

SOCIETY FOR INDUSTRIAL ARCHEOLOGY

48th ANNUAL CONFERENCE JUNE 6 - 9, 2019 CHICAGO, ILLINOIS

GUIDEBOOK TO CHICAGO



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SOCIETY FOR INDUSTRIAL ARCHEOLOGY MICHIGAN TECHNOLOGICAL UNIVERSITY 1400 TOWNSEND DRIVE HOUGHTON, MI 49931-1295



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The Baltimore & Ohio Railroad's bascule bridge over the Chicago River at the Chicago Terminal. Photo Credit: Historic American Engineering Record

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INTRODUCTION

INTRODUCTION CHICAGO'S INDUSTRIAL HERITAGE AUSTIN WEBER

Well-known as the nation's rail hub, hog butcher for the world, steel producer extraordinaire, and home of the company town of Pullman, the question really becomes, what didn't Chicago manufacture? The city was once the center of the nation's electronics, candy, printing, and metal fabrication industries. More bicycles were produced in Chicago than anywhere else. How about coin-operated machines, furniture, and stoves?

Many historic events of the 20th century had a direct link to Chicago-made products. When the *Enola Gay* B-29 Superfortress dropped the atomic bomb on Hiroshima, Japan, it flew there and back with engines made on the Southwest Side. Less than two decades later, when the Beatles made their U.S. debut on the *Ed Sullivan Show*, they used Ludwig drums made on the North Side.

Chicago was and is still is a diversified manufacturing powerhouse, owing to its central location on Lake Michigan and the Chicago River, transportation connections, and a skilled workforce. The "city that works" was also innovative in the development of industrial parks.

Chicago became America's industrial capital because of its strategic geographic location in the middle of the country. The city provided manufacturers with easy access to rail and water transportation networks. Chicago was ideally situated at the foot of the Great Lakes and at the junction of important rail and water routes.

The Windy City's population rose to more than 100,000 by 1860 and 500,000 by 1880, before it skyrocketed to more than 1 million by 1890. Many of the new residents were recent European immigrants armed with valuable skills such as carving wood, hammering metal, or meshing gears on complex mechanical components. That vast talent pool enticed entrepreneurs to open up a variety of factories and workshops throughout Chicago.

A large number of those facilities were strategically located on the Chicago River or along the numerous railroad tracks that linked the city to markets in the east, west, north, and south.

That transportation network quickly transformed the way that products were manufactured and distributed. It provided manufacturers with a convenient way to bring in parts, components, and raw materials. Rail and water transport also provided an inexpensive way for companies to ship their finished products nearly anywhere in the United States or Canada.

WATER TRANSPORT

The opening of the Erie Canal in 1825 connected the Hudson River and New York City to the Great Lakes. The improvement in navigation encouraged the development of Chicago as the jumping off point for westward expansion.

In 1834, U.S. Army engineers permanently opened the mouth of the Chicago River, which was frequently clogged by shifting sand dunes on Lake Michigan. The goal was to make it easier for ships to deliver supplies to soldiers stationed at Fort Dearborn. The fort was established as a wilderness outpost in 1808, destroyed in the War of 1812, and reestablished in 1816.

More than 170 ships arrived in Chicago in 1834, followed by 250 vessels the following year. By 1836, 1,427 sailing ships and 39 steamships called on the Windy City. Shipbuilding quickly became an important industry in early Chicago. Two of the first ships built in the city were the "Clarissa" in 1836 and the "James Allen" in 1838. Four years later, James Averell established a shipyard near the Rush Street bridge and by 1845 Chicago was producing eight schooners a year. Many barges and tugboats were also locally made.

A pivotal moment in Chicago's history occurred a decade after it was incorporated as a city in 1837. The Illinois & Michigan (I&M) Canal opened in 1848, when the Windy City only had 20,000 inhabitants. The canal linked the Chicago and Illinois Rivers together and provided a vital connection between Lake Michigan and the Mississippi River. Canal traffic up and down the waterways created a strategic artery that stimulated the industrial growth of the city.

Waterborne trade made Chicago a center of commerce and the gateway to the western frontier. The city quickly developed into a major inland port that was serviced by many types of barges, frigates, schooners, and steamships.

The 97-mile I&M Canal between Chicago and LaSalle, IL, was constructed by Irish laborers between 1836



During the mid-19th century, Chicago developed into a major inland port. That forced the city to build numerous movable bridges to accommodate heavy ship traffic. *Photo courtesy Library of Congress*

and 1848. They cut through thick layers of limestone using only picks, shovels, and black powder. The canal was 60-feet wide and 6-feet deep. To allow for the 115foot drop in water level between Chicago and LaSalle, a series of 17 locks were constructed. The I&M Canal, which cost \$6 million to build, was designed with towpaths for horses and mules. However, after the Civil War, it became the first American canal to make extensive use of steam-powered boats.

The first canal boat to make the journey from LaSalle to Chicago took four days. Its cargo, a load of sugar from New Orleans, was transferred to a steam ship that reached Buffalo, NY, and the Erie Canal 7 days later. That was 2 weeks faster than the old method of shipping by sea via the Gulf of Mexico, around Florida, and up the east coast to New York City.

The I&M Canal played a major role in changing transportation patterns in the Midwest during the mid-19th century. It helped Chicago replace New Orleans and St. Louis as the forwarding point for goods bound to or from the West. For instance, by 1857 western farmers were shipping 20 million bushels of wheat and corn through the Windy City.

In Chicago, the canal terminated on the Southwest Side of the city in a working-class neighborhood that became known as Bridgeport (the home turf of many Chicago mayors through the years, including the Daley clan). The area contained numerous docks and wharves that were lined with grain elevators and warehouses. Barges typically unloaded grain there and then loaded up with lumber and merchandise before their return journey west.

