/brown sandstone, was constructed near the filtration beds. The station at Aspinwall, built in 1913, was designed in the Italian Villa style by Thomas H. Scott. From this station, water was distributed to the Lanpher Reservoir.

Associated with the pumping stations were large filtration beds constructed of cast concrete with adjacent receiving basins. Before the filtration beds were emplaced in 1905, the entire terrace was excavated to a uniform depth of approximately 13 feet below ground surface. A complex system of concrete piers and galvanized iron was formed within the excavated terrace. By-pass conduits were placed inside these galleries of concrete, iron, and filtered sand. The filtration plant galleries were then covered. After the filtration plant became obsolete, St. Margaret's Hospital was constructed on a segment of the site.

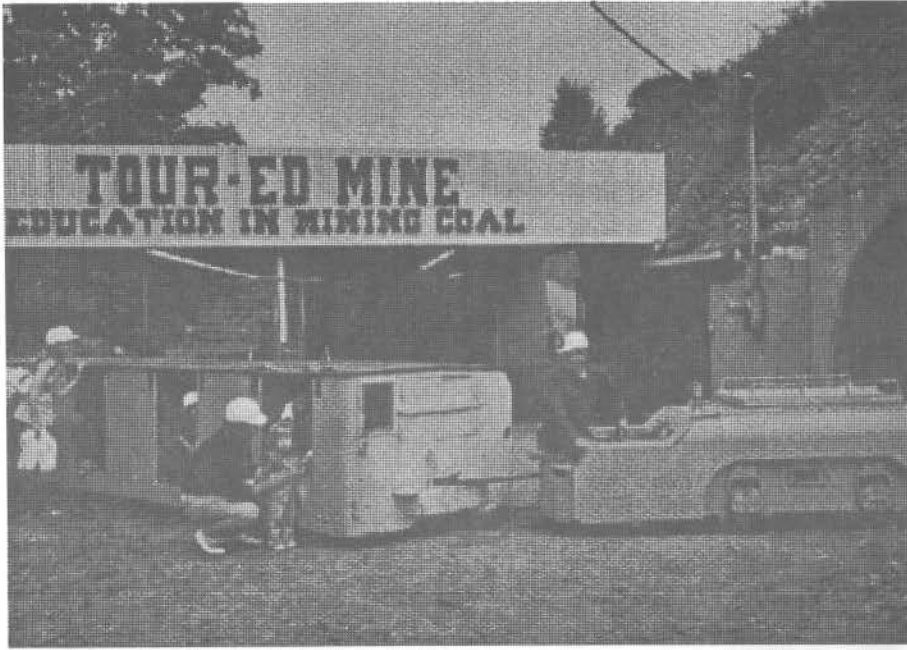
VIII. Allegheny Tour



Allegheny River Lock &
Dam No. 2
1898; 1934

The Lock and Dam No.2 navigation facilities on the Allegheny River consist of single lock chambers and a fixed crest dam. The original locks were constructed from 1898 to 1908 and were replaced in 1934 after a three-year construction period. Two concrete lock chambers admit an average of 10 commercial loads and 400-800 pleasure boats per day during the summer. Today, the principal commodities transported on the river are bituminous coal and gravel.

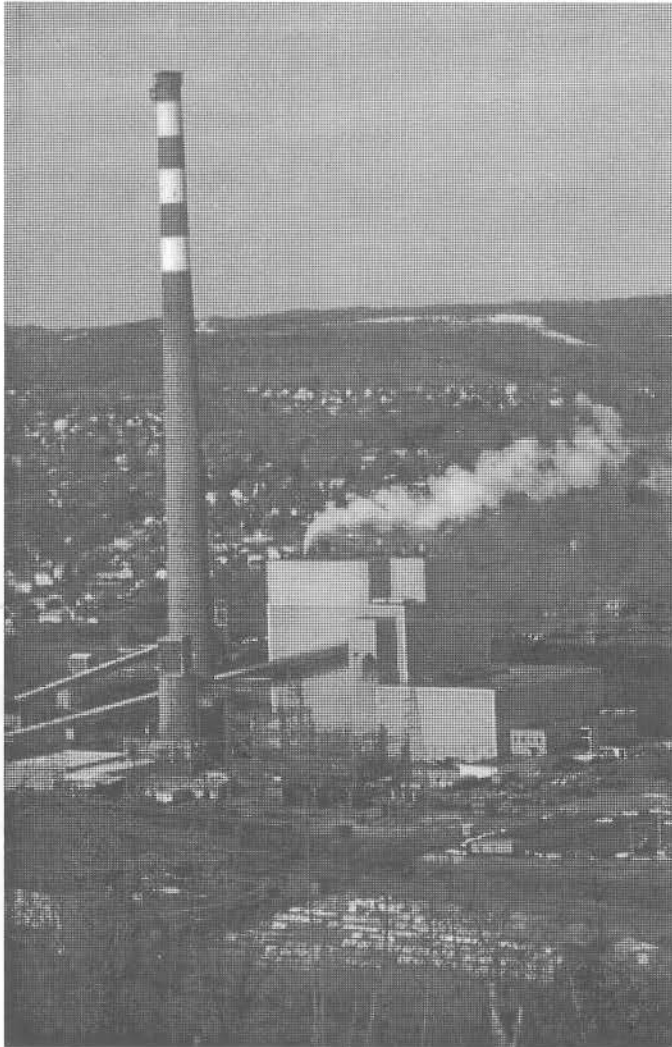
VIII. Allegheny Tour



Tour-Ed Mine and Museum
Tarentum

The Tour-Ed Mine maintains a historic bituminous coal mine and museum for educational purposes. The mine tour includes a locomotive ride into the original mine, a demonstration of the continuous miner, the shaker conveyor, the installation of roof bolts, and a brief history of bituminous mining. A company store, company house, saw mill, mining museum, and a modern strip mining operation are tour components.

VIII. Allegheny Tour



Duquesne Light Company-Cheswick Power Station Freeport Rd., Cheswick 1918; 1972

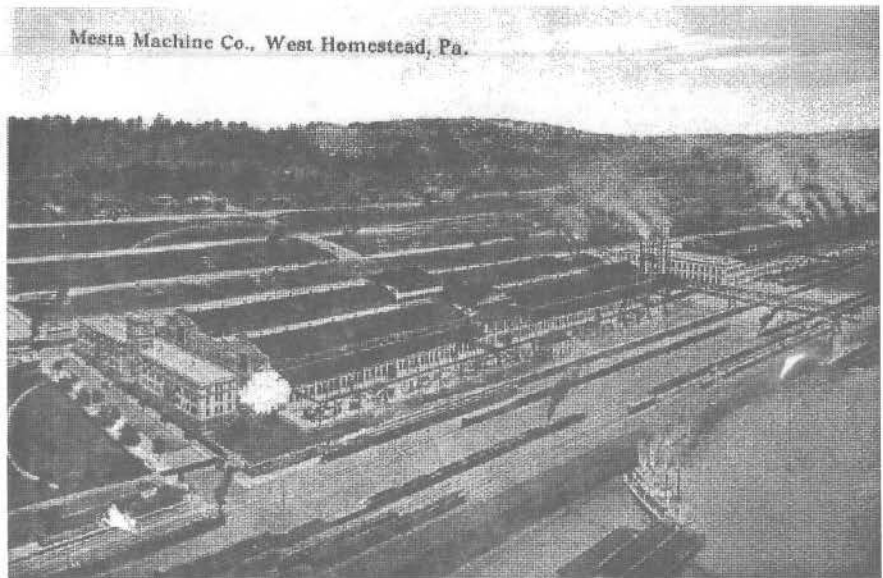
The Cheswick Power Station replaced the original Colfax Plant located on the river. The new station with its 750-foot smoke stack, is a 570,000-kilowatt, coal-fired, electric generating plant. State-of-the-art environmental control equipment has been installed in the plant.

The Colfax Plant was one of the many industrial landmarks along the Allegheny Valley corridor that were part of Rachel Carson's environment before she composed her seminal work *Silent Spring* in 1962. Carson resided in a vernacular frame farmhouse constructed in 1840 above the Allegheny River at the adjacent river town of Springdale. The building is now listed on the National Register of Historic Places and serves as a community museum.



The Jones & Laughlin Works once creating a dramatic silhouette against the downtown skyline, today this site is all but leveled.

A major supplier for the industry, the Mesta Machine Company built a complete line of heavy machinery for steel making. These buildings remain for light industrial use, while part of the site has been redeveloped as a water slide park called Sand Castle.



IX. MONONGAHELA RIVER BOAT TOUR by Christopher H. Marston

The Sunday boat tour begins in the heart of downtown Pittsburgh and floats up the Monongahela River, under twenty bridges and past the remains of the once-dominant iron and steel industry. Starting at the "Forks of the Ohio," the tour continues along the modern towers of downtown Pittsburgh, where parking lots and expressways have replaced the once-busy Monongahela wharf area. After passing the restored P&LE Railroad station, the route crosses under the Smithfield Street Bridge, Gustav Lindenthal's masterpiece of 1883, and the oldest extant steel truss bridge in the country. These surviving landmarks contrast with the landscape just beyond the downtown bridges: the vacant flat land of the former Jones & Laughlin Steel Works, now being converted into a future computer technology center on the north shore. One J&L legacy continues to thrive, however: LTV's by-product coke plant in Hazelwood. As the tour continues upriver and beyond the city limits, it encounters the lands where the behemoth mills of Carnegie and USS once stretched.

