THEMATIC CONTEXT STATEMENT

Building Industrial Philadelphia

WRITTEN BY MALCOLM CLENDENIN, PHD
WITH INTRODUCTION BY EMILY T. COOPERMAN, PHD
FOR THE PRESERVATION ALLIANCE FOR GREATER PHILADELPHIA

JULY 2009

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Written by Malcolm Clendenin, Ph.D.
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I. INTRODUCTION

Philadelphia's richly deserved reputation as the "Workshop of the World" is largely based on its international eminence in manufacturing in the late nineteenth and early twentieth centuries. Industry – the production of "hard" goods and the refinement of raw materials – has been a key force in both fueling the city's economy and shaping its built environment since the immediate aftermath of the establishment of subsistence farms by European immigrants in the second half of the seventeenth century. While the city is justly significant on the world stage for its eighteenth-century political history and eminence in the early national culture, the vast majority of the physical city as it survives today was shaped by industrial production in the nineteenth and twentieth centuries, the wealth it produced, the peoples it brought to Philadelphia, and the infrastructure it both necessitated and enabled. The city's recognized "public" face arguably consists largely of its eighteenth and early nineteenth-century downtown core, and, to a certain extent, the later developments in Center City nearby by virtue of adjacency. What might be called its "private" reality is that the city as it exists today would not exist without Philadelphia's industrial production in that later period.

Tourists see an early American reality that is far more authentic than that in Williamsburg, but the vast majority of Philadelphia citizens live in that private city shaped by the forces of the "Workshop of the World." In addition to the many manufacturing facilities themselves that can be found throughout the territory within the city limits, neither the tens of thousands of houses (most of which were constructed as speculative rows, a phenomenon itself of Philadelphia culture) outside of Center City, nor the historic social, cultural, and recreational institutions built for those who came to work in the city would exist without the formidable economy that attracted them.

In addition to the vast local significance that Philadelphia's industry has in shaping most of the city of today, it was also a regional and national force in a number of ways. One in particular should be noted. The importance of the quality, quantity, and innovative new types of Philadelphia's industrial products is remarkable by itself. A nationally significant strain of industrial innovation, however, is intimately linked to the level and types of the city's production. These innovations span all of the periods of the city's industrial development, beginning with Oliver Evans's continuous process flour mill, continuing, most notably, with Josiah White's exploitation of anthracite coal which shaped steam power and steel manufacturing. The nineteenth century saw the founding of a remarkable organization for the transfer of technological innovation, the Franklin Institute, the adoption and spread of industrial standardization through the leadership of William Sellers and the Pennsylvania Railroad, and the quantum leaps in workplace efficiency that would affect industrial facilities created by Frederick Winslow Taylor at Sellers's Midvale Steel plant.

II. PERIODS OF DEVELOPMENT

The location, type, and scale of industry, industrial facilities, and Philadelphia's related urban fabric were shaped by several key, inter-related factors. First among these was the matter of the source of power used to drive the machinery that produced finished goods and refined raw materials. To put it somewhat simplistically, the source of power for larger facilities changed over the course of the city's three-century history from water to electricity, with steam power in between. This "progress" was not always linear, and the use of power sources overlapped in many locations. The type of power also related to the type and scale of production: it should be noted that smaller production facilities relied on human power in the form of foot-treadle driven belts until well into the nineteenth century.

Not surprisingly, the availability of open, often relatively inexpensive land greatly informed the places where Philadelphia industry grew. One of the key factors in this from the very beginning of Philadelphia manufacturing was the noxious byproducts and inhospitable environment (in the form of foul odors, for example) that industry brought to already established residential portions of the city.

Another key factor was transportation – the facility to move goods to market. Again, water (both in the form of natural streams and rivers and man-made canals) was generally the earliest principal means of transporting goods of any bulk or quantity (although Philadelphia's earliest roads certainly also played a key role). The locations of horse-powered, and later steam-powered railroads played a substantial part in the construction of new industrial facilities in the nineteenth and early twentieth century. Finally, the advent of highways and trucking in the twentieth century spurred changes in locations, as well as ultimately assisting in the decline of the city's industry in providing access to undeveloped sites outside Philadelphia's limits.

Late 17th through mid-19th Century: Water Power, Extraction and Refinement, and Artisanal Shop Production

The earliest phase of Philadelphia's industry was shaped by the extraction, refinement, and processing of agricultural products and natural resources, as well as smaller-scale artisanal production. In contrast to other areas within the American colonies, Philadelphia's geographic environment was propitious not only for highly productive farming, but also provided plentiful natural materials for building in the form of old growth timber, suitable stone (including "Wissahickon schist" as well as granite and marble), and abundant clay beds conducive to brick burning. Most important, however, for the city's first wave of production, was the natural advantage given by the city's location on the fall line of the Delaware watershed, which, outside of the flat river plain of Center City and most of South Philadelphia, provided multiple opportunities for water-powered mills, thus leading to the early settlement in Frankford, for example. With the exception of Baltimore, no other city had such propitious physiographic circumstances for water power among the eastern colonies.

Water power was quickly put to use in the earliest phases of the city's development in the refinement of agricultural products (the Evans mill is the quintessential example) and extraction and refinement natural resources, such as timber and stone. The Rittenhouse paper mill is arguably the most famous example of the latter.

Within the denser part of residential development in the original city and along the Delaware River, small-scale, artisanal production became the norm in the eighteenth century. Philadelphia's prominence in the colonies and young nation in furniture and furnishings production is the most salient example of this, although textile production, again, principally human-powered, was predominant.

Early 19th Coal, Canals, and Steam

The transition from water to steam as the primary source of power in manufacturing was closely related to the discovery by Josiah White in 1815 of the method for exploiting the potential of anthracite coal. Anthracite, which burns hotter than bituminous coal, provided greater energy for steam engines and was also key in the higher temperatures necessary for the production of steel. White and his partners' Schuylkill Navigation canal on the Schuylkill of roughly the same period not only provided a means of transporting coal more efficiently from upriver but also enabled a great expansion of water power to Manayunk, which soon became a concentrated area of mills. Other canals within the city limits, including the channelized Cohocksink Creek in Northern Liberties, similarly gave water power to mills in the first half of the nineteenth century. The channelization of the Schuylkill also provided the city with its first reliable public water through the creation of the Fairmount Waterworks.

Steam power began to be more widely used by the 1840s, when the first rail lines were also beginning to be used in the city. One of the factors that kept Manayunk production high well into the twentieth century, for example, was the establishment of railroad lines along the Schuylkill, including Philadelphia's first – the Philadelphia, Germantown and Norristown Railroad, which reached Norristown in the 1830s.