By 1850, the I&M Canal handled 318,000 bushels of corn, 417,000 bushels of wheat, and 6 million pounds of sugar. Within two years, canal boats were hauling almost 3 million bushels of grain to Chicago from farms on the prairie.

During the 19th century, the Windy City was clogged with maritime traffic that consisted of barges, cargo steamers, passenger side-wheelers, sailing ships, and tugboats. For instance, in 1887, more than 21,000 ships arrived and departed from the Chicago River.

Every day, hundreds of schooners arrived in the city with lumber from the forests of northern Michigan and Wisconsin. Outbound ships loaded grain and other cargo from elevators, factories, and warehouses that lined the river banks.

RAIL POWER

The same year that the I&M Canal opened, two other milestones occurred—the first telegraph line reached Chicago and the first rail line out of the city opened—the Galena & Chicago Union Railway. Under the leadership of William B. Ogden (Chicago's first mayor and later president of both the Chicago & North Western and the Union Pacific), the railroad initially only ran 10 miles west of the city, using secondhand strap rail.

The first locomotive used on the line, dubbed the

"Pioneer," was a 4-2-0 machine-built in Philadelphia at Matthias Baldwin's shop in 1837. It previously served in upstate New York on the Utica and Schenectady Railroad and was transported to Chicago by ship. The "Pioneer" has been preserved and is now on display at the Chicago History Museum.

Rolling stock for the Galena & Chicago Union Railway was made locally by H.H. Scoville & Sons, which was located at the corner of Adams and Canal. The company made many other types of products, including stationary steam engines, line shafts, and pulleys. Hiram Scoville also started the Chicago Locomotive Works, which produced its first machine for the Galena & Chicago Union Railway in 1853.

The first rail terminal in Chicago was constructed by the Galena & Chicago Union. The two-story structure was located near the intersection of Canal and Kinzie. Nearby, it also built the Windy City's first railroad bridge in 1852. That year, the Galena & Chicago Union reached Rockford, 90 miles northwest of the city. Eastbound freight traffic on the railroad included 2 million bushels of grain and 715,000 pounds of lead. Westbound traffic



For decades, this Illinois Central railyard was located just east of Michigan Avenue. Today, this area has been converted into the Illinois Center and Millennium Park. *Photo courtesy Library of Congress Farm Security Administration - Office of War Information photograph collection*

included more than 21 million feet of lumber, 4 million pounds of iron, and 34 million pounds of manufactured merchandise.

The immediate success of the Galena & Chicago Union Railway attracted the attention of investors who soon built other lines that radiated out in all directions from the Windy City, including the Chicago & Alton; the Chicago, Burlington & Quincy; the Chicago & North Western; the Illinois Central; and the Chicago, Rock Island & Pacific

Eastern railroads, such as the Baltimore & Ohio, Michigan Central, and Pennsylvania, extended their tracks west to connect with the Windy City. By 1856, 10 trunk lines ended in Chicago, making the city an important transfer point for railroad freight traffic and waterborne trade. Almost 100 trains entered and left the city each day.

The opening of the transcontinental railroad in 1869 further enhanced Chicago's status as America's rail capital. The Chicago & Northwestern operated the second leg of the route between the Windy City and Omaha, where it connected with the Union Pacific.

Chicago's central role in the national rail network soon became unparalleled by any other city in the nation, with the highest amount of passenger and freight traffic. This enabled early industries to flourish, ranging from coal and raw materials for manufacturing to agriculture, including corn and wheat. The city's location at the hub of the national railroad network established Chicago as the industrial capital of the Midwest and the nation's "great central market."

Large railyards and freight terminals sprang up in many corners of the city. Most were south or west of the central business district, but the Chicago & Northwestern and Illinois Central operated facilities in downtown Chicago well into the 20th century. Today, Chicagoland is still home to many railyards, including some of the busiest facilities in the world, such as the Clearing, Proviso, and Willow Springs yards, which process thousands of freight cars every day.

During the 19th century, Chicago also became a leading manufacturer of everything from rails to rail cars. Long before George Pullman set up his large factory on the South Side of Chicago, the city was already a leading producer of freight and passenger cars.

Several railroad car manufacturers were established in the Windy City during the mid-19th century. Wells, French & Co., located on the Southwest Side in the city's lumber district, was one of them. Other major producers were the American Car Co., F.E. Canda & Co., the Eagle Works of P.W. Gates & Co., and the Union Car & Bridge Works. American Car Co. produced 700 freight and passenger cars in 1853, while Union Car & Bridge Works made 400 rail cars in 1854.

Local companies such as Adams & Westlake Manufacturing Co. also made a wide variety of products, including lamps, lanterns, and signaling equipment. Pettibone Mulliken Corp. specialized in railroad track equipment such as frogs, crossings, and switches. Thousands of railroad cars rolled across America on products made by the Griffin Wheel Co., which mass-produced as many as 500 wheels a day in the 1900s and 1,000 a day in the 1920s. Other local firms, such as the Mercury Manufacturing Co., made material handling equipment used in the city's numerous freight houses.

Chicago was also ground zero for the diesel revolution that transformed the railroad industry in the 1940s and 1950s. For decades, General Motors' Electro-Motive Division (EMD) in west suburban McCook was the world's largest manufacturer of diesel locomotives. The automaker adopted mass-production techniques, such as moving assembly lines, to improve productivity at the plant. By the early 1960s, more than 50 percent of all diesel locomotives in use were made by EMD.