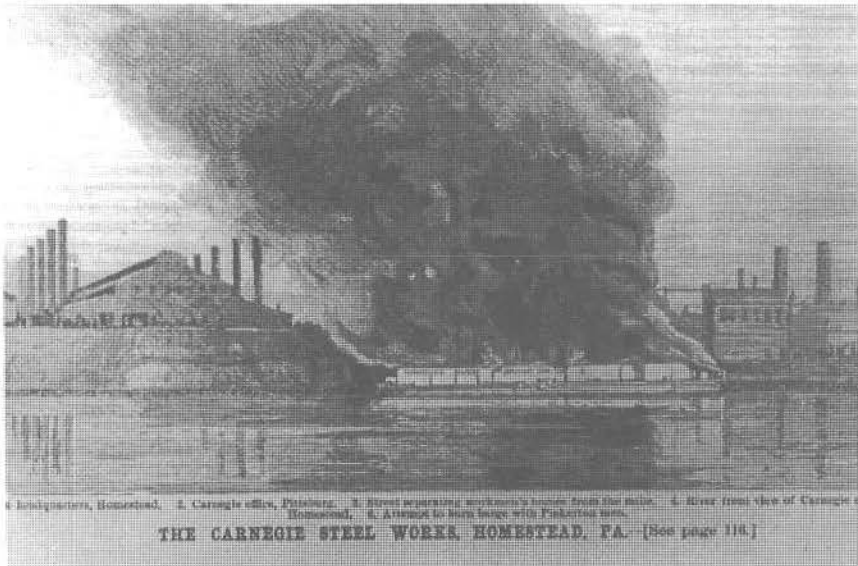
Besides surveying the iron and steel industry, the tour will explore Pittsburgh's contribution to advancements in transportation. Until the 1920s, rail and trolley lines were the dominant form of transportation, and bridges were built for this purpose while connecting the region. In the 1920s and 1930s Allegheny County began a major highway bridge building campaign, automobiles, including two tunnels to connect commuters to downtown. Four railroads served the valley and their bridges and right-of-ways still bound the river on both sides. But it is the mills which dominate the scene as one leaves the city; although the J&L Works are leveled, the coke plants of Hazelwood and Clairton survive. Homestead, Duquesne, and McKeesport are all shadows of their former selves, while at Edgar Thomson, the oldest of Carnegie's legacy, a new continuous caster has been recently added. Another curious contradiction is seen in the topography. While industry has taken over all the flat land by the river, it is not

uncommon to see a hillside of untouched woodland on the other side. After the long stretch of seemingly endless industrial sites, the tour ends at bucolic Elizabeth, PA, an 18th century settlement renowned as an antebellum boat building center.

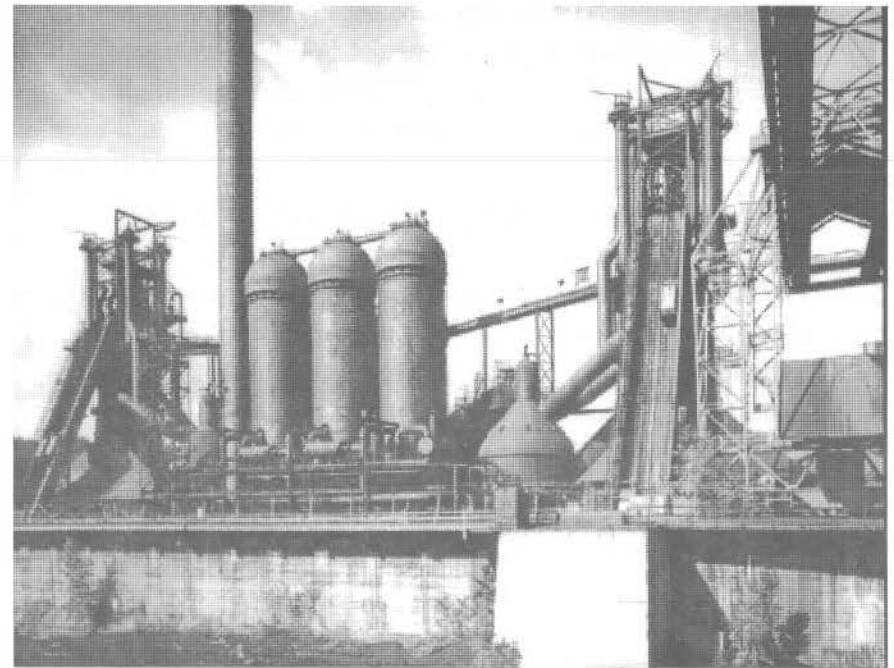
The Monongahela Valley epitomizes the legacy of the iron and steel industry in the Pittsburgh region. The boat tour will give SIAers a first-hand look at the remaining artifacts that made up the huge and complex infrastructure which served this once-dominant industry. It will also give participants the vantage-point of the barge captain, navigating through the myriad of bridges spanning the river. The following photos bring to life some of the industrial plants in their heyday, when Pittsburgh was truly the "Steel City."



The *Samuel Clark* and *Jim Wood* await high water at the Point, late 19th century.

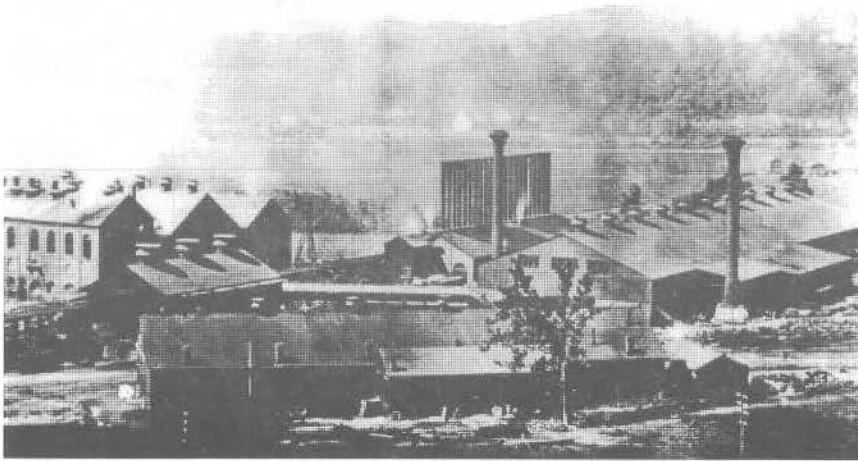


The Pump House and Water Tower at the Homestead Works remain to signify the location of the Pinkerton Barge Landing during the Homestead Lockout of 1892.