The late 19th through mid-20th Centuries: Railroads, Electricity, and Highways

Although steam continued to serve as the primary source of power until the widespread distribution of electricity at the end of the nineteenth century, railroads increasingly became an important factor in the location of factories in the city in the period after the Civil War. The main Reading and Pennsylvania Railroad lines, particularly in North Philadelphia and adjacent areas such as Nicetown, served as the spines for the location of new facilities. With the advent of motor vehicles and truck transportation in the twentieth century and related construction of highways within the city limits, these transportation spines also increasingly became areas of those new industries that were established after 1900. These became fewer and fewer as the century reached its mid-point, and dwindled to virtually nothing as the early twenty-first century arrived.

20th and 21st Centuries: The Exodus of Industry

Industry deserted Philadelphia slowly but inexorably after the 1920s. The Depression only partially accounted for this, and although the Second World War increased manufacturing volume for a time, the exodus resumed even more dramatically in the 1950s. One of the factors was the growing importance in industry of scientific research that could best be conducted by giant corporations with multiple plants. Philadelphia industry had been composed of a huge number of smaller firms, but few of them could maintain a market share in the new environment.

Another cause was the architecture: Philadelphia's multistory loft buildings were no longer desirable for business (though a number were converted to residential use after the 1970s). Companies had come to prefer one-story structures that could accommodate long assembly lines and vast, uninterrupted floor areas. And as buildings aged, it was cheaper for companies to sell them and build new, more technologically advanced ones in semirural industrial parks, where real estate was relatively cheap, than to revamp the old structures.

Another major factor was the cost of doing business in the city. Apparel and textile makers, which had been the largest segment of Philadelphia's industry at the beginning of the twentieth century, were particularly dependent for their competitive edge on keeping labor costs low, and therefore were prone to move their operations to other regions, particularly the South and overseas. There was far less unionization in the southern states, and in addition the cost of living was generally lower there, which meant less upward pressure on wages. Thus, companies that established factories in the Carolinas, for example, could significantly reduce labor costs.

Going hand-in-hand with this departure of firms was a perceived decline in the quality of life in inner-city Philadelphia. This reflected a trend across numerous large urban centers in the U.S., particularly in the Northeast and Great Lakes. Residents fled old neighborhoods of rowhouses, which only further contributed to the undesirability of those neighborhoods, and it would take several decades before new sectors of the population would rehabilitate even some of them. The prosperity that had led to home ownership for workers in vast areas of the city became a trap once mortgages were paid off, and many houses were simply abandoned, particularly in North Philadelphia. Corporations began to prefer locations outside the city which were perceived to be safer, where real estate for their plants was cheaper, where fast traffic routes for shipping by truck were more accessible, and where suburban living was nearby for their work force.

Fortunately America's first great industrial capital did not spiral into a general decline as did such cities as Detroit. But the city of Philadelphia did change markedly into a service-oriented and retail-oriented economy in which industry will probably never again play such a big role. It does still retain an architectural record of American industry over three centuries to testify to the prodigious magnitude and range of the city's former production.

III. INDUSTRY BY CITY AREA

Philadelphia's built environment reflects a wide spectrum of developments that shaped American industry over the past three centuries. Unlike most American cities, where development centered around one type of product, Philadelphia was marked until the 1940s by a remarkable diversity of manufacturing. Even within a particularly significant sector such as textiles, products covered a vast range: socks, carpets, blankets, rope, silk stockings, laces, upholstery, sweaters, surgical fabrics, military uniforms, draperies, and raw yarns of every kind. At the same time, Philadelphia excelled at hard goods such as tools, furniture, automobile bodies, locomotives, ships, precision instruments, and toys. On the most massive scale of all, chemical plants, refineries, electrical generating, and freight handling developed along the Delaware and Schuylkill Rivers.

The original City of Philadelphia, which roughly corresponds to today's Center City, had little water that was suitable for powering mills because of its relatively flat geography, so industry was pushed to areas that were on the periphery of the city proper in the early days except at the smallest scale of production. In contrast, the more varied topography within Philadelphia County was conducive to the fall necessary to effectively move water wheels. The many streams and creeks that fed into the Schuylkill and Delaware rivers quickly became the locus of industrial uses that aided settlement and agricultural life, such as the grinding of grain for flour, the processing of trees for lumber, and the extraction of stone from quarries for building. When steam power was developed for factory use by the 1840s, in large measure because of the discovery of the potential of Pennsylvania Anthracite coal, manufacturing was no longer necessarily tied to inland waterways. At the same time that steam power was beginning to be exploited extensively, the city grew enormously, enlarging its boundaries through the Consolidation Act of 1854 to take in the whole of Philadelphia County. This new territory included mills almost every kind of manufacturing. Though many sites have disappeared, Philadelphia still possesses a significant concentration of representative American industrial architecture.

1. CENTER CITY

Dock Creek (a tidal inlet formerly located where approximately Dock Street is today), which emptied into the Delaware, was the site of the earliest industry that required relatively fast-running water. But as the city developed over its first century between 1680 and 1780, activities that generated unappealing by-products like tanning, and the firing of kilns for potting, and brick making were pushed northward into Northern Liberties, and west to the Schuylkill, because they were less acceptable in residential areas. For example, Antony Duche, who operated a kiln on Chestnut Street not far from the State House in the 1760s, was pressured to move. Thomas Sparks well-known, surviving Shot Tower, was built in 1808 on Carpenter Street in Queen Village, slightly south of the city limit to produce lead shot.

Eighteenth-century Philadelphia, with plenty of old growth trees near at hand, had become an important shipbuilding center by the early eighteenth century. Shipyards such as William West's, located on what is now Delaware Avenue at the foot of Callowhill Street survive only in sub-surface remains, and are brought to light only through such excavations as those that revealed wooden shipways in the twentieth century in a parking lot.

Many long-running businesses that began in what is now known as Old City gradually moved westward as land prices increased with the expansion of the city's settlement from the Delaware. Typical of this pattern of movement was the Wetherill Paint and Chemical Company, which started as a small textile firm in Old City in 1775. As part of the textile manufacturing process, the company branched out into hardware and paints and dyes, and by 1809 was manufacturing white lead, an important ingredient for building paint, at 19 South 7th Street. Shortly afterward, a new factory was erected at 12th and Cherry streets. The company operated there until 1848 when it opened a new facility on the west bank of the Schuylkill between Chestnut and Walnut streets.