Because of railroads, Chicago became the transportation center of the United States in the mid-19th century. At the height of its power in the early 1950s, the city was home to thousands of miles of track that exchanged thousands of freight cars every day. Chicago was served by 37 long-distance railroad lines that fanned out in all directions, connecting the Windy City with all corners of the nation.

In 1846, two years before the arrival of the railroad transformed Chicago, there were 177 manufacturing businesses in Chicago, employing 1,400 people, including 71 in foundries. By 1857, when Chicago was served by 10 railroads, a census of industrial employment indicated that twice as many people—2,866—worked in foundries making iron, steam engines, and machinery, as had been in the entire industrial workforce a decade earlier.

ENGINEERING MARVELS

In addition to the construction of the I&M canal and railroads, two audacious civil engineering projects transformed Chicago. A water tunnel under Lake Michigan and the reversal of the Chicago River helped the city grow into a manufacturing mecca and a modern metropolis. Although Chicago is located on the world's largest source of fresh water, its low elevation at the southern end of Lake Michigan provided no natural method for carrying away waste. As a result, within a few years of its founding, the Windy City began to choke on its own sewage that was collecting near the shore. This unfortunate situation created contaminated water, a foul odor, and repeated outbreaks of cholera.

The solution to the problem was to dig a 5-foot diameter tunnel more than 30 feet beneath the bottom of Lake Michigan. Two miles out in the lake, the tunnel ended under a large intake "crib" where fresh water was pumped ashore by steam engine. The construction project was one of the most significant engineering feats of the 19th century. When the system opened in 1867, it was hailed as "the wonder of America and of the world."

The man behind the project was a young engineer named Ellis Chesbrough. He devised plans to hand-dig a tunnel and line it with bricks. Construction began in 1864 with workers using picks and shovels. Using sperm candles for light, they dug around the clock for more than 2 years

A large pentagonal-shaped crib was constructed onshore from lumber and iron. The structure was 40-feet tall and each side was 58-feet long. The crib was towed into Lake Michigan by tugboats, floated into position, and then filled with masonry and stone to anchor it to the lakebed. A 9-foot diameter, cast-iron cylinder shaft made in Pittsburgh by James Marshall & Co. was then sunk to connect with the tunnel below.

On land, a pumping station was constructed to house a steam engine that could pump 18 million gallons of water per day. The condensing coupled-beam engine was made by the Morgan Iron Works in New York City and shipped to Chicago by rail.

Chesbrough's audacious project was an immediate success when it was completed in 1867. Because they were constructed out of thick limestone blocks, the waterworks and water tower survived the Great Chicago Fire of 1871 and still exist today, nestled among the shoppers and skyscrapers of North Michigan Avenue.

The crib remained in use until it was demolished in 1936. Seven other cribs were built and placed in service between 1892 and 1935. Today, two still remain in use, while the others have been deactivated.

Another civil engineering milestone occurred in 1900 with the successful reversal of the Chicago River and the construction of the Chicago Sanitary and Ship Canal.

Despite the success of the water intake crib, Chicago's population kept growing through the end of the 19th century. Sewage and waste carried by the heavily industrialized Chicago River poured into Lake Michigan and reached the water intake pipe, resulting in new outbreaks of cholera. The solution was to construct a 28-mile canal that was 21-feet deep and 160-feet wide. It linked the Chicago River to the Des Plaines and Illinois Rivers.

The canal was the largest municipal project at the time it was built during the 1890s. Its construction required workers to dig out more clay, rock, and soil than was removed to make the Panama Canal a decade later. In fact, General George Goethals, who oversaw construction of the Chicago project, later moved to Central America and applied lessons learned in the Windy City to the Panama Canal.

WORLD OF WHEAT AND WOOD

The first big industries in Chicago were connected to grain, lumber, and meatpacking. That was because of the city's strategic position within the nation's burgeoning transportation network and its close proximity to bountiful farmland, forests, and prairies.

Grain elevators were the first skyscrapers in Chicago. In fact, for much of the 19th century, they dominated the skyline along the Chicago River. During the 1850s, the I&M canal and railroads transformed Chicago into the world's largest grain market. By 1856, due largely to the combined efficiencies of the city's 12 grain elevators and the large hold capacities of Great Lakes ships, wheat could be handled at a cost of a half cent a bushel in Chicago, compared to the nickel-per-bushel cost in St. Louis.

In the 1850s, two large steam-powered elevators that could each hold 700,000 bushels of grain stood near the mouth of the Chicago River. The first steam-powered elevator appeared in Chicago in 1848, which was the same year that the I&M Canal and the Galena & Chicago Union Railway opened. The 4-story brick building had a total capacity of 80,000 bushels. Within less than a decade, the largest grain elevators in Chicago were almost 10 times bigger.

By 1857, Chicago's grain elevators had a combined capacity of more than 4 million bushels. When operating at full capacity, Chicago could receive and ship nearly half a million bushels of grain every 10 hours. Elevators 120-feet tall were constructed from 2-inch wide wooden planks bolted on top of each other and bound with iron rods to form walls 10 inches thick. In



During the 19th century, the Chicago River was lined with grain elevators and stacks of lumber. Photo courtesy Urban Remains

1856, the Rock Island railroad's largest facility boasted a 700,000-bushel capacity. It contained 90 bins that were served by 10 conveyor belts. The Illinois Central's largest elevator could simultaneously empty 12 railroad cars and load 2 ships at a rate of 24,000 bushels per hour.

Chicago's strategic location at the southern tip of Lake Michigan also made it easy to transport lumber by ship from the thick forests of Michigan and Wisconsin. The Windy City soon became the largest lumber distribution center in the world. The commercial lumber business began in Chicago in 1833 with the arrival of a shipload of cottonwood boards from St. Joseph, MI. One year later, the first steam engine was imported from the East to operate a sawmill on the north branch of the Chicago River. By the 1840s, stationary steam engines were manufactured locally.