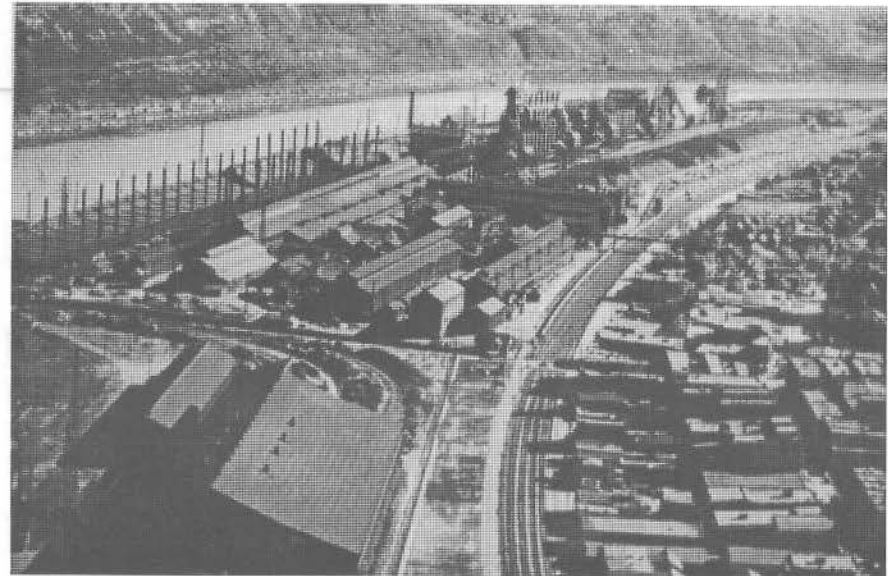


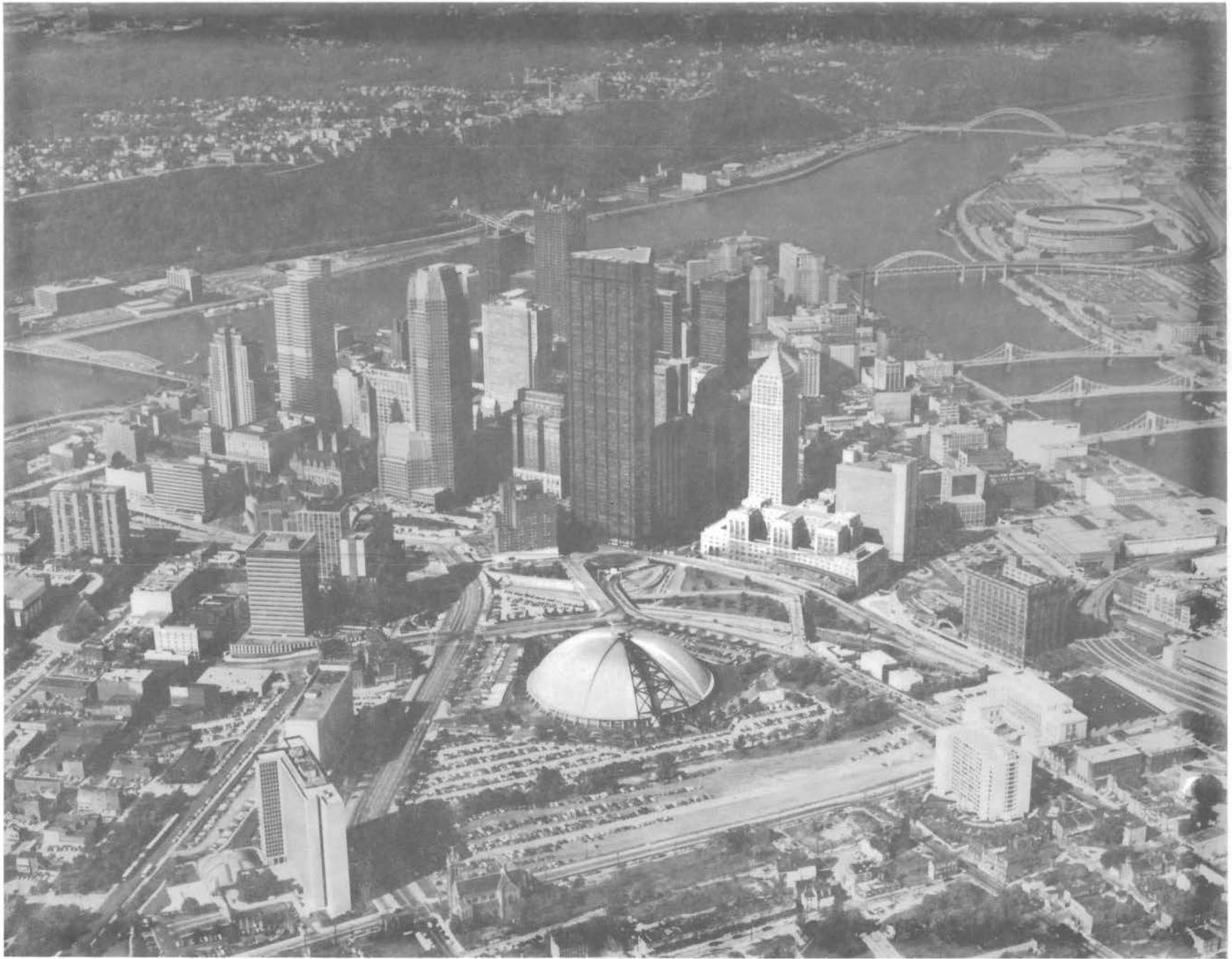
Across the river from Homestead, the Carrie Furnaces still stand, awaiting conversion into a steel heritage museum.

The Edgar Thomson Works has undergone many changes since 1875, the latest being the addition of the Continuous Caster, which will keep it competitive into the twenty first century.



The Duquesne Works, home of "the Duquesne Revolution" in blast furnace technology, is being redeveloped as an industrial park.





X. PITTSBURGH WALKING TOUR by Walter C. Kidney

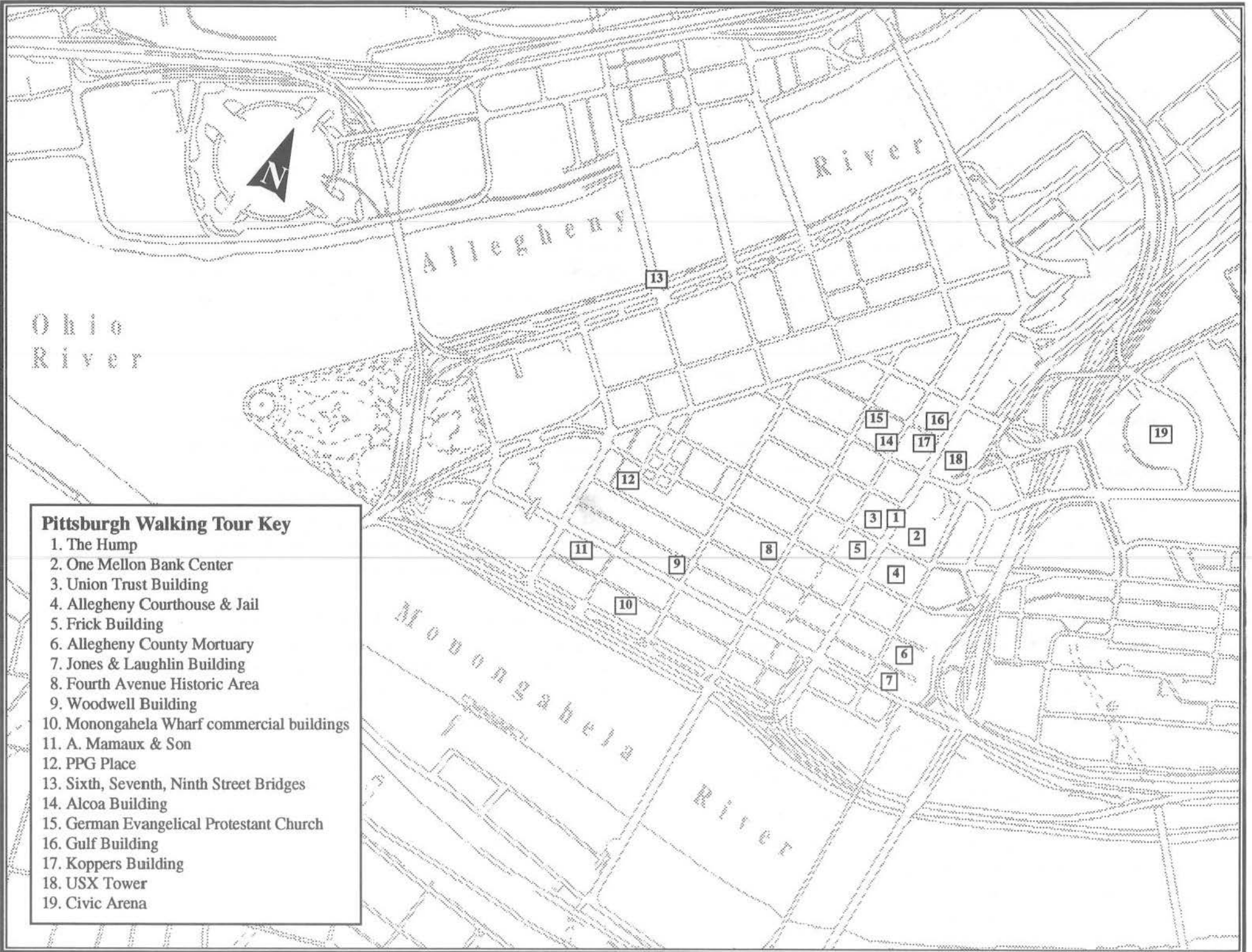
This tour explores the original Pittsburgh, the so-called Golden Triangle of Modern times. On the surface, signs of the industrial past are rare. The outlet of Suke's Run at the Monongahela, where Benjamin Latrobe built steamboats for Robert Fulton, Charles Dickens alighted from a canal boat, and the Westinghouse airbrake had its first emergency application, is now yard area for the Port Authority light-rail line. Where James Rees & Sons built metal-hulled steamers for Latin America, Africa, and even for a run between Siberia and Mongolia, a television studio now stands. One of our rare cast-iron fronts bears the mark of the Anderson & Phillips Foundry, formerly where the approaches of the Fort Pitt Bridge now converge. The steep slope of the Monongahela Wharf, where the packets tied up and the coal fleets awaited a rise of water, is now cut away, leveled off, and concreted over.

What remains to us are the commercial buildings of the past, the banks that thrived on the financing of industry, and industry's headquarter buildings. For the most part, these do not speak directly of industry; they could house insurance businesses as readily as an industrial corporation. But they are proud buildings all the same, and some of their concealed technology is of interest.

The history of any city is inexhaustible in its detail, and we offer it in the most skeletal way. Here, if anywhere, geography has been destiny. Thanks to 300 million years of changing geological circumstances, the Pittsburgh area captured from the French in 1758 found itself divided from its capital of Philadelphia by mountains, with a river system flowing west and south, and in possession of fantastic amounts of bituminous coal. A chain of events - the surveying of the Northwest Territory beginning in 1788, the pacifying of the Indians in 1794, the Louisiana Purchase in 1803 - led to a massive westward

emigration from and past Pittsburgh in flatboats, drifting in the spring thaws to new pioneer homes. Pittsburgh industry grew to supply emigrant needs, and also to process goods for its own use as our population grew. It built boats and machinery, forged and cast the iron from country charcoal furnaces, made utilitarian and fancy glass. In 1811, the departure of the *New Orleans* from Pittsburgh introduced steam navigation to western rivers. In 1852 the first trains ran out of Pittsburgh, east and west, replacing the old canal-rail system of 1834 across Pennsylvania. In 1854, the first oil refinery in America if not the world began operation at the same intersection where the Gulf Building was later erected. In 1859 the first successful coke-fueled blast furnace in the immediate area, the Clinton Furnace, went into blast across the Monongahela River from town. In 1875, Andrew Carnegie opened his Edgar Thomson Works, a Bessemer rail plant eleven miles up the Monongahela at Braddock, introducing high-tonnage steel to the area. In 1888 the Pittsburgh Reduction Company, now Alcoa, was incorporated.

Through such dates the history of a city like this is seemingly outlined. This, of course, is quite inadequate. It says nothing of culture, recreation, ordinary living these two centuries and a half. It speaks to the present occasion, however.