From the early 1700s until the 1920s, Philadelphia was a leading center for all kinds of textiles. William Calverly made the first carpets in America in Loxley's Court in what is now Old City in 1775, the same year the spinning jenny (a multi-spool spinning wheel invented in England in the 1760s) arrived. A key impetus that pushed Americans to do their own cotton and woolen spinning, rather than importing such goods, was the nation's attempt to avoid exchange with Great Britain, just prior to and during the War of 1812.

Most of the loft buildings still to be seen in Old City originated as sweat shops producing clothing, for example the Leland Building of 1855 by Stephen Decatur Button at 37-39 South 3rd. In the late nineteenth century, clothing was Philadelphia's most important industry, followed by boot and shoe manufacturing and sugar refining. This last specialty is remembered today in the "Sugar House" casino created for the former site Jack Frost Sugar site at Shackamaxon Street. Small-scale textile manufacturing facilities continued within the original city limits well into the twentieth century, particularly in areas that were less desirable as wealthy residences. Examination of real estate atlases indicates that small factories could be found in what is now Chinatown and the Washington Square West neighborhoods long after other areas of the city had become better known for larger industrial facilities. One of the sectors that survived very close to downtown was the printing and publishing industry in the area between Washington Square, Broad Street, South Street, and Spruce Street, where a number of surviving buildings testify to the former presence of this particularly sector. In addition to those that served printing and publication, large industrial buildings were occasionally being inserted into Center City as late as the 1890s, such as the S. S. White Dental Manufacturing Company on S. 12th Street between Walnut and Locust streets.

2. MANAYUNK, THE SCHUYLKILL, AND WISSAHICKON VALLEY

Manayunk

The textile village of Manayunk emerged during the 1820s and 1830s, transforming the rural quiet of the banks of the Schuylkill. Since the early eighteenth century, small-scale industry, including paper-making and stone quarrying, had been conducted on the many small streams that lead into the Schuylkill in the ravines between uplands along the river in the vicinity of Manayunk. The Schuylkill Navigation Company, by constructing locks, canals, dams, and ponds, made the river navigable from Fairmount to Schuylkill County's coal fields. A substantial by-product of the Schuylkill Navigation, however, was the water power the company sold along the Manayunk Canal. When the Flat Rock Dam was completed in 1819, it created a fall of 26 feet, providing the power to turn multiple, large waterwheels on this portion of the Schuylkill and thus enabled textile manufacturing on a significant scale.

The Navigation Company's heyday was the mid-nineteenth century, before the railroads took over transportation of goods and people along the Schuylkill. The company was the primary means of transporting anthracite coal from the west and north and helped make Philadelphia a major coal exporting hub. When steam-powered factories spread in the 1840s, some of this coal was used to power them in Philadelphia and its environs. Mill owners began to install steam engines in the 1850s to give themselves the security of continuous power in dry periods when the river currents were unreliable. The appearance of the steam engine also enabled manufacturers to build mills not dependent on waterways at all, as James Kempton did in 1847 when he constructed Manayunk's Blantyre Mills in addition to his water-powered mill.

One of the significant factors that effected mills in Manayunk and elsewhere -- including the Dobson Mills on the river below Manayunk -- was the Civil War, which created a huge demand for uniforms, blankets, and other military fabrics. Simultaneously, it cut off much of the shipment of cotton from the southern agricultural states, so Philadelphia's cotton mills largely converted to wool during the war, and there was a new spur to mechanization of the processing of wool. Some firms amassed huge profits supplying the Union government with war goods.

A number of mill buildings in Manayunk testify to the period of the aftermath of the war. The T. Kenworthy and Brother's two mills at Pechin Street and Shurs Lane of 1876 survive, as does Robert Wilde's carpet yarn mill in 1884 at the corner of Leverington Avenue and Hamilton (now Wilde) Street. In 1880 the Wilde brothers, John and Thomas, of a different Wilde family, leased a floor from S. S. Keely's Enterprise Mill and then built their own three-story mill along Cresson Street at Ridge Avenue. Between 1870 and 1890, Sevill Schofield filled a parcel of land on both sides of the canal with stone structures of four and five stories. His Economy Mills became the largest textile complex in Manayunk. To the south, John and James Dobson operated an enormous complex in East Falls.

A distinctive feature of Manayunk still evident today is the worker housing that spread higher and higher up the hill as the factories grew ever more numerous. In the early decades of the

Industrial Revolution, young children worked long hours in the mills, but gradually laws were passed that raised the minimum legal age for employment, and then required children to attend school. Their places were filled by a new sector of cheap labor: waves of immigrants, who came at the turn of the century from Italy and Eastern Europe above all.

In the early twentieth century, Manayunk's production continued to grow. Robert Krook Carpet Yarn built a new factory at 4120 Main Street in 1912, followed by Fred Pearson, who attached a five story brick mill onto what had been Robert Wilde's earlier stone mill. Up the hill, the Kaufman Plush Company constructed a five-story complex at Pensdale and Mitchell Streets, while the Manayunk Plush Manufacturing Company built a three-story facility at Umbria and Lemont Streets. Manufacturers of plush, a velvet of cotton, linen, or wool, became more numerous to supply a growing upholstery market. The firm of Collins and Aikman sold wool plush to the automobile industry for car interiors, itself an important Philadelphia sector concentrated on North Broad Street.

Textiles dominated Manayunk up to the Depression. One mark of the strength and size of Manayunk's textile production was the creation of the Philadelphia College of Textiles and Science (now Philadelphia University), established nearby in East Falls to train employees and managers. Although textile making dwindled in the 1930s, industry in the area did not die altogether. The Pencoyd Iron Works in Manayunk survived, later absorbed by the American Bridge Company.

The third significant type of manufacturing in Manayunk, paper production, remains active today. It began on the canal in 1827 in the Samuel Eckstein Mill, near the present intersection of Main Street and Leverington Avenue. In 1828 the McDowell Paper Mill was constructed at the present site of Connelly Container Corporation. In 1864 it was sold to William H. Harding, owner of the *Philadelphia Inquirer*. Harding expanded the mill to produce paper for his publications. Connelly Container Corporation has owned the property since the 1940s, and still ships massive rolls of craft paper, each weighing several tons, across the river to the site of the Pencoyd Iron Works, which is now the location of Connelly Container's box factory.

The Wissahickon Valley and Chestnut Hill

Manayunk forms only part of the story of the Wissahickon Valley, which became a cradle of industry in the eighteenth century long before steam power had been developed. In those days the availability of strong currents in streams and rivers defined where mills could be located, so only certain parts of the Philadelphia area became industrialized in the eighteenth century. The Wissahickon and its tributaries provided power for more than 50 mills, almost half of which lay within the limits of today's Fairmount Park. The massive increase in construction over the past 300 years along the Wissahickon watershed has affected the flow of water in its streams, so today the raw power that turned the wheels of so many mills can only be seen after a storm or heavy rainfall.