The opening of the I&M Canal enabled Chicago to become the national lumber distribution center. In fact,

the amount of lumber flowing into the city in 1848, the year the canal opened, was nearly double that of the previous year.

During the 1860s and 1870s, a northerly wind could bring as many as 200 hundred ships into the Chicago River on a single day, clogging the waterways and making Chicago the busiest port in the United States. Entire shiploads of lumber were sold at the wholesale docks located at the foot of Franklin Street. After the sale, lumber schooners were towed by steam-powered tugboats down the south branch of the Chicago River to the lumber district where the ships were unloaded.

Piles of wood were stacked up to 30 feet tall along the river in the city's sprawling lumber district, which had more than 10 miles of dockage space. In 1874, 7,000 men worked on the docks and wharves unloading, piling, and sorting lumber. Another 2,000 worked in sawmills and planing mills processing the raw materials into blinds, doors, sash, and dressed lumber ready for shipment. In 1870, 17 local firms were processing lumber, but there were 116 plants by 1890.

By the 1870s, Chicago's lumberyards could dispose an average of 3 million feet per day. Local yards held more than 400 million board feet of lumber in 1879. Chicago shipped 220 million board feet of lumber in 1860, 580 million board feet in 1870, and more than 1 billion board feet by 1890. During a typical day, two lumber schooners passed through the Chicago River every minute with their loads. Until 1880, more than 90 percent of Chicago's lumber arrived via Lake Michigan. However, 95 percent of the milled lumber was shipped from Chicago by rail.

PORKOPOLIS BY THE LAKE

For decades, Chicago was famous for its stockyards and the nearby meatpacking industry. Carl Sandburg affectionately called the city the "hog butcher for the world." Indeed, at their peak, the stockyards processed 18 million livestock a year and employed 45,000 people daily.

By the early 1860s, three of the four stockyards in Chicago were located within the city limits. To consolidate operations and move them further away, the city encouraged the development of a new site. The Union Stock Yard was built in 1865 on the Southwest Side in an area that was formerly a marsh.

Nine railroad companies contributed the majority of the \$1 million cost, but every railroad entering Chicago was connected to the yards. The 475-acre site was operated

by the Union Stock Yard & Transit Co. In the mid-1870s, several meatpackers located their plants next to the stockyard. Philip Armour moved his meatpacking business from Milwaukee to Chicago, and Gustavus Swift relocated his operation from Boston. By the end of the decade, more than 530,000 cattle and 2 million hogs arrived annually by train. Spurred by the development of the refrigerated railroad car, 170 million pounds of fresh and cured meat was shipped by rail.

The development of interstate trucking and the decentralization of the meat industry brought its decline during the 1960s. The Union Stock Yard closed in 1971 after handling more than 1 billion animals. Today, the only trace of it is the old stone entrance gate. However, several important industries developed in Chicago because of meatpacking, such as can manufacturing. American Can Co. and Continental Can Co. operated several large factories in the city that employed thousands of people.

Sporting goods was another industry that was an offshoot from the stockyards. Hide and other byproducts were ideal for making products such as baseball gloves, footballs, and tennis racquets. A former professional baseball player named Albert Spalding started a sporting goods company in Chicago in 1876. The firm originally made baseballs and gloves; within a decade, it was producing 500,000 baseball bats a year. Wilson Sporting Goods Co. has been based in Chicago since 1913. The company, originally a division of the Sulzberger and Schwarzchild meatpacking company, evolved into Wilson & Co. a few years later.



Fire insurance map of the Chicago Union Stock Yard and packinghouses as they appeared in 1901. Courtesy Library of Congress

Fat and other meatpacking byproducts also attracted soap manufacturers to Chicago. James Kirk moved his soap manufacturing business from Utica, NY, in 1859 and built a large factory on the north bank of the Chicago River just east of today's Michigan Avenue bridge. By 1900, it was one of the world's largest bar soap factories, producing 100 million pounds of product a year. In the late 1920s, the company built a new plant along the north branch of the Chicago River that was eventually acquired by Procter & Gamble.

Dial deodorant soap was developed in Chicago by Armour & Co. in the late 1940s and until recently was manufactured in west suburban Aurora. At one time, Unilever operated soap manufacturing plants in the Chicagoland area and Palmolive's corporate headquarters was located on Michigan Avenue.

Today, Method Soap operates a state-of-the-art factory on the South Side of Chicago that produces environmentally friendly products. The 150,000-square-foot green facility, nicknamed "the Soapbox," features a rooftop farm and renewable energy sources such as solar panels and wind turbines.

INSPIRATION FOR THE ASSEMBLY LINE

The stockyards and meatpacking plants were a major tourist destination in Chicago for decades. In fact, between 1908 and 1957, the "L" system included a branch that serviced the area and provided easy access for visitors, as well as panoramic views of the facilities. However, the area was notorious for its smell.

While some visitors were horrified by the operations, others were enthralled by the process. One visitor who was impressed and left the tour inspired was Henry Ford. The Windy City helped shape Ford's vision during a remarkable 20-year period. Indeed, several trips to Chicago proved to be pivotal moments for him.

In 1893, Ford visited the World's Columbian Exposition in Jackson Park on the South Side. He was fascinated by the thousands of exhibits, but one display in particular captured Ford's eye and his imagination. It was a horseless carriage tucked away in an obscure corner of one of the large exhibition halls. The unusual device was created by an unknown mechanical engineer from Stuttgart, Germany, named Gottlieb Daimler.