Pittsburgh Walking Tour Key

- 1. The Hump
- 2. One Mellon Bank Center
- 3. Union Trust Building
- 4. Allegheny Courthouse & Jail
- 5. Frick Building
- 6. Allegheny County Mortuary
- 7. Jones & Laughlin Building
- 8. Fourth Avenue Historic Area
- 9. Woodwell Building
- 10. Monongahela Wharf commercial buildings
- 11. A. Marnaux & Son
- 12. PPG Place
- 13. Sixth, Seventh, Ninth Street Bridges
- 14. Alcoa Building
- 15. German Evangelical Protestant Church
- 16. Gulf Building
- 17. Koppers Building
- 18. USX Tower
- 19. Civic Arena

X. Pittsburgh Walking Tour



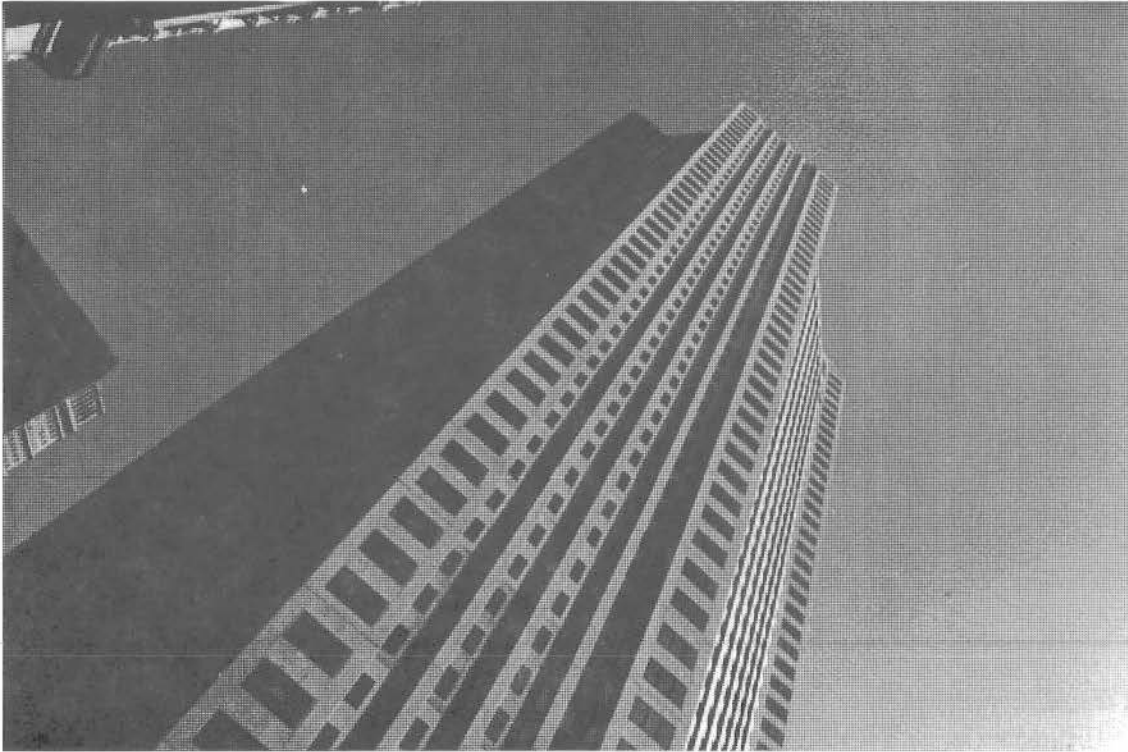
The Hump
Vicinity of Grant & Fifth St.
1911

The area between the Courthouse and the Frick Building across Grant Street is much lower than when these buildings were originally constructed. The cubical plinths on which the Courthouse lions sit rested on the steps up from the sidewalk, about six feet below. The plinths on which the architrave of the Frick Building entrance rests seem rather to float now, but used to be at pavement level. Attacks on the Grant's Hill Hump had already been made before 1837 and twice afterwards, but in 1911 the job was undertaken in earnest to ease the climb from the west. In places the Hump came down sixty feet. A plaque on the Fifth Avenue end of the Frick Building indicates the slope as it was before 1911.

REFERENCE:

Walter C. Kidney, *Landmark Architecture: Pittsburgh and Allegheny County*, Pittsburgh History and Landmarks Foundation, 1985.

X. Pittsburgh Walking Tour



One Mellon Bank Center
Grant St. & Fifth Ave.
Welton Becket Associates, architects
1984

One Mellon Bank Center required tactful design, since H. H. Richardson's Court House stood alongside and its 325-foot tower would look small against the new building's 724-foot rise. Whatever its aesthetic success, its tower has engineering interest in its tubular construction, consisting of wide-flange and spandrel beams, stiffened with stressed-skin steel plating that serves as the exterior. This skyscraper serves as the modern headquarters to the Mellon banking empire. It began in 1869 as T. Mellon & Sons Bank, a private enterprise of the recently-retired judge Thomas Mellon. Henry Clay Frick, then a coke maker, was an early and eventually important industrial client. His sons, Andrew W. and Richard B. Mellon, took over the bank in the 1880s and became financiers to the Pittsburgh Reduction Company (Alcoa), various steel companies, Gulf Oil, the Koppers Company, and the "Combine" that had a near-monopoly on coal mining and river shipping in this area.

X. Pittsburgh Walking Tour



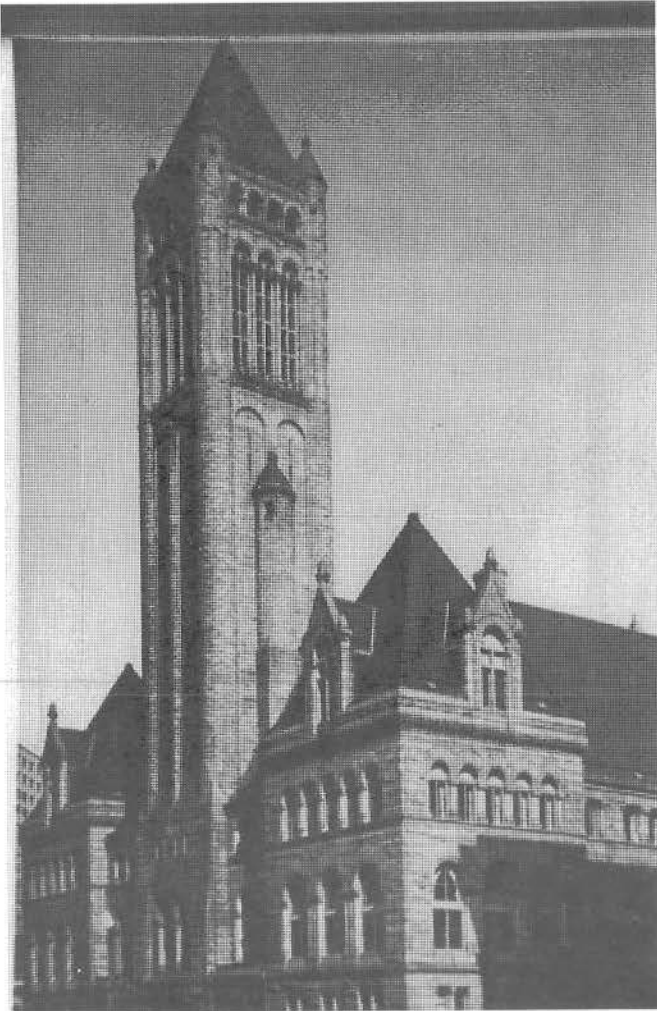
Union Trust Building
Grant St. & Fifth Ave.
Frederick Osterling, architect
1915-17

The Union Arcade was a speculation of industrialist Henry Clay Frick, whose headquarters building was next door. The commercial arcade of the four lower floors - the space was filled in long ago - had 240 shops, and there were 760 offices above. Construction was extraordinarily strong, intended for loads of 150 pounds per square foot. The wall piers are stone and the whole roof and dormer system above is terra cotta. Despite its many thousands of pieces and recent restoration, this precarious system of delicately-wrought baked mud hanging from steelwork has held up surprisingly well.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Allegheny County Courthouse & Jail (Allegheny County Buildings)

Grant & Ross St. between Fifth & Forbes Ave.

Henry Hobson Richardson, architect

1888; numerous alterations

The Allegheny County Buildings are among the largest and greatest works of an outstanding American architect, H. H. Richardson. The Courthouse was one of the most-imitated public buildings of its time, and has a tower of timeless beauty. (Originally, the tower was rationalized, partly as an archival stack but also as the air intake for a primitive air-conditioning system that probably was never installed.) The Jail is known internationally as an outstanding piece of proto-modern architecture. The buildings are faced in granite with brick backup masonry, as the coursing on the Courthouse facade implies. Construction was conventional for the time: masonry walls, brick segmental vaults on rolled iron joists, riveted iron box girders for wide spans, limestone arches and vaults in the grand-stair case in the front. The Jail is connected to the Courthouse by an enclosed "Bridge of Sighs." It has an octagonal tower serving as a central guard post from which, first three, later four, cell blocks radiate.

The Courthouse has had spaces filled in, and the lowering of the Hump and the subsequent widening of Grant Street have forced its main entrances to basement level, requiring new architectural treatment in the 1920s. The Jail was enlarged somewhat in 1904, preserving the original architectural detailing.

REFERENCES:

Kidney, *Landmark Architecture*.

James D. Van Trump, *Majesty of the Law*, Pittsburgh History and Landmarks Foundation, 1988.

X. Pittsburgh Walking Tour



The Frick (L) towering over the Carnegie Building (R).

Frick Building

Grant St. & Fifth Ave.