Richard Townsend is recorded to have built a grist mill and a saw mill at the mouth of the Wissahickon between 1686 and 1689, and to have sold it to Andrew Robeson and Charles Saunders in 1690. That year the first paper mill in the American colonies was built on Paper Mill Run for Wilhelm (William) Rittenhouse, near what is today Rittenhouse Street and Lincoln Drive. Paper Mill

Run was a small tributary of the Wissahickon. Nicholas Rittenhouse carried on the papermaking tradition, housing his workers in an enclave known as Rittenhousetown. By 1746, a dozen water-powered sites were situated on the creek. The vast majority of these, and of those further upstream on the Wissahickon, were demolished after the incorporation of this area into Fairmount Park.

Today there is little evidence of the nineteenth-century establishments that once thrived where Fairmount Park now stretches. The Park Oil Refinery at 38th Street and Girard Avenue was small, but the much larger Belmont Petroleum Refinery was constructed in 1865 just north of the Columbia Bridge. Smaller manufacturing facilities lined both the Wissahickon and the banks of the Schuylkill and threatened the quality of the city's water pumped at Fairmount. The threat which such industries posed by polluting Philadelphia's water supply were important factors in the official founding of the park in 1867. A large part of the massive Powers & Weightman site that extended from Falls Bridge almost to the Wissahickon, and produced chemicals and pharmaceuticals, was included in the lands appropriated for the park.

Within the boundaries of today's Chestnut Hill in the valley of the Wissahickon Creek once stood mills for grain, cotton, woolens, carpet, and especially paper. Names of roads reflect this: Paper Mill Lane (West Mermaid Lane), Barge's Mill/Spruce Mill/Thomas Mill Road (parts of West Chestnut Hill Avenue and West Highland Avenue), and Paul's Mill/Thorp's Mill/Bell's Mill Road. Many of the mills, located in the Wissahickon, were taken over by the city in the late nineteenth century and added to Fairmount Park, while others were shut down as the real estate became desirable for residential development. Today it is difficult to imagine the large textile concerns that once operated along Cresheim Creek and near the McCallum Street Bridge. At the other end of Germantown Avenue, where it crosses the Wissahickon near Northwestern Avenue, stood the paper and grist mills of the Dewees family, one of which had operated since 1710.

A quarry located between Mermaid Lane and Moreland Avenues was in operation until just before World War II. East of Germantown Avenue near the foot of the hill, the Yarnall-Waring Company once manufactured brass valves.

3. THE LOWER DELAWARE RIVER FRONT: NORTHERN LIBERTIES, KENSINGTON, FISHTOWN, AND PORT RICHMOND

Kensington and Northern Liberties

In the eighteenth century the rural lands north of Philadelphia's original city limits in what is now known as Northern Liberties provided a setting for businesses whose side effects were undesirable in a densely built section, such as tanneries, claypits, and dye works. Civil War Philadelphia had more than two dozen processors of hides, and most were located in Northern Liberties between Arch Street and Girard Avenue. The Adams and Keen Company, at 934 St. John (now American) Street, was one of the largest and specialized in morocco in the early nineteenth century. The oak necessary to the curing of morocco, the goatskins imported from India, and the

transport of finished leather to other urban centers depended on the Delaware River corridor's port and rail complex.

Henry Deringer, the famed maker of firearms, lived on North Front Street and then on Tamarind (now Hope) Street, and worked in Northern Liberties from 1814 to 1868. The Deringer pocket pistol has a firm place in American lore. It was widely sold in the South and in California during the Gold Rush. Deringer's larger weapons were sold to the U.S. government through one of the first Federal arms contracts.

Like nearly every part of Philadelphia, Northern Liberties had textile makers, especially in that industry's early years. William Peter Sprague was an Englishman trained in the Axminster technique of hand-knotting carpets. His Philadelphia Carpet Manufactory relocated several times, but always remained in Northern Liberties.

From 1844 to 1870 Thomas Haig and his family produced a variety of earthenware goods at their Fourth Street location above Poplar. Decorative examples of Haig's work can be found at the Philadelphia Museum of Art and New York's Metropolitan Museum, but the family also manufactured non-decorative ceramics such as cooking furnaces, chimney flues, drains, sewer pipes, and stoneware for chemical and pharmaceutical uses.

The Liberty Iron and Stove Works, on the south side of Brown Street between Fourth and Fifth, operated from 1851 until 1915 under several owners. One of the largest of its kind in Philadelphia, Liberty produced everything from small cast iron stoves to huge double oven models. It marketed its wares far beyond the Delaware Valley.

Northern Liberties home to a large concentration of brewing. Among those who maintained breweries in the area were Christian Schmidt, Theodore Finkenauer, Frederick Feil, John Roehm, Joseph Rieger, William Heimgaertner, Albert Wolf, John Wagner, and generations of member of the Ortlieb family. A rare surviving building is that of "Emil Schaefer—Copper, Brass and Iron Works, Manufacturer of Brewers', Distillers' and Sugar Refining Apparatus" at 1321-1312 North Randolph Street (here again is an ancillary industry that grew up beside the central ones of brewing and sugar refining). Yards Brewing, which is widely known yet was not formed until the 1990s, purchased 2439 Amber Street, which from 1882 to 1938 was the site of Weisbrod & Hess Brewery. On the second floor, the gently sloping concrete floors and two floor drains now serve their original purpose. Yards began in 1995 in Manayunk, then moved to Roxborough before coming to Northern Liberties.

Henry Disston's Saw Manufactory began in Northern Liberties, at Front and Laurel Streets, before moving to the Tacony section. The buildings on Laurel Street eventually covered seven acres, with departments devoted to every conceivable aspect of rendering a saw more effective or more durable. The need for expansion and for a site away from an increasingly congested part of the city led Disston to purchase a 350-acre tract in Tacony, several miles northeast of Northern Liberties, in

1872. Although the main manufacturing facility moved to Tacony, the Laurel Street complex served as the office, packing department, and showrooms of the firm until 1907 when it became a paper box factory. It was demolished in 1968.

Development of industry in the Kensington neighborhood began along the canals that were created out of Cohocksink Creek (near today's Girard Avenue) and Aramingo Creek that were established there in the early nineteenth century. As the century progressed, additional growth was spurred by railroads: the Reading, the Philadelphia and Trenton, and the North Pennsylvania Railroad.