Ford returned to Detroit and spent the next decade tinkering in his free time. Ironically, Ford sold his first commercially successful automobile—a 2-cylinder, 8-horsepower model—to a Chicago dentist in 1903. On a trip to the Windy City a few years later, Ford found inspiration for the moving assembly line that would eventually help make his Model T such a huge success. He visited several meatpacking plants on the Southwest Side. Ford claimed that the "disassembly lines" of Chicago meatpackers served as a model for flow production at his Highland Park, MI, plant that first implemented the moving assembly line in 1914.

In his autobiography, *My Life and Work*, Ford said "The idea [of the assembly line] came in a general way from the overhead trolley that the Chicago packers use in dressing beef." Years later, a Swift & Co. publication described the division-of-labor principle that Ford adopted in Detroit: "The slaughtered animals, suspended head downward from a moving chain, or conveyor, pass from workman to workman, each of whom performs some particular step in the process." To ensure that Chicago meatpackers got their due credit for the assembly line idea, the Swift publication proclaimed: "So efficient has this procedure proved to be that it has been adopted by many other industries, as for example in the assembling of automobiles."

In addition to the stockyards, Ford also visited the Sears, Roebuck & Co. plant that processed orders from the company's famous catalog. The 40-acre operation on the West Side of Chicago was called "the world's greatest mercantile institution." Shortly after the huge facility opened in 1906, Ford was one of the first visitors and he delighted in its operation. The Sears warehouse contained numerous elevators, conveyors, endless chains, moving sidewalks, gravity chutes, pneumatic tubes, and "every known mechanical appliance for reducing labor" to reduce time and improve productivity. Many of those same devices were implemented at Ford's Highland Park plant, which opened in 1910.

Another source of inspiration for the moving assembly line concept came from Ford's visit to Chicago's Continental Can Co. Its large plant on the Southwest Side used automated machinery and an elaborate conveyor system to mass-produce tin cans for the food industry.

INDUSTRIAL PARK PIONEER

Another legacy of the Union Stock Yard is the modern industrial park. In 1971, when the facility closed, the area bounded by Pershing Road, Ashland, Halsted, and 47th Street became the Stockyards Industrial Park. But, decades earlier in 1908, the Union Stock Yard & Transit Co. acquired a large tract of land adjacent to the complex and developed the Central Manufacturing District. The goal was to attract additional freight traffic for its belt rail line, the Chicago Junction Railway Co. Opening in 1915, the Central Manufacturing District (CMD) was the first planned industrial park in the United States. All buildings were a uniform height and eventually housed more than 200 companies that produced a wide variety of products. Most were small- and medium-sized manufacturers, but several early tenants were large firms such as Westinghouse Electric and Wrigley chewing gum.

Each CMD building was served by a rail spur. Although the structures were not identical, they conformed to a uniform lot size and a standardized design. Many of the buildings were multi-bay industrial lofts faced in red brick with concrete, stone, or terra cotta ornamentation. Large windows and articulated corner towers emphasized the massive scale the development.

What made the CMD unique was the development of large tracts that housed a multitude of diverse firms with a coordinated system of freight shipment and centralized services. The district's scope of services acted as incentives and controls. The CMD also seamlessly managed the complex relationship between industry, labor, and transportation.

The district was based on a comprehensive plan that accounted for traffic patterns, forms of shipment, established land use controls on setbacks, lot sizes, landscaping, and ongoing management to protect the investment of the developers and tenants, and to ensure maintenance of an attractive and well-functioning district. The CMD also offered site planning, construction, financing, and direct freight service. These incentives allowed for cheaper land, lower taxes, centralized location, better layout for industrial use, proximity to complementary manufacturers, and financial incentives that drew manufacturers to the area

The district targeted small manufacturers that could not provide amenities for themselves, such as specialized buildings or arrangements with freight carriers. The CMD was the first to provide tenants with a variety of services that defrayed the costs of doing business and improved the quality of the industrial community. Amenities included a central 12-story clock tower; a staff of architects to design new buildings; a pool of approved contractors to bid on building jobs; a bank to provide favorable lending terms; and a dedicated post office, police force, and medical staff. The CMD even published a business magazine that was distributed to tenants.

The CMD architectural designs capitalized on state-ofthe-art building technologies, including the use of corrosion-resistant metal alloys and welded framing that provided more rigidity and reduced the problem of vibrations. District architects strived for safety and efficiency for their tenants and their workers, prioritizing adequate light and ventilation, the best fire protection, flexible floor plans, adequate power sources, and efficient loading areas. Construction in the CMD was a streamlined process. The district advertised that excavation could begin the day after a contract was signed, foundation plans could be ready 4 days later, and complete plans 10 days after excavation began.

Today, many buildings in the CMD are underutilized or vacant and the area is threatened with redevelopment. Some structures, such as the large Wrigley complex, were recently demolished. However, the success of the 265-acre CMD spurred the development of the Clearing Industrial District on the Southwest Side. It also pioneered the layout of today's industrial parks. The large site, which became an influential model for industrial communities around the U.S., was laid out as quarter mile "superblocks" of 40 acres.

This district started with 18 companies in 1915 and grew to more than 90 firms by 1928. It was championed by the Belt Railway of Chicago, which was jointly operated by 12 railroads. The nearby Clearing Yard is still in operation today, where it remains one of the largest and busiest freight car switching complexes in the world. Every day, more than 8,000 rail cars are sorted and processed on more than 300 miles of track.

In the 1950s, many Chicago manufacturers began moving to the suburbs. They were lured by cheap land and wide open spaces previously occupied by farms or prairies. One of the largest suburban industrial parks in the United States was built on the western fringes of O'Hare International Airport. Today, this area is still going strong and features hundreds of companies engaged in light manufacturing and warehousing. It covers more than 2,000 acres in northwest suburban Bensenville and Elk Grove Village, with multiple rail spurs served by the Chicago Terminal Railroad.