D.H. Burnham & Co., architects

1901-2

This, the headquarters of Coke King Henry Clay Frick, was constructed where it would overshadow and almost hide the Carnegie Building, an act of spite against Frick's former partner. Its pale-gray granite is smoother than that of the older Courthouse across the street, and reflects a design attitude new in Pittsburgh at the time: to ignore the notorious soot, use light and washable facings like granite, glazed brick, and terra cotta rather than accepting blackness as inevitable. The building lobby as it is now, is the result of the lowering of the Hump: the marble ceiling stayed in place but the floor came down, giving the bronze entrance lions a raised position and skying John LaFarge's *Fortune on Her Wheel* window facing the front entrance. Originally, the basement had a generating plant and hydraulic-elevator machinery, and all toilets were on the tenth floor. The lobby still has bronze phone booths with an operator's enclosure between each pair. The interior's white marble with occasional bursts of molded bronze are very Pittsburgh in feeling: quietly, cold-bloodedly sumptuous.

REFERENCES:

Kidney, *Landmark Architecture*.

Toker, *Pittsburgh*.

X. Pittsburgh Walking Tour



Allegheny County Mortuary
604 Fourth Ave.
Frederick Osterling, architect
1901

The Mortuary in its original location behind South School.

This clumsy pastiche of H. H. Richardson's County Buildings is of interest because it was moved one block downhill by rail in the late 1920s to make way for the County Office Building. It was formerly across Forbes Avenue from the Jail. The doorway arch imitates the rear archway of the Courthouse, even to the gnashing monsters on the impost blocks that suggest the Conqueror Worm. The dormers more or less imitate those of the Courthouse. The stumpy tower is like that that overlooks the bridge to the Jail. Although Osterling pleased the architectural community by extending Richardson's Jail with a faithful copy of its details, he then enraged the public by proposing to heighten the Courthouse by two stories, which was fortunately never carried out.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Jones & Laughlin Building (now John P. Robin Civic Building)

200 Ross St.

MacClure & Spahr, architects

1907

This building was built as headquarters for the Jones & Laughlin Steel Company, whose Pittsburgh Works began a mile and a half up the Monongahela and stretched on for three and a half miles. J & L, like many such iron and steel operations in the 19th century, was a gradual cementation of small fragments. B. F. Jones set up a second-hand rolling mill in 1850 next to the puddling furnaces of Bernard and James Lauth on the South Side. After first smelting charcoal, the newly coke-fired Soho Furnace across the river together with James Laughlin's Eliza Furnaces both supplied smelted iron for the puddling furnaces. Bessemer steel production began in 1886 and open-hearth in 1895, but it was only in 1900 that everything was under a single management. In 1979 the last of the Eliza Furnaces was blown out, and all were demolished by the end of 1983. The South Side Works, where J & L began, was officially closed in 1987.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Pittsburgh's Wall Street in 1904

4th Avenue Historic District

between Wood & Market Sts.

MacClure & Spahr, Alden & Harlow,
F.J. Osterling, etc., architects

This has been largely a street of financial institutions for a century and a half. The oldest of these today is the Burke Building, next to PPG Place, a Greek Revival structure from 1836. The next oldest is the the Italianate Dollar Bank of 1870, close to Smithfield Street. The latest is the Integra Bank building of 1906 at Wood Street. Although the Mellon Bank, strongly associated with Alcoa and Gulf Oil, is two blocks away, Fourth Avenue's institutions profited at least indirectly from industry, and at one time the Petroleum Stock and Metal Exchange was here. The Integra Bank building bears an explanatory National Register Plaque.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Moving Captain Brown's house.



Woodwell building in its present location.

Woodwell Building

205 Wood St.

John Eichleay, Jr. Company, engineer
1907; moved 1921

The John Eichleay, Jr. Company was famous for its ability to move very large, heavy, and often frail objects safely. When the large wooden packet *Virginia* was deposited in a cornfield by a falling flood, Eichleay brought it back to the river's edge (not into the river; another flood did that). When Charles Schwab decided to have his big frame country house on the other side of an orchard, Eichleay lifted it 37 feet over the treetops. When Captain Brown's 24-room house got in the way of the B & O Railroad line, Eichleay lifted it 160 feet to the top of a bluff. When Second Avenue was being widened in 1921 to form the Boulevard of the Allies, the 8-story, steel-framed Woodwell Building was lifted by Eichleay and moved 40 feet to the north; normal business continued.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Monongahela Wharf
commercial buildings
(First Side)
between Wood & Market Sts.
ca. 1850-1890

These few buildings are left from the original Water Street, which almost entirely burned in the Fire of 1845. There is a rough chronological ascension from west to east on the block. The Conestoga Building at Fort Pitt Boulevard and Wood Street is probably the latest, dating from 1890. The Monongahela Wharf, until the late 1930s, was a steep, paved embankment, with a 15% gradient. The wharf served as the rallying-point for packets headed in both directions: up the Monongahela as far as Brownsville 56 miles away, down the Ohio to the Falls of Louisville or all the way to New Orleans, 1,852 miles down the Mississippi. Across the river, the coal boats waited for favorably high water. This could be a long wait, since in late summer the Ohio could be waded. Beginning in 1885 the Ohio was dammed in places, and was completely canalized in 1929. The Pittsburgh Pool is 710 feet above sea level.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



A. Mamaux & Son
121 First Ave.
ca. 1870

This is one of the few surviving downtown Mid-Victorian commercial fronts; the front on the Boulevard of the Allies is 1930s Modernistic light brick with a broad window, more appropriate to showing off Mamaux' stock of flags and bunting. The Italianate lintels of the First Avenue front appear to be of cast-iron, but the brickwork around them reveals a paradox of the Victorian "Iron City." Though Pittsburgh had made its reputation from making iron, the cast-iron front was more readily to be found in the commercial districts of New York, Philadelphia, or even Portland, Oregon, than here. In fact around the 1870s four *wooden* bridges still crossed the Allegheny River. However, Andrew Carnegie's new bessemer works at Edgar Thomson began the revolution to steel.

X. Pittsburgh Walking Tour



PPG Place

Market Square

John Burgee with Philip Johnson, architects

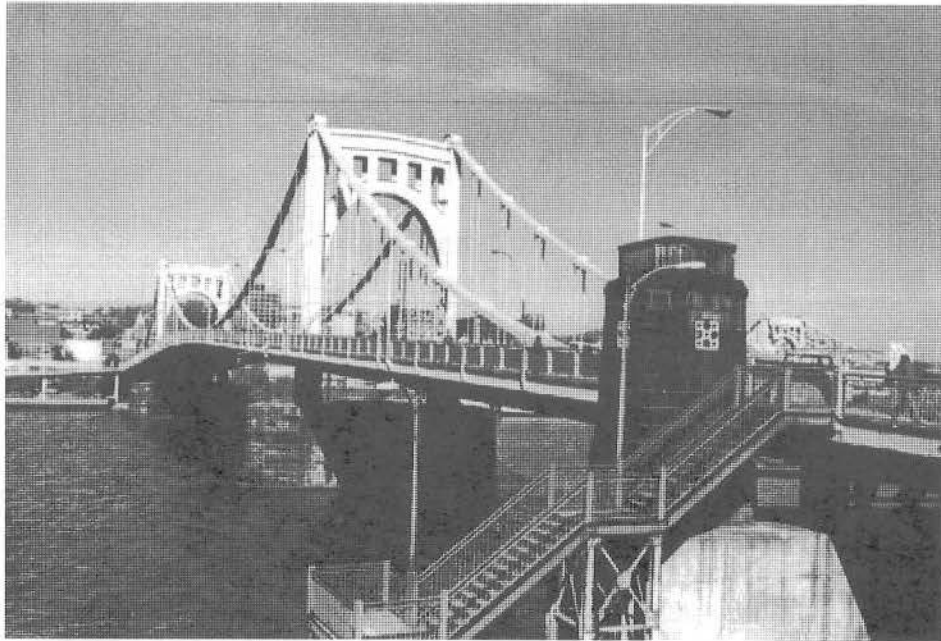
1979-84

The new headquarters of the Pittsburgh Plate Glass Corporation is yet another manufacturer advertising their product, in this case plate glass, namely PPG neutral-silver Solarban 550-20(2). The main tower of the six-building group is 680 feet high. There are 231 pinnacles in all. PPG credits itself as the first successful plate glass maker in America. The New York City Plate Glass Company of 1880 became the Pittsburgh Plate Glass Company in 1883. It actually moved its headquarters to Pittsburgh in 1895, at which time it was making 20,000,000 square feet of plate glass a year. The company's need for soda ash led, in 1899, to a chemical-producing division, and the opportunities of their marketing practices to the acquisition of a paint division the next year. Other expediencies of manufacture and sales led to the manufacture of commodities as diverse as cement, and to products such as tempered glass and fiberglass that went against long-held popular ideas of the material's limitations.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Sixth Street Bridge

6th, 7th, and 9th St. Bridges
across the Allegheny River
V.R. Covell, Allegheny County Dept. of
Public Works, engineers;
Stanley L. Roush, architect
1925-28

Beginning in the early 1920s, Allegheny County launched a construction campaign that created over a dozen beautiful and progressive bridges over the rivers and some of the inland valleys. The bridges here were the second, third, and fourth self-anchored suspension bridges in existence, replacing older bridges by Theodore Cooper and Gustav Lindenthal. The Municipal Art Commission, which had jurisdiction over bridge design aesthetics within Pittsburgh, decided that their replacements should be suspension bridges to uniform design. This posed a problem, because conventional anchorages were not always possible. The County engineers, then, looked to Germany, where there was a bridge whose stiff girders at deck level held the ends of the catenaries apart. For reasons of proper connection of girders and catenaries, it proved expedient to make the latter of heavy eyebar chains. The spans were constructed as cantilevers, and only when all the eyebars were pinned together were the temporary struts withdrawn and the bridges became the suspension ones the Art Commission required. In 1929 the American Institute of Steel Construction awarded the Sixth Street Bridge, the last to be constructed, a beauty prize.