As they did in other parts of the city, textiles dominated Kensington by the mid-nineteenth century, although dye and chemical works were located there as well. The ingrain carpet industry was centered around Oxford and Howard Streets, where some buildings still stand. Others that have been lost included James Gay's Park Carpet Mill, the Dornan Brothers' Monitor Carpet Mill, William J. Hogg's Oxford Carpet Mill, and the Stinson Brothers' Columbia Carpet Mill. Associated trades, such as dye works, yarn factories, worsted mills, and even textile machinery factories were often located in the same building or complex.

The largest of the Kensington firms, John Bromley and Sons, covered more than a city block. Like many manufacturers that outgrew their original space, the Bromley Mills had several Kensington locations over the years. Their huge building of 1860 at Lehigh Avenue and A Street still stands, and is an excellent, representative example of its type. Pennsylvania Woven Carpet Mills is the only survivor of the more than 200 rug and carpet producers that were established at one time or another in Kensington. It was founded in 1846 by Peter Doerr and called at the time the Philadelphia Carpet Company. Doerr's first mill was at Fifth Street and Columbia Avenue, and was equipped to manufacture ingrain carpet on 27-inch and 36-inch steam power looms. By 1918 it had moved to its present location where broadloom velvets were produced. In addition to the manufacture of large goods like carpet, hosiery and knitting mills became more common at the end of the nineteenth century and many smaller examples were established. Their products included socks, fabrics, scarves, and sweaters. During World War II, some mills produced goods for the government war effort, such as mosquito netting and tarpaulins.

One of the greatest of Kensington area's factory complexes, the John B. Stetson Hat Manufactory, no longer exists. Constructed between 1874 and 1930, it included more than twenty buildings and more than thirty acres of floor space. While the company is most famous for their Western hats, Stetson made many other styles in addition and became America's largest producer, manufacturing 3 million pieces annually by the 1920s. The facility closed in 1971, the victim of an uncontrollable force: changes in fashion, which saw hats go from a standard item of everyday clothing to an accessory often omitted.

While Stetson is now gone, a nearby survivor is the American Paper Products company in Kensington, which since 1929 has specialized in supplying cardboard tubes to the textile industry.

This is example of an ancillary industry cropping up adjacent to the primary industry, which in Kensington was textiles.

In 1842, the Philadelphia and Reading Railroad extended tracks from the banks of the Schuylkill to the banks of the Delaware, and Port Richmond developed from the construction of freight handling facilities on the Delaware. Until their closing in 1976, the Port Richmond yards and docks were the largest privately-owned tidewater terminal in the world, spread over 230 acres. From these piers, cargoes were dispatched up and down the Atlantic coast and around the world. Some of the coal that arrived here from points west was burned to create electricity for Philadelphia's power grid at the huge Port Richmond Generating Station near the rail yards.

The yards had a capacity of 5,600 cars at 44 feet each in length. A shed containing five tracks, each capable of handling eight cars, was constructed for wintertime loading; it contained steam coils to thaw frozen loads of coal so that it could be dumped into ships. At the river's edge were four loading ramps for rail cars, which could be transported by floats over the Delaware, five at a time, to New Jersey.

Grain, raw sugar, and other bulk materials were also handled at Port Richmond. Ships were loaded from the 2.5 million bushel grain elevator that was built in 1928. Sugar was processed in Philadelphia's sugar refineries.

Fishtown

As waterfront land in Center City became increasingly expensive over the course of the nineteenth century, owners of shipbuilding and repair facilities moved northward as well as southward. Listings for Fishtown residents in Philadelphia *City Directories* of the late nineteenth century show that more than one-half earned their living as shipwrights, joiners, smiths, or carpenters. Others worked as rope makers, mast makers, caulkers, wharf builders, or fishermen.

Major names included Humphrey's Shipyard, New York Ship, and the Cramp Shipbuilding Company. William Cramp started his business in 1830 at the foot of Otis Street (now Susquehanna Avenue) and was Fishtown's biggest employer until the mid-twentieth century. In 1846, William's son Charles built the first screw-propelled tugboat in the U.S., the *Sampson*, with engines provided by a neighboring firm, Neafie & Levy (see below). In 1862 Cramp launched *New Ironsides* for the Union fleet, a wooden ship with steam engine, screw propellor, and four inches of iron plating.

During the 1870s, Cramp started making its own steam engines and became a successful competitor to British vessels which had previously dominated the market for passenger and mail service. Cramp became one of the world's largest manufacturers of iron ships, producing not only naval vessels, but also passenger liners, luxury yachts, and Coney Island excursion boats. At its height it occupied nearly one hundred acres between Richmond Street and the Delaware River. The market for ships proved difficult, however, and in 1927, owing to lack of work, the company decided to give up the marine business and concentrate on its non-marine subsidiaries. But thirteen

years later, with the outbreak of World War II, the U.S. Navy helped to underwrite the reopening of the Cramp Shipyard for the construction of warships. The facilities were greatly enlarged to include a dry dock and repair base and facilities for submarine construction. More than 18,000 workers were employed here at the height of World War II. Sadly, only a single, yet still important building survives on the site today.

In 1838, the firm of Reaney and Neafie began manufacturing steam engines and boilers at the corner of Beach and Palmer Streets. Eventually changing its name to Neafie and Levy, it also made iron boats, propellers, forgings, and brass and iron castings until the early 1900s.

Manufacturing not related to maritime commerce began in Fishtown in the late eighteenth century. In 1771, Robert Towars and Joseph Leacock erected a glass furnace along Bank Street (Richmond Street). In the nineteenth century Thomas Dyott operated this furnace, which became known as the Dyottville Glassworks. Jonathan Wainwright and Samuel Gillingham's steam-powered sawmill and lumber business started at Beach and Hanover Streets (East Columbia Avenue) during the 1830s. Later known as Gillingham & Garrison, it survived until the 1940s. Bancroft & Sellers began manufacturing machine tools and mill gearing in 1848 on Beach Street, opposite what is now Penn Treaty Park. William Sellers & Company, as it came to be known when Bancroft died in 1855 and one of the most important of Philadelphia's nineteenth-century manufacturers, moved not long after to North Philadelphia. It was known for the outstanding quality of its teeth cutting wheels, lathes, planing machines, steam hammers, and screw stocks and dies.

In the 1850s, Fishtown was also swept up in the industrialization of Philadelphia's textile trades. Factories still extant include Martin Landenberger's Hosiery Mill on the corner of Frankford Avenue and Wildey Street and the Henry Becker Hosiery Mill on Moyer Street.