STEEL AND METAL FABRICATION

Making steel and fabricating heavy metal objects has always been an important part of Chicago's industrial footprint. The Chicagoland area once turned out steel rails that tamed the Wild West, steel beams that transformed city skylines, and girders for bridges that spanned rivers. Local factories also mass-produced the barbed wire fences, nails, and pipes that built America.

Stamping machines and other metal fabrication equipment turned raw steel plate into the massive parts



Chicago dominated the bike industry through most of the 20th century because of innovative companies such as Schwinn. Photo courtesy Mark Mattei

needed to build appliances, automobiles, construction equipment, freight cars, locomotives, ships, tractors, trucks, and other products. Chicago's iron and steel industry started modestly along the banks of the Chicago River in the 1850s, but gradually moved south as operations expanded. Early foundries cast parts for boilers, bridges, carriages, machinery, pipes, printing presses, rail cars, steam engines, stoves, tools, and wagons.

The iron and steel industry was fueled by the discovery of coal in Southern Illinois during the 1850s by geologists working for the Illinois Central railroad. Cheap, accessible fuel induced scores of industries to build factories and thrive in Chicago. Local coal provided a way to cost-effectively make and forge iron and steel. It also drove demand for boilers and stationary steam engines to drive machinery.

The city's first rolling mill opened on the North Side in 1858 and began making rails for the booming railroad industry. Within three years, the North Chicago Rolling Mill Co. was producing 100 tons of iron rails daily. On May 24, 1865, the company produced the first highstrength steel rails in the United States, which enabled railroads to increase the size and weight of their steam locomotives. The Chicago Iron Co. built the city's first blast furnace in 1868. The following year, the North Chicago Rolling Mill built two more blast furnaces and eventually adopted the Bessemer process in 1872. Other companies that sprang up included the American Iron and Steel Works, Union Rolling Mill Co., and the Chicago Steel Works. The later specialized in making attachments for agricultural equipment produced by the McCormick Reaper Works and other local manufacturers.

Within five years, Chicago companies accounted for onethird of all rail production in the United States. By 1885, there were 246 iron and steel companies employing more than 19,000 people. Southwest suburban Joliet also was an important steel maker for decades, starting in the early 1870s. The Joliet Iron and Steel Co. became part of the Illinois Steel Co. in 1889 and was eventually absorbed into U.S. Steel Corp. At one time, the mill was the largest nail producer in the world. For decades, Joliet was called the "city of steel," because it was a major producer of nails and other products. Today, remnants of the local industry can be seen at the 52-acre Joliet Iron Works Historic Site.

In 1889, the North Chicago Rolling Mill Co. merged with the Union Steel Co. and purchased the plant of the Joliet Steel Co. to form the Illinois Steel Co. (in 1901, this company became the cornerstone of the newly formed U.S. Steel Corp.) As operations grew in size in the 1880s and 1890s, companies moved south to the mouth of the Calumet River, which provided cheap land and easy access to lake-borne iron ore imports. Several large, vertically integrated steel mills were built on the Southeast Side of Chicago.

Both sides of the Calumet River were lined with steel mills that operated blast furnaces and rolling mills 24 hours a day. The area was dominated by U.S. Steel's South Works, which stretched along Lake Michigan from 79th Street to the Calumet River. But, several other companies also operated big facilities nearby, including Republic Steel, Wisconsin Steel, and Youngstown Sheet & Tube. At its peak, the Southeast Side of Chicago employed 200,000 people in steel mills and industries related to metal fabrication. In the early 1950s, Chicago surpassed Pittsburgh as the nation's largest steel producer with an annual output exceeding 20 million tons.

The Republic Steel Corp. mill was the site of a violent labor battle in 1937. On Memorial Day, a group of striking workers clashed with police in a bloody confrontation near the main gate of the steel mill. Ten workers died in the controversial incident and 60 were injured. Today, a sculpture and memorial plaque honor the victims. Wisconsin Steel Works was owned by the International Harvester Co. The large facility supplied International Harvester's factories with steel needed to produce the company's farm implements, refrigerators, tractors, and trucks.

As late as the mid-1970s, U.S. Steel alone employed almost 40,000 people in the Chicago area—more than any other company. In addition to the Southeast Side of Chicago, it had operations in southwest suburban Joliet and north suburban Waukegan. To link those facilities together, U.S. Steel owned and operated its own railroad called the Elgin, Joliet & Eastern.

American Steel and Wire Co. in Joliet specialized in barbed wire, nails, rods and other products. The U.S. Steel Waukegan Works was located along the shore of Lake Michigan. This facility, which closed in 1979, also produced a wide variety of steel products, such as fencing, nails, and wire.

The crown jewel of U.S. Steel's operations in the Chicagoland area was the South Works. It contained 31 open-hearth blast furnaces and numerous continuous plate mills that turned out steel beams and girders that were used to build many skyscrapers in Chicago and other cities during the 20th century. At its peak in the 1940s, the South Works employed almost 20,000 people. The 570-acre site has been abandoned since the early 1990s and is still awaiting redevelopment.

Chicago was also the home to many metal fabricating firms, such as Hansell-Elcock Co. and Mississippi Valley Structural Steel Co., that riveted and welded beams and sheets of steel into products ranging from barges to bridges.

However, the sudden decline of the American steel industry in the late 1970s took its toll on many facilities. For instance, Wisconsin Steel closed in 1980 and U.S. Steel's South Works shut its doors in 1992. Today, the local steel industry is based nearby in northwest Indiana, where ArcelorMittal and U.S. Steel operate large, thriving production complexes.