REFERENCES:

Carl W. Condit, *American Building Art: The Twentieth Century*, New York, 1961.

Kidney, *Landmark Architecture*.

Joseph White and Martin Von Bermewitz, *The Bridges of Pittsburgh*, Cramer Printing and Publishing Co., Pittsburgh, 1928

X. Pittsburgh Walking Tour



Alcoa Building

Sixth St. & William Penn Way

Harrison & Abramovitz, architects

1950-53

The Alcoa Building was designed to make every conceivable use of aluminum, from the facing to the electrical work. It contains a cast-aluminum sculpture in the lobby, *Birds in Flight*, by Mary Callery, and an aluminum mobile by Alexander Calder. Decorative surfaces are partly in aluminum, and so are light fixtures. Some of the surfaces, however, are now covered over. The external effect is that of a large, refined work of industrial design. The stamped aluminum panels, 12 by 6 feet, were bolted to the steel frame, in a way that required no caulking, from inside the building at the rate of one floor a day. The windows were designed so that both surfaces could be washed from inside. They are rounded at the corners because they fit in inflatable gaskets that are deflated to rotate the sash.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



German Evangelical Protestant Church

620 Smithfield St.

Henry Hornbostel, architect

1925-26

The spire of this church, just around the corner from the Alcoa Building, reveals an early use of architectural aluminum, albeit on a steel frame. The use of aluminum at such an early date was not unprecedented but was still characteristic of Henry Hornbostel's bold spirit. At Carnegie-Mellon University in Oakland, he gave the nation perhaps its handsomest technical-school design, in an "industrial" classical style. For Baker Hall he designed a shell-vault stair of exposed, hand-laid Guastavino tile. The hallway of the hillside building was built as a ramp in the event that if the school failed it could be converted into a factory.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Two Art Deco neighbors: the Gulf building (R) & Koppers building (L).

Gulf Building

Grant St. & Seventh Ave.

Trowbridge & Livingston, architects;

E.P. Mellon, associate architect

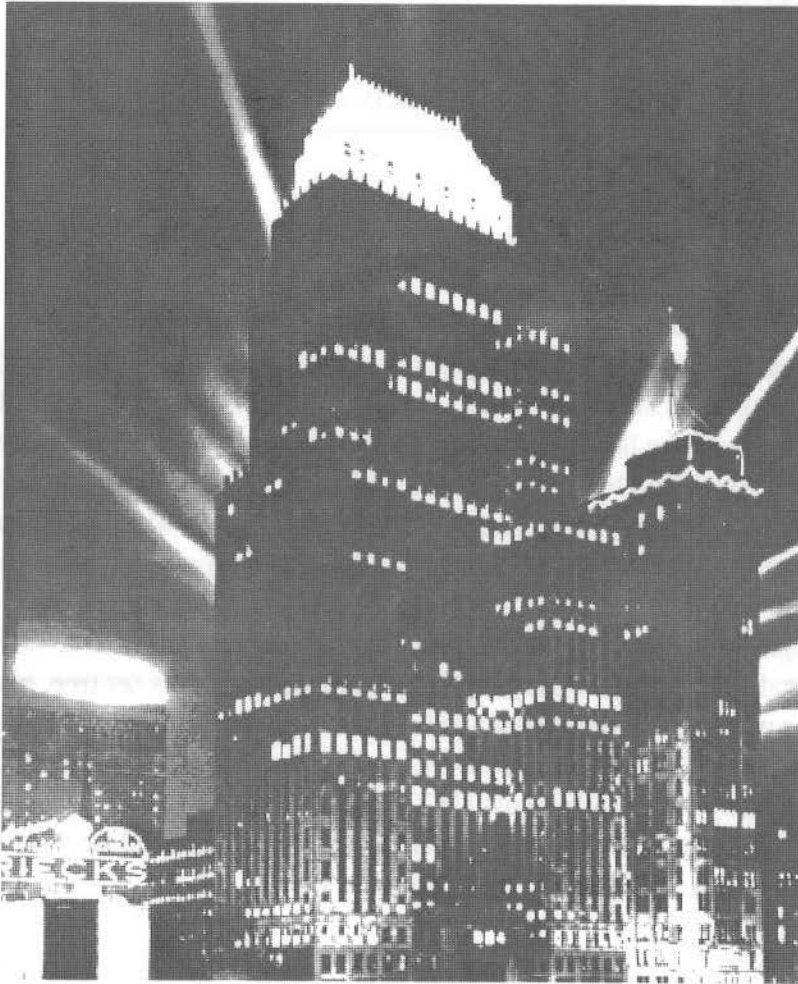
1930-32

At this intersection, if not on this precise corner, Samuel Kier's still of 1854 began petroleum refining in America. This 582-foot tower dramatizes the events of the next three-quarters of a century. Because so much Mellon capital was invested in Gulf, the architects of the Mellon Bank returned to create this monumental work, stoney in effect, conservative and permanent-looking. Mellon money had financed the drilling of the Spindletop Well in Beaumont, Texas, where a gusher in 1901 made possible formation of the Gulf Refining Company of Texas, as well as the J. M. Guffey Petroleum Company, actual owners of the well. Business expanded, bringing reorganization under the Mellons and a move of the company headquarters to Pittsburgh. In 1913, Gulf opened the world's first drive-in service station in Pittsburgh. In the 1980s, however, Gulf Oil Corporation lost its home and identity, having merged with Chevron U.S.A. of California.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



Koppers Building

Grant St. & Seventh Ave.

Graham, Anderson, Probst & White,
architects

1928

The best Art Deco interior in the city, this was the headquarters building of the Koppers Company. Heinrich Koppers was among the many who sought a process to capture and convert the by-products of coke from pollutants into saleable chemicals. Beginning in Germany in 1899, he built his first American ovens in 1907 and by 1920 had a worldwide business. It diversified into chemical products, including the by-products of the Koppers ovens themselves.

REFERENCE:

Kidney, *Landmark Architecture*.

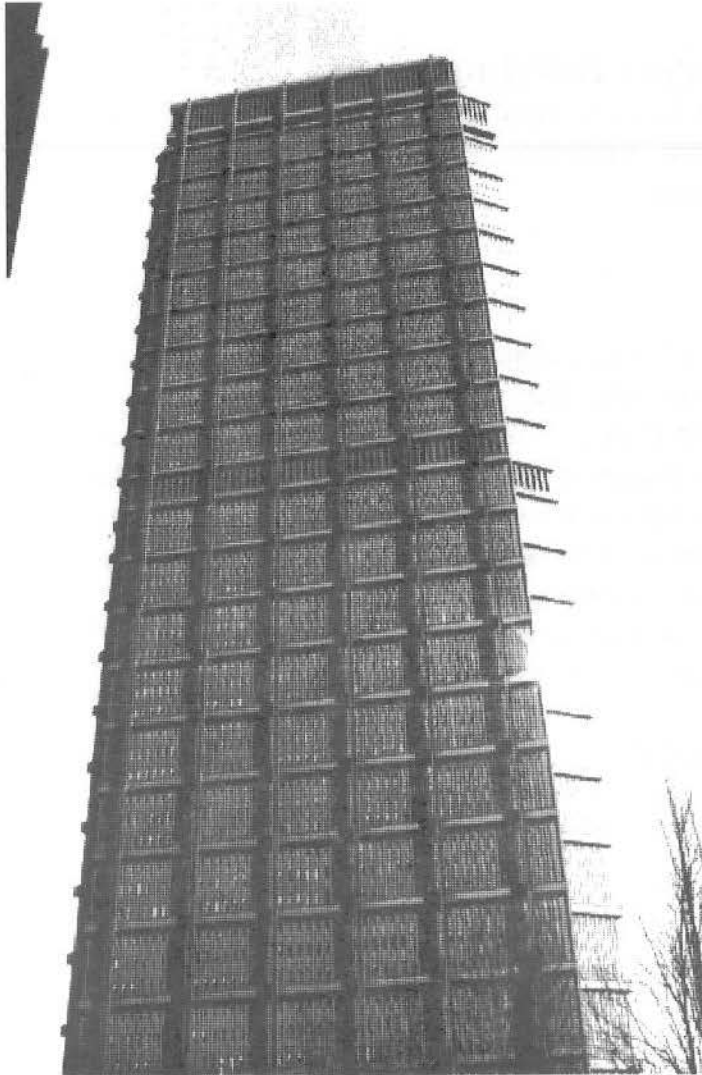
X. Pittsburgh Walking Tour

United States Steel Building (USX Tower)

Grant St. & Sixth Ave.

Harrison & Abramovitz, architects

1968-70



Like PPG Place and the Alcoa, the United States Steel Building was the headquarters of a manufacturing company showing off its product. The tubular columns are uninsulated Cor-Ten weathering steel, filled with water to resist the heat of fires and treated with antifreeze to keep the water from freezing. The bare Cor-Ten has had to be coated to keep its thin coat of rust, rain-driven, from staining other buildings. At 841 feet, the building is the tallest in the city. The United States Steel Corporation came into being in 1901, capitalized at \$1,100,000,000 and consisting of the Carnegie Company, National Steel Company, American Steel & Wire, and National Tin Plate Company. Andrew Carnegie was thus set free, his former partners were enriched, and the works where steelmaking and labor history had been created were gradually absorbed into the largest corporation in the world. Now USX Corporation, it has diversified into other industries such as oil, and retains only one integrated steel mill in the Monongahela Valley, the Edgar Thomson Works.