The last decades of the nineteenth century saw the establishment of the Ajax Metal Company and A. J. Reach, manufacturers of sporting goods. Both remained in Fishtown until the mid-twentieth century. In 1911, the American Can Company, formed from a group of small can factories, built a plant at Beach and Palmer Streets. American Can was a leader in sanitary cans, in which foods are packed without air leakage which would spoil the contents. It ceased production in 1989.

At Beach Street and East Columbia Avenue stands the monumental cast concrete Delaware Generating Station of the Philadelphia Electric Company, designed by architect John Torrey Windrim, with engineer William Eglin. Constructed in 1919, it had to be expanded only four years later due to high demand. Additional construction was undertaken in 1953.

4. NORTH PHILADELPHIA

In the eighteenth century, what is now North Philadelphia consisted mainly of farms and large estates, including Bush Hill to the west and Fair Hill to the east. After the 1830s, railroads began to have a dramatic effect on industrial growth. In 1832, Matthias Baldwin made "Old Ironsides," one of the first locomotives, in Philadelphia. In 1835 he moved his locomotive factory from Center City to Broad and Hamilton Streets, and gradually expanded westward. By 1914, the Baldwin Works had expanded to 38 buildings covering 17 acres of land, with 19,000 employees. Supplying not just American railroads but also Brazil, Russia, Japan, and other nations, it was one of the largest companies of its kind in the world. Hampered by lack of space, the company moved in 1925 to Eddystone, near Chester, where it had acquired 184 acres in 1906. The works in North Philadelphia were demolished in 1937, as the company declared bankruptcy and was merged into another company, having never moved beyond the fundamental steam engine technology that had first made Baldwin's fortune.

By the 1850s an industrial enclave was growing along the Philadelphia and Reading Railroad in the Spring Garden district. The Reading's grain elevator built in the early twentieth century at 411 North 20th Street still stands today, having been converted to modern offices and apartments. Close to the rail line were such industries as Hoopes and Townsend, which manufactured nuts, bolts, and rivets in a plant on Buttonwood Street; Bancroft and Sellers (see above) with their machine shops along Pennsylvania Avenue between 16th and 17th Streets; the industrial works of Bement and Dougherty at 20th and Callowhill Streets; and the Pennsylvania Soap-Works on Callowhill Street.

Broad Street north of Vine was the home of newspaper plants, of which the Philadelphia *Inquirer*'s building still remains. Just off of Broad is the Lasher Printing Company building at 1309 Noble Street, designed by Philip Tyre in 1927 with Art Deco touches and distinctive concrete balconies.

The automobile industry appeared on Broad Street between Vine Street and Fairmount Avenue, with large factories for Packard, Cadillac, Ford, and Studebaker. These buildings testify to a different kind of automobile manufacturing than the assembly line model for which the industry has become known, and recall an era when car manufacturing was to a great extent a matter of custom outfitting for relatively wealthy purchasers, although the number of garages associated with Philadelphia row houses reminds us of the wealth of Philadelphia's industrial workers. Still standing today, and converted to loft apartments, is the Packard Motor Car building at 321 North Broad, designed in 1910 by Albert Kahn, with showrooms redesigned in 1927 by Philip Tyre.

West of Girard College was a nine-block area, adjacent to the Reading Railroad along the north edge of Fairmount Park, that became known as Brewerytown. Beer was manufactured in many areas of Philadelphia, but between 1860 and 1920 this neighborhood had the densest concentration. The Bergdoll, Poth, and Arnholdt & Schaefer Brewing Companies were among the better known. The largely German ethnic neighborhood surrounding them featured bars, concert

halls, and beer gardens selling lager. Prohibition largely destroyed this industry in the 1920s; very few breweries returned to operation in this neighborhood after its repeal.

5. THE UPPER DELAWARE WATER FRONT: FRANKFORD, TACONY, AND BRIDESBURG

Frankford

The fast-running Quessionominck -- known as the Frankford Creek since the early eighteenth century -- which emptied into the Delaware River, early on provided an ideal environment for an industrial settlement northeast of Center City. Water-powered mills also spread rapidly along the Little Tacony and Dark Run Creeks. Tanning, which was banned from Center City along with other dirty industries, was begun in Frankford by Captain Samuel Finney in 1701. Soon many others entered the tanning business, and nine dams were built on the streams that emptied into the Frankford Creek. Many other types of manufacturing flourished, including umbrella and parasol sticks, chemicals, gunpowder, military supplies, and milled lumber. Nothing survives of the Philadelphia Cordage Works of Edwin Fitler, which supplied massive ropes to millowners and shipbuilders.

One of the most important aspect of the history of Frankford came in the aftermath of the War of 1812 when construction was begun on a United States Arsenal in 1816 at what is now Bridge and Tacony Streets. Well supplied by the Delaware Valley's gunpowder industry which was already thriving, the arsenal evolved from a small post where small-arms ammunition was made by hand to a massive industrial complex employing hundreds of civilians. John Fraser designed the Rolling Mill here in 1865. Frankford Arsenal produced 232 million rounds of ammunition during World War I and an astounding 1.4 billion rounds during World War II.

As it did in Manayunk, the Depression dealt a major blow to Frankford's textile industry, and it never fully recovered. Most companies were liquidated by the 1950s. During the succeeding three decades, many mill buildings remained vacant, but a noticeable surge in the economy began in the mid 1980s. The factory at 1215 Unity Street, former site of Quaker Felt, is in use today, as is 4355 Orchard Street, former site of H. Riehl & Son Textile Machinery, and 3450 J Street, former site of Luithlen Dye. Auto salvage and repair shops occupy many of the ground floor spaces in the former mills of Frankford, for example at Tremont Mills, though one third of this stone rubble building was removed when Wingohocking Street was widened. Perhaps the most greatest remaining example is the North American Lace Company factory of 1903, designed by William Steele & Sons, along Glenwood and Allegheny Avenues at 8th Street.

Tacony

English immigrant Henry Disston originally established a facility for manufacturing saws in Northern Liberties, but soon outgrew his original space. The need for expansion and for a site away from an increasingly congested part of the city led Disston to purchase a 350-acre tract in Tacony, several miles northeast of Northern Liberties, in 1872. All the operations needed for making saws of

every description were carried on there, even the steel making. The name changed over the years to the Henry Disston and Sons Keystone Saw, Tool, and Steel Works. It was the largest such manufacturer in the United States, and probably the world. Sixty-eight structures were built in Tacony.