EARLY MANUFACTURING IN CHICAGO

When Chicago was founded in 1833, the city was a rough and tumble frontier outpost with fewer than 400 residents. Anything that resembled manufacturing activity was confined to one or two small blacksmith shops that produced crude iron objects on an as-needed basis.

Manufacturing in Chicago began quietly with a few small chair makers who set up shop shortly after the city was officially established in 1837. One of the first commercial enterprises was a small factory that made cabinets. It opened on Lake Street in 1839, run by Augustine Bates and Caleb Morgan.

During the mid-19th century, most factories lined the banks of the Chicago River; 80 percent of firms operated within three miles of the intersection of State and Lake. Downtown Chicago was dominated by companies that made clothing, furniture, carriages, and wagons. But, the number of manufacturers in the Loop steadily declined between 1881 and 1924 as companies moved to other corners of the city, such as the Southwest Side.

A good example was the Crane Co. The R.T. Crane Brass & Bell Foundry began humbly in 1855 in a 14-by-24foot wooden structure at the corner of Canal and Fulton Streets. As business grew steadily, the company eventually built a large factory at 10 North Jefferson St. in 1865 that housed the first malleable iron foundry west of Pittsburgh. In 1912, Crane constructed a huge factory on 160 acres of land on the Southwest Side to produce its diverse line of valves, fittings, and other types of plumbing fixtures. A key part of the 47 building "Great Works" was a large automated foundry that could produce 800 tons of forgings a day. Wood was an essential raw material for many early Chicago manufacturers. Lumber was turned into products such as railroad cars, ships, and wagons. The city also became the nation's leading manufacturer of furniture and musical instruments.

Chicago's abundant supply of lumber and its close proximity to the western prairie appealed to agricultural equipment manufacturers. These included Cyrus McCormick, a 38-year-old inventor from Virginia who arrived in the city in 1847 and built a small factory on the north bank of the Chicago River just east of today's Michigan Avenue bridge to mass-produce horse-drawn farm implements. The McCormick Reaper and Mower Works soon became the city's largest manufacturer and one of its biggest employers.

McCormick's first factory was a two-story building that was 100 feet long by 30 feet wide and included a 10-horsepower steam engine for driving machinery. Inside, carpenters made wooden frames, while other workers hammered, drilled, and riveted metal parts. During its first year in operation, the modest facility produced 450 machines and employed 33 men, including 10 blacksmiths.

Within two years, McCormick was producing 1,400 machines annually. He lengthened his factory from 100 to 190 feet, installed a 30-horsepower steam engine, and added a rail spur. Soon, more than 200 employees were turning out 40 machines per day and the company occupied more than 100,000 square feet of floor space. Production surpassed 5,000 units in 1859. By the time of the Great Chicago Fire in 1871, the product line was expanded and annual production jumped to just shy of 10,000 machines.

One of McCormick's greatest contributions to the growth of Chicago manufacturing is that he purchased some parts from a network of local suppliers that operated small forges and machine shops (however, as the company grew in size, it became more vertically integrated). For instance, a local businessman named Thomas Sherry provided many of the metal castings and cast iron parts that were needed to make early reapers.

The success of McCormick's operation also attracted other farm implement manufacturers to the city, including George Easterly, who built a factory to make a grain header, and William Deering, who eventually set up a huge reaper works of his own along the north branch of the Chicago River.

Another company in this growing industry was the F.C. Austin Manufacturing Co., which was founded in 1849 to make farm tools and equipment. It eventually specialized in horse-drawn scrapers that were used to build railroads and maintain dirt roads. But, by the late 19th century, it was a leading producer of steam rollers. The company eventually evolved into the Austin-Western Road Machinery Co. which mass-produced construction equipment such as power shovels, road graders, rollers, and scrapers. Thousands of miles of American highways and roads were paved with construction equipment made at the company's factory in west suburban Aurora.

Other innovators and entrepreneurs from the east followed in McCormick's footsteps and set up shop in Chicago. For instance, John Brunswick relocated from Cincinnati in 1848 and began manufacturing billiard tables. In 1855, toolmaker Mathias Klein arrived from Philadelphia and started to produce pliers in the Windy City. That same year, Richard Crane moved west from New Jersey and set up a small foundry to make brass bells, copper lightning rods and steam engine parts.

As America expanded westward in the 19th century, manufacturers of sewing machines, stoves, typewriters, and other products relocated their operations from Eastern cities such as Cincinnati, Cleveland, and Philadelphia to the fast-growing city of Chicago. That's because in the mid-19th century, Chicago was a manufacturer's dream. The city was easily accessible by lake, river, and canal. Barges and schooners clogged Chicago's waterways and exchanged goods with railroads that branched out in every direction.

Because of the abundant supply of lumber, Chicago attracted companies that mass-produced carriages and wagons. One of the largest manufacturers in the country was the Weber Wagon Works, which was founded in 1845 by a German immigrant. The company eventually was absorbed into the International Harvester Co.

Another large wagon manufacturer began in 1843 when Peter Schuttler opened a small factory in a one-story wood frame building at the southwest corner of Randolph and Franklin. He later operated a facility on the northeast corner of Monroe and Clinton before eventually relocating to a much bigger factory on the Southwest Side that the company proclaimed was "one of the largest and most commodious in the country, fully equipped with up-to-date machinery." By the late 1870s the factory was consuming 4 million feet of lumber and 20,000 tons of iron per year.

Chicago's large supply of lumber also appealed to makers of musical instruments. Lyon & Healy was founded in Chicago in 1864 and quickly became one

of the world's largest manufacturers of musical instruments. It operated a large factory that produced harps, pianos, and other products on the West Side.