REFERENCE:

Kidney, *Landmark Architecture*.

X. Pittsburgh Walking Tour



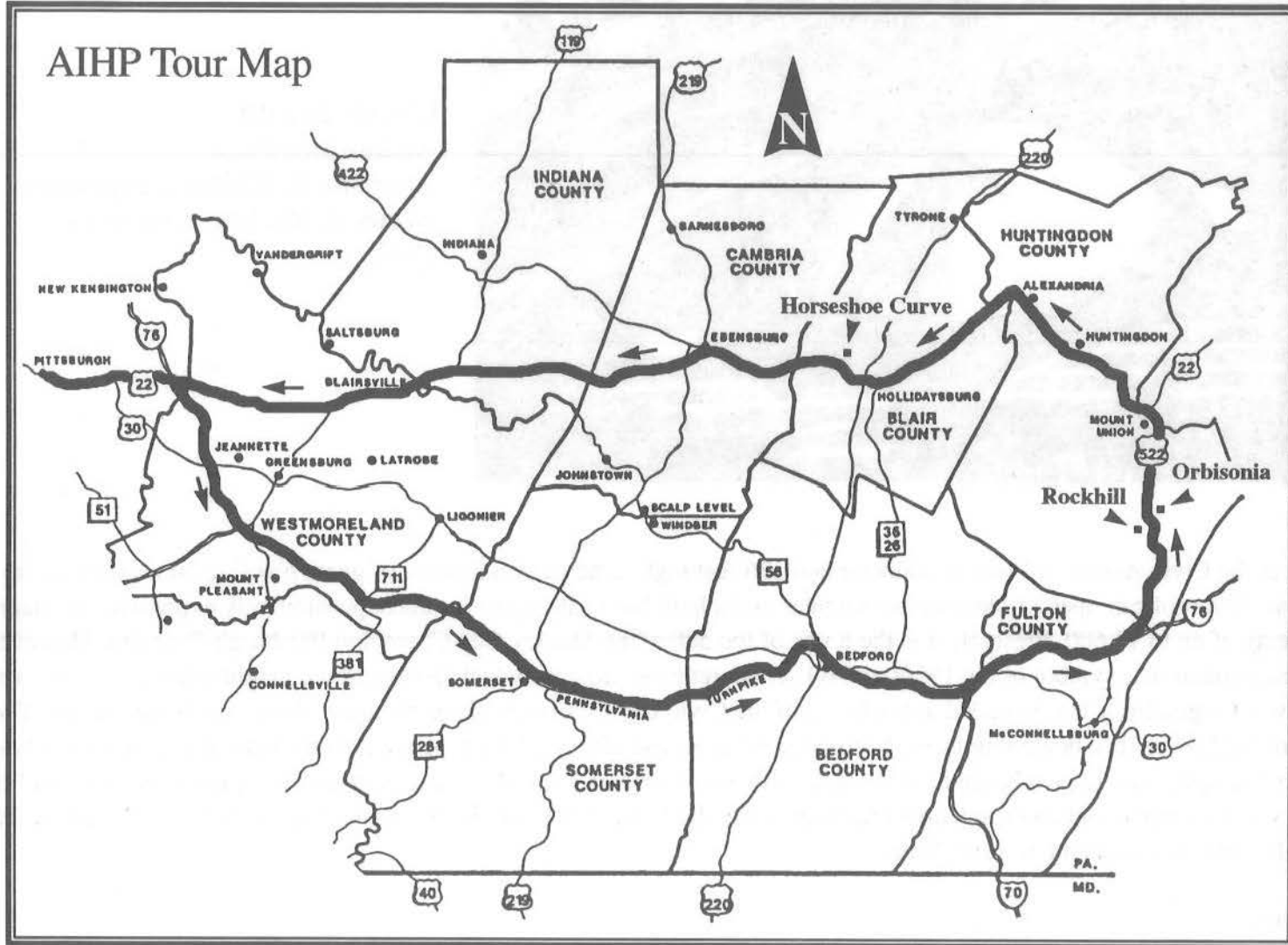
Civic Arena
Auditorium Place
Ammann & Whitney, engineers;
Deeter & Ritchey, architects
1961

The dome of the Civic Arena, 415 feet in diameter and 136 feet high, is actually a number of gores pivoting on a cantilever so as to fold fanwise. The roof can open or close in two minutes and a half, but its doing so is almost prohibitively expensive. As planned, it had a capacity of up to 13,600. Presently it is the home of the defending Stanley Cup Champion Pittsburgh Penguins. However, the Civic Arena remains as a symbol of the 1950s and 60s urban renewal projects, which destroyed old neighborhoods for the expansion of downtown. Originally, it was intended as the home of the Civic Light Opera, with sports, trade shows, and conventions. The clearance of the Lower Hill, beginning in 1956, emptied 95 acres and displaced 8500 people. On the land, rising prominently east of the Golden Triangle, were to go a "center for the arts" with a concert hall, exposition hall, art museum, apartment house, and parking garage, as well as commercial and residential buildings. Only the Civic Arena was built, and the land went undeveloped until the Crawford-Roberts development 30 years later.

REFERENCES:

Kidney, *Landmark Architecture*.

Toker, *Pittsburgh*.



XI. MONDAY TOUR: THE EAST BROAD TOP RAILROAD AND THE AMERICA'S INDUSTRIAL HERITAGE PROJECT

by Jim R. Alexander

The primary focus of America's Industrial Heritage Project is on the development, enhancement, and interpretation of the iron and steel, coal, and transportation industries, and of the labor and social history themes within the nine-county AIHP area. Early on in AIHP planning, Altoona, Pennsylvania, was identified as the focal point around which the story of rail transportation could revolve. However, other resources in the nine-county area are integral components of the rail transportation theme of AIHP. Two such resources are the Allegheny Portage Railroad National Historic Site (a unit of the National Park Service) and the Horseshoe Curve (a National Historic Landmark). A third resource is the East Broad Top Railroad, which is privately owned. The EBT also relates to the AIHP's secondary theme of support industries, including refractory industries, timber, and iron ore production. The National Park Service and the commission are interested in protecting and preserving the East Broad Top and in making the railroad accessible for visitors to learn more about this significant resource; the park service and the commission also view the EBT as an important transportation resource within the AIHP.

The East Broad Top Railroad was more than a transportation system; its right-of-way tied together coal mining areas and coal company towns in the Broad Top coal area in Huntingdon, Bedford, and Fulton counties. The EBT provides a unique opportunity to tell a complete story of coke and coal production and transportation in a single area. This opportunity relates to several AIHP objectives detailed in the 1987 Action Plan, including transportation, coal and coke production, and provision for economic development and tourism. The EBT project is further complemented by the other AIHP projects in the surrounding area, including the following listed below.

The Pennsylvania Railroad's history and development will be interpreted by the Railroaders Memorial Museum in Altoona and at the Altoona railroad shop complex. This complex was constructed by the Pennsylvania Railroad to build, service, and test locomotives and cars, and the site will be interpreted for its importance to American railroading and locomotive technology. Today, the shop complex serves the Conrail system.

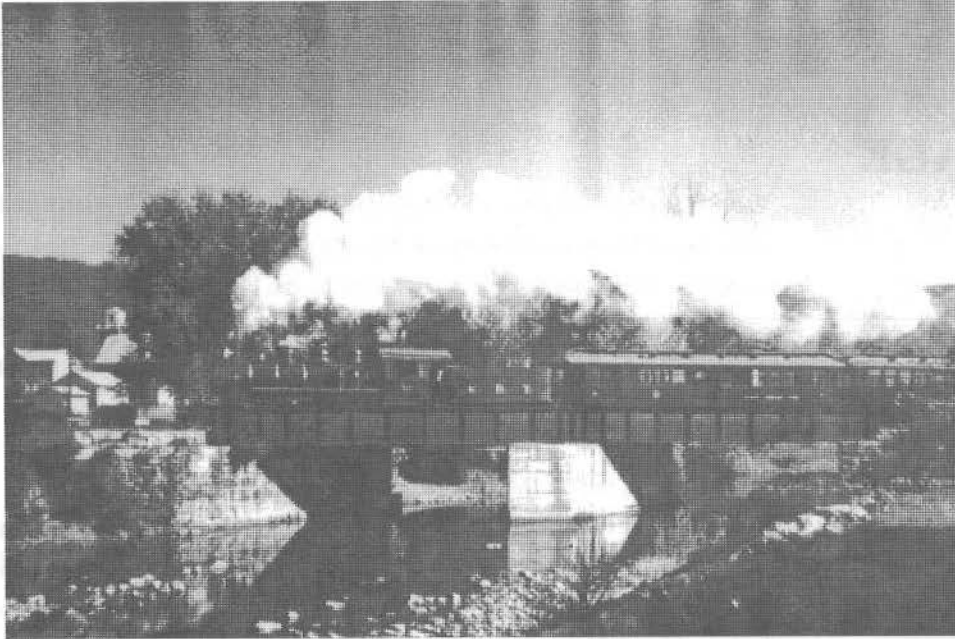
Mount Union, the northern terminus of the EBT, is a place where many transportation systems noted in the AIHP Action Plan come together. The Pennsylvania Main Line Canal ran through Mount Union. The EBT served as a regional railroad system and linked with the Pennsylvania Railroad at Mount Union. Mount Union is at the intersection of U.S. 22 and U.S. 522, located on the proposed Southwestern Pennsylvania Industrial Heritage (AIHP) tour route and U.S. 22 (the William Penn National Heritage Highway route).