After Disston purchased land for a factory and community of workers, Tacony grew from a hamlet of fewer than 200 people to a community of 12,000 in 1906. The company moved its operations in stages from its plant in Northern Liberties. Planned as a utopian village by Disston, the workers' community was said to have clean air and pure water. From 1900 to 1929 houses were built by the company and sold or rented to the workers at reasonable prices. Tacony had its own water supply, opera house, movie house, parks, bank, and shopping street. Disston and Sons was the primary economic and social catalyst, sponsoring athletic teams, dances, variety shows, and civic associations.

Disston's success and the presence of a corps of skilled craftsmen in Tacony did attract other companies, including the Tacony Iron Works (1881), Erben Search textile mill (1885), and Gillinder Glass Works (1910). Many fragments of the town created by Henry Disston are still visible, including Marsden Row at Marsden and Knorr Streets, Jonathan Marsden's house at Longshore and Keystone Streets, Superintendent Butterworth's house at Disston and Tulip Streets, and Magistrate Thomas South's house at the comer of Disston and Keystone Streets. On Longshore Street between Keystone Street and Torresdale Avenue, one can spot storefronts, the bank building, the opera house, and the first movie house.

Bridesburg

Joseph Kirkbride established the Bridesburg Manufacturing Company, a textile mill along the Frankford Creek, in 1820. However, the limited water flow here prevented the enlargement of the textile industry in Bridesburg, as had occurred in neighborhoods such as Kensington. A more important and lasting effect on Bridesburg was the opening of the Tacony Chemical Works in 1842. Bridesburg became home to many of its workers.

Similarly, Bridesburg's prosperity was linked to that of Robert H. Foerderer's plant in Frankford, at which glazed kid leather was manufactured. The site is now occupied by the chemical company Rohm & Haas. Haas had come to America in 1906 bringing with him a new chemical, Oropon, for curing leather, while his partner Rohm remained in Germany manufacturing the same chemical for European use. Oropon eliminated the need for animal dung to soften the leather, which had always been an extremely unpleasant aspect of tanneries. Adoption of Oropon by Robert Foerderer's factory led to the opening of a Rohm and Haas plant nearby for synthesizing this chemical; eventually a plant was also built in Bristol, Bucks County.

In 1920 Rohm and Haas bought out the Tacony Chemical Works. During World War II it developed another chemical which helped in the production of plexiglas for fighters and bombers. This catapulted Rohm and Haas to a leading place in the chemical industry.

6. GERMANTOWN AND NICETOWN

Germantown

In 1881 the Reading Railroad opened a station at Wayne Junction, along the southern end of Germantown. Here was established a freight handling node for the Philadelphia area and it was here that Germantown's biggest concentration of industry occurred in the latter part of the nineteenth and early twentieth centuries. McCallum and McCallum, owners of the Glen Echo Mills, purchased four and one-half acres and built the New Glen Echo Mills. Shortly thereafter, diverse manufacturing plants were built adjacent to the railroad, including brass foundries, a carpet mill, and the Leeds & Northrup Scientific Instrument Company. Eventually these were joined by the Arguto Oilless Bearing Company, the Blaisdell Paper Pencil Company, Carbutt's Keystone Dry Plates Company, H. Levy and Co., and the Atwater Kent Company's radio manufacturing plant on Wissahickon Avenue at Abbottsford Road. This factory, begun in 1923, grew to 32 acres of floor space, but closed in 1936 due to the Depression. It was designed by the architectural and engineering Ballinger firm. The vast roof of sawtoothed skylights let in plentiful illumination, yet required remarkably few supporting columns which would have interrupted the floor area. This was possible because the peaks of the sawtooths were joined with steel beams, forming a transverse truss that spanned the entire factory.

Urban congestion and poor housing conditions caused a decline in Germantown's infrastructure during the Depression. After World War II, industries began to move out of the area, in search of safer and less expensive environments in which to grow. One of the few bright spots was the Cunningham Piano Company's establishment of a manufacturing plant in what had been a mill. Also fortunate was the presence of the Asher Candy Company, a Philadelphia tradition, which confirmed its allegiance to this neighborhood by enlarging its production facility on Germantown Avenue, although they have left the facility in the last decade.

Nicetown

The Philadelphia, Germantown, and Norristown Railroad made Nicetown accessible in 1832. A decade later, the Philadelphia and Reading Railroad also came through the neighborhood. The Reading connected northeastern Pennsylvania's anthracite coal fields with the wharves at Port Richmond; by the early 1870s, Wayne Junction, adjacent to Nicetown, became a major freight yard and coal depot along this route.

Midvale Steel was founded in Nicetown in 1867 as the Butcher Steel Works. It competed with the Pencoyd Iron Works in Manayunk and Henry Disston's crucible steel plant (part of his saw works) in Northern Liberties. After William Butcher died, the company was taken over by William Sellers, a prominent maker of machine tools (see above). The company's name was changed to Midvale Steel in 1872 and three years later it landed its first of many contracts with the U.S. Navy. It also supplied steel to Baldwin Locomotive, the Pennsylvania Railroad, and John Roebling's Sons, who built the Brooklyn Bridge. By 1912 the site covered 50 acres and employed 3,500 workers.

Midvale Steel was the home of a famed American innovator in labor efficiency, Frederick Winslow Taylor, the founder of scientific management. He grew up in Germantown, the child of a wealthy family, but instead of pursuing college, he opted to work as an apprentice at Ferrell & Jones, a small pumpworks on Race Street. In 1878 he came to work at Midvale Steel as a day laborer, and rose to clerk, then to machinist, then to gang boss, and finally to Chief Engineer. Taylor introduced time studies to determine how much time should be allowed for each operation, and a "differential" piece rate system under which an employee's pay was based upon his efficiency. He left Midvale in 1890 and established similar studies at the Manufacturing Investment Company, a paper manufacturer, and then at Bethlehem Steel.

Taylor's ideas were based on the belief that workers operate at a much lower level of productivity than they are capable of. If their capabilities were scientifically determined, and if they received pay incentives for producing at top capacity, then productivity, wages, and profits would be improved, Taylor thought. His ideas were contested by organized labor, which feared that his push for greater output could lead to the exploitation of employees. His ideas were opposite to those of the "welfare work" movement which taught that improving a worker's welfare would inspire loyalty to the company, cooperativeness, and a desire for self-betterment.

In 1915, Midvale merged with the Cambria Steel Company of Johnstown, Pennsylvania and two other steel companies. The timing allowed it to benefit from enormous contracts with the Army and the Navy during World War I. By 1919, payroll had swelled to 7,300. Midvale became one of the nation's largest sources of armor plate for ships and tanks. But with the end of hostilities, the company's market declined dramatically and Bethlehem Steel gained control of Cambria and several other portions of the company. One of Midvale's products, a nickel and chrome alloy steel originally developed for military use, did find an effective application in the auto industry. But the Depression hurt Midvale deeply and by 1933, only 800 workers were on the site. World War II brought activity back to Midvale. By 1940, the site had grown to 80 acres. But after 1945, production again dropped off. In 1970 began the systematic shutdown of the Nicetown plant.

Immediately adjacent to Midvale Steel alongside the Reading Railroad stood the George W. Blabon Company Oil Cloth and Linoleum Works. The manufacture of patented floor cloth (or summer carpet) had begun in Philadelphia back in 1807. In 1887, Blabon patented the first printing machine for oil cloth, and became the largest U.S. manufacturer of linoleum, oil cloths, and pure linseed oil. Several factors contributed to the company's eventual demise, notably the rise of petrochemicals in the early twentieth century and the disappearance of flax as marketable crop. Flax was used to produce linen and its seeds were used for linseed oil. By the early 1920s, Blabon's business shut down.

Budd Company was established in Nicetown in 1912 on Hunting Park Avenue, and continued to be a major manufacturer of rail cars and components there until 2002. Nearby on Hunting Park Avenue, Tasty Baking opened its facilities in the 1920s, and are in the process of moving their facilities to the Philadelphia Naval Yard as of the date of this study. Of the twentieth-

century Hunting Park factories, only Penn Reel, manufacturing fishing tackle and founded in the 1930s, remains.

7. SOUTH, WEST, AND SOUTHWEST PHILADELPHIA

Before the mid-nineteenth century, South Philadelphia's sparse population and marshy areas made it a site of slaughterhouses, leather works, and fertilizer and chemical companies whose noxious fumes were unwelcome in the center of the city. The natural clay in the soil also attracted brickyards to the area. Six of the nine brickmakers listed in McElroy's 1859 *City Directory* were located in South Philadelphia, primarily along Grays Ferry Road, which was the major thoroughfare long pre-dated the establishment of the city grid through this part of Philadelphia. With the emergence of railroads, Washington Avenue became a major east-west rail connection. The abandoned factories that still line it are reminders of this former medium-scale manufacturing corridor.

Starting in 1801 the Navy Yard became one of the most familiar landmarks in the district and one of the key employers in Philadelphia. After nearly two centuries of supplying American defense efforts, it closed when the fall of communism in Eastern Europe caused shifts in military spending. One of the largest yet most shortlived industries in Southwest Philadelphia was the Hog Island Ship Yard, a World War I merchant shipbuilding facility established by the American International Shipbuilding Corporation. Hog Island occupied the site of what is now the Philadelphia International Airport, but only a few of the thousands of pilings remain from this massive facility. It employed 34,000 people at its peak and covered 300 acres. Although the U.S. Navy has given over control of the Yard to the city, a small amount of shipbuilding remains, and the buildings of the Yard have been (or are being) redeveloped for a number of uses. A lasting reminder is the 1,479 houses built for Hog Island workers around the 2500 blocks of South 67th and 68th Streets.

At Philadelphia's southern extremity, petroleum has long been the dominant industry. Atlantic Refining began business in 1866 as a storage facility but quickly expanded to include refining as more and more uses were discovered for petroleum. By 1882, Atlantic's plant at Passyunk Avenue in the Point Breeze district was one of the largest refineries in the United States, employing about 3,000 workers. In 1891, Philadelphia was exporting 35 percent of all U.S. petroleum and Atlantic was producing nearly 50 percent of the world's illuminating fuel. It continued for decades to be one of Philadelphia's major exporters. The current refinery covers 675 acres and includes millions of barrels of tankage.

The Marshall Laboratory of E.I. DuPont de Nemours Company at 3500 Grays Ferry Avenue is a twentieth-century complex built on the site of the Harrison Brothers Grays Ferry Chemical Company. Back in 1792 John Harrison's chemical works at 3rd and Green Streets in Northern Liberties had produced the first American-made sulfuric acid, as well as America's first strychnine. His technical breakthroughs greatly advanced the nation's chemical industry. His

company moved several times, occupying sites in Spring Garden, Frankford, and Kensington. It purchased the property on Grays Ferry Avenue in 1863 and by 1910, the complex included paint mixing, solvent production, and sulfuric acid production. The DuPont Company purchased Harrison Brothers in 1917. Paint manufacturing continued until the 1950s, when DuPont decided to concentrate on research. Unfortunately all nineteenth-century structures were demolished.

As the railroads made their way to Philadelphia from the south, supporting industries grew up along the lines that passed through. The Brill Company, on Woodland Avenue between 60th and 62nd Streets, manufactured traction equipment and rail cars from 1868 through the 1940s. The Brill works covered 30 acres of ground and employed nearly 1,500 employees as late as 1920.

South of Market Street, a light industrial center grew up around the Pennsylvania Railroad's 30th Street yards by the late nineteenth century. Dominating dozens of small manufacturing buildings at that time were the Allison & Sons Car & Tube Works at 31st Street south of Chestnut, and Job T. Pugh's Auger Works. The latter, dating back to the end of the eighteenth century, was one of many metalworking companies in West Philadelphia and remained active into the twentieth century. The Bonney Vise Works at 3015 Chestnut Street, the Junction Car Works at 32nd and Chestnut, and the Otto Gas Engine Manufacturing Company at 33rd and Walnut were all demolished.

North of Market Street in West Philadelphia were a few large facilities like the Standard Roller Bearing Company factory (Merion Avenue between 48th and 51st Streets), now partly demolished, and the Robert Smith Ale Brewing Company (38th Street and Girard Avenue), of which nothing remains.

8. NORTHEAST PHILADELPHIA

Significant growth occurred in the Far Northeast when the Budd Company established a large complex for building auto bodies in 1942. It was built on Red Lion Road above Bustleton Avenue to designs by the Ballinger Company. Roberts & Schaefer of New York were the engineering consultants, and they used the "barrel shell" or "Z-D" roof construction that they had developed for wartime construction. It was cost-effective and fast to construct, yet also gave the roof a powerful ridged profile with real visual drama. The plant employed 20,000 at its height. Eventually, however, the company moved to Hunting Park and was bought by a German corporation.

Nabisco (which had started as National Biscuit Company in North Philadelphia) and the Yale & Towne Company built large facilities after World War II along the recently constructed Roosevelt Boulevard in the Northeast.

Most of the present industry is located in industrial parks, of which Philadelphia Industrial Park, Red Lion Industrial Park, and Byberry Industrial Park are the largest. Manufacturing in these complexes comprises sheet metal components, electronics, clothing, printing, and bookbinding.

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