Horseshoe Curve National Historic Landmark, which will include excursion trains between Altoona and Johnstown and the construction of a new visitor center and interpretive exhibits.

The Mount Etna Iron Furnace complex contains the story of an early 19th century iron complex. Preservation and management options are being explored.

There are many coal and iron industries identified in the AIHP Action Plan as possessing potential for preservation and interpretation. Robertsdale (on the EBT line), with its company town architecture, would provide an excellent opportunity for interpretation of cultural and social history and lifestyles in early 20th century company towns and would complement the commemoration of the coal story in Windber and Scalp Level (which are in Somerset and Cambria counties). Preservation of the Paradise furnace at Through Creek State Park, Huntingdon County, and the coke ovens at Riddlesburg, Bedford County, also provide opportunities to demonstrate and interpret important industries related to coal and iron.

XI. AIHP Tour



East Broad Top Railroad
Rockhill Furnace/Orbisonia,
Huntingdon County
1874; numerous dates

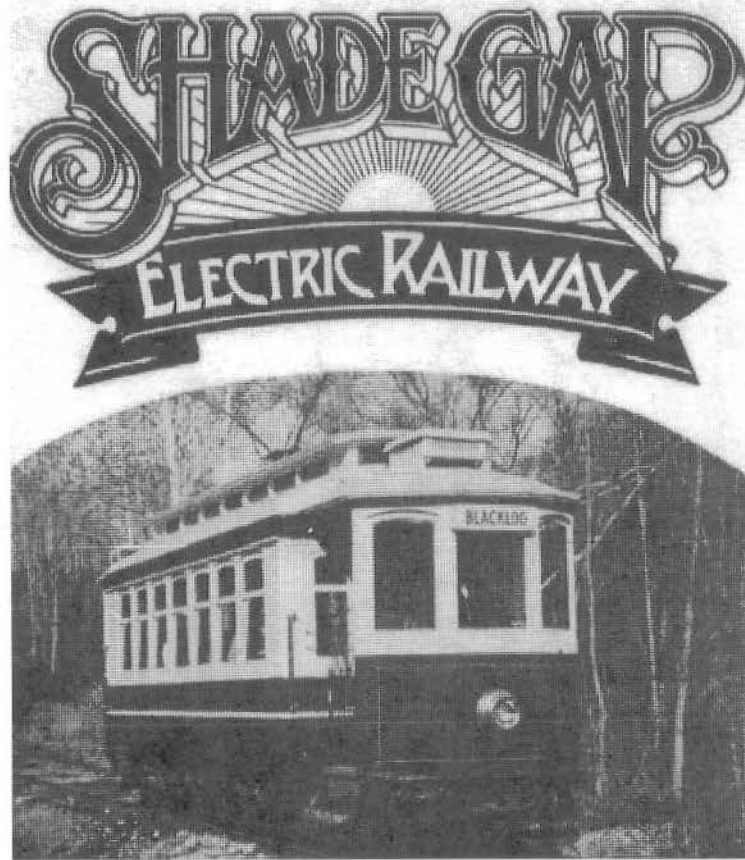
Originally chartered in 1856, the East Broad Top Railroad & Coal Co. was founded to mine and transport coal from the rich Broad Top Mountain coal field. Delayed by financial troubles, the railroad became a reality when controlling stock was purchased by the Rockhill Iron & Coal Co. By 1874 a 30 mile narrow-gauge railway line was completed from Mt. Union on the Pennsylvania Mainline to the company-built town of Robertsdale, near Rockhill Mine No. 1. The railroad was the backbone of a fully integrated 19th century industrial complex focused on iron production at Rockhill Furnace.

At Rockhill Furnace the EBT built an extensive shops complex and engine house. With its steam-generated/belt-driven machinery, the EBT was almost totally self-sufficient, maintaining its rolling stock and constructing its own freight cars. Although the furnaces closed by the 1900s, coal transportation continued to grow. As the railroad prospered, passenger service was expanded to include public excursions as well as transport of miners. In the early 1900s, the trackage and bridges were substantially rebuilt, including an early concrete arch railway bridge.

In 1919, the EBT was purchased by Madiera, Hill & Co. At Mt. Union, MHC established a coal cleaning plant and a "timber transfer" to change trucks of standard-gauge cars to move on EBT rails. The company was reorganized again in 1938 as the Rockhill Coal Co. After World War II, rising labor costs, crippling strikes, diminishing coal deposits and a decreasing market took their toll. Finally, in April, 1956, the last coal run was made to Mt. Union. In 1960, passenger service was restored to celebrate the bicentennial of Orbisonia. The East Broad Top Railroad was designated a National Historic Landmark in 1964, and is the only narrow-gauge railroad still operating in the East.

REFERENCES:

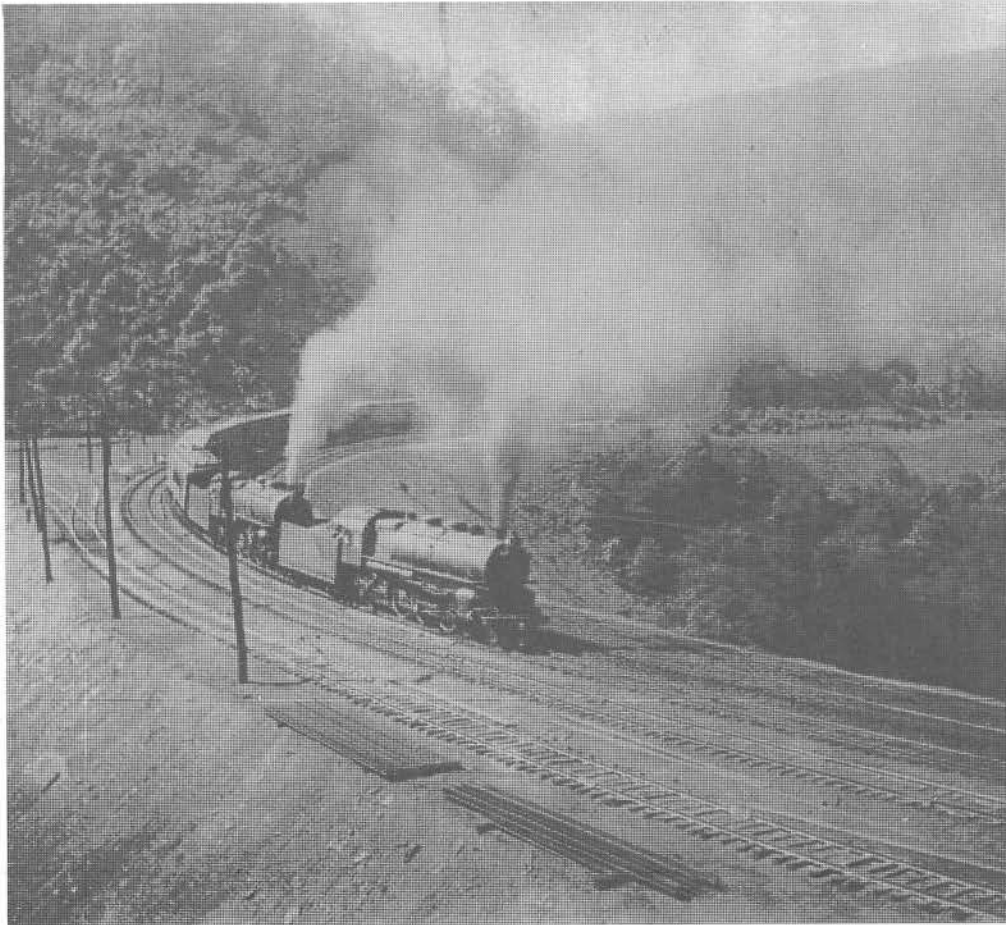
Lola Bennett, "The East Broad Top Railroad & Coal Co.," unpublished HAER report, Washington, D.C.
East Broad Top Railroad: National Historic Landmark, AIHP report, produced by the National Park Service.



Rockhill Trolley Museum Rockhill Furnace/Orbinsonia Huntingdon County 1963

Begun in 1963 with the acquisition of a single trolley car, the Rockhill Trolley Museum currently maintains a fleet of two dozen restored electric trolley cars that run along an abandoned right-of-way of the Shade Gap Electric Railway. Rockhill is operated by Railways to Yesterday, Inc. and is located adjacent to the East Broad Top Railroad. The facility includes two car barns, the Buehler Restoration Shop, and a small gift shop/display building. Its manifest includes electric trolleys from operating systems in the United States, Portugal, and Brazil, interurban cars, and maintenance vehicles. Representative of the passenger vehicles on its manifest are:

- * Brill (1904) semi-convertible double truck
- * Wason (1922) Birney double truck safety car
- * 1912 open air summer car
- * Kuhlman (1909) high speed interurban
- * 1941 Chicago North Shore "electro-liner"
- * 1931 Philadelphia and Western "Bullet Car"



Horseshoe Curve
Blair County
1852-54

In 1847 John Edgar Thomson, chief engineer of the Pennsylvania Railroad, began surveying a route for the mainline across Allegheny Mountain. Restricted to a grade of 1.8 percent, a bridge over two ravines at Kittanning point would have required a 4.37 percent grade. Thomson instead decided to build a large curved embankment across Kittanning Run and Burgoon Run, requiring 1.8 more miles of track but with a maximum grade of 1.75 percent. The total rise in elevation is 275 feet. Horseshoe Curve opened as a two-track right-of-way in 1954. A third and fourth track were added in 1898 and 1900, respectively. The land around the curve has been operated as a park by the city of Altoona since 1940. Designated a National Historic Landmark in 1966, Horseshoe Curve continues to operate as a three-track section along Conrail's mainline.

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