In the early 1880s, William W. Kimball opened a piano factory on the Southwest Side. Within 30 years, he employed 1,500 people and produced more than 13,000 pianos a year. By 1906, local companies were mass-producing 25 percent of the U.S. total. Another 30,000 instruments were made within close proximity to the city. South suburban Steger was the self-proclaimed "piano capital of the world" because local factories shipped an average of 100 units a day in the 1920s.

The Chicagoland area also excelled at making all types of furniture, ranging from upholstered living room items to commercial products such as church pews, school desks, and office chairs. In 1850, there were 13 firms in Chicago producing furniture. Within six years, the largest furniture factory in the city was Adams & Clark. It employed 60 men who turned out 18,000 bedsteads annually. Most items were shipped by rail to people in the expanding western part of the U.S.

The number of furniture manufacturers in Chicago increased to 20 companies by 1860, then quickly multiplied to 174 firms by 1879. In 1929, there were 286 companies in the industry. At the time, the Windy City accounted for more than 10 percent of all furniture production in the United States, employing more than 20,000 workers. Companies such as A.H. Andrews and S. Karpen & Brothers operated large automated factories on the Southwest Side.

PRODUCTION POWERHOUSE

Once upon a time, few cities could match Chicago's production prowess. The typical American home, school, and office contained numerous products that were proudly stamped "Made in Chicago, USA."

Homes contained Chicago-made appliances, furniture, lamps, pianos, radios, televisions, and telephones. Offices used locally produced adding machines, hole punches, mimeograph machines, pencils, postal scales, staplers, teletype machines, three-ring binders, and typewriters. Kids rode bikes, used sporting goods, and played with toys made in the Windy City. At school, they used chairs, desks, lockers, and pencil sharpeners manufactured by Chicago companies. And, they watched educational movies and film strips on projectors made in the city and surrounding suburbs.

For much of the 20th century, the Chicagoland area was a manufacturing mecca, due to its central geographic

location and ready access to rail and water transportation. Chicago was one of the largest and most diverse manufacturing regions on earth. In fact, the city even dominated the field of globe making thanks to local firms such as Denoyer-Geppert, George F. Cram and Co., Rand McNally, Replogle, and Weber Costello.

On the North Side of the city, there were companies such as A.B. Dick, Bell & Howell, Stewart-Warner, Teletype, and Victor Adding Machine Co. The West Side was once home to factories that mass-produced everything from irons and toasters to ovens and washing machines at companies such as American Stove, Cribben & Sexton, GE Hotpoint, and Sunbeam. On the Southwest Side, there were massive complexes operated by companies such as Crane and International Harvester.

The suburbs of Chicago also contained giant factories of their own. In the western suburbs, factories ranged from Western Electric's Hawthorne Works in Cicero to the Elgin National Watch Co. South suburban Harvey was home to large employers such as the American Stove Co. and the Buda Co., a leading manufacturer of gasoline and diesel engines that was acquired by Allis-Chalmers in the early 1950s.

In addition to large manufacturers, Chicagoland was home to thousands of small companies that specialized in casting, forging, and stamping metal parts that were then turned into finished products. Other facilities made cardboard boxes or plated electrical and electronic components. Large manufacturers were supported by a vast network of smaller companies that supplied them with parts and subassemblies such as brackets, nuts, rivets, screws, springs, and wiring harnesses.

Chicago once excelled at producing a plethora of products. The daily output from these diverse factories was mind boggling. In its prime, the Chicago area produced more bicycles, pianos, pinball machines, radios, and televisions than anywhere else on earth. For decades, mail-order firms based in Chicago, such as Montgomery Ward and Sears, kept local factories busy producing hardware, kitchen appliances, sporting goods, tools, toys, and watches.

At one time, more than 50 percent of all telephones in the world were assembled at the sprawling Hawthorne Works. There were 29 shoe factories in Chicago in the 1920s, with more than 4,500 workers producing almost 9 million pairs of shoes annually.

Printing was also a major industry in Chicago during the 20th century. Companies such as Cuneo Press, Donnel-



Chicagoland was once a major producer of pinball machines and other types of coin-operated novelty games. *Photo courtesy A. Epstein and Sons Inc.*

ley, and W.F. Hall operated large plants that mass-produced books, encyclopedias, mail-order catalogs, magazines, telephone directories, and many other items.

Another industry that Chicago manufacturers dominated was bicycles. In 1869, a local pipe manufacturer named Loring & Keene became the first company in the city to license the rights to produce a new mechanical contraption called a velocipede. By the time the modern bicycle was perfected and a cycling craze swept over America in the 1890s, more than 30 companies were located along a stretch of Lake Street in an area that was known as "bicycle row." In 1897, 88 Chicago companies produced more than 250,000 bikes, accounting for two-thirds of all bicycles made in the United States. Three of the largest manufacturers were Arnold, Schwinn & Co.; Gormully & Jeffery; and Western Wheel Works.

A young German bicycle maker named Ignaz Schwinn immigrated to America in the early 1890s and settled in Chicago. In 1895, he went into business with a local meat packer named Adolph Arnold. They opened a factory on the West Side of Chicago (the building is still there and has been converted into offices). Schwinn perfected the art of brazing and welding tubular steel to make sturdy, lightweight frames. That attention to quality, combined with its marketing prowess, helped the company become the world's leading bike manufacturer. By 1950, one in every four bicycles sold in the U.S. was a Schwinn. The company produced 1 million bikes in 1968. However, the last Chicago-built Schwinn was made in 1982.

The Gormully & Jeffery Manufacturing Co. was one of the largest bicycle producers in America between 1878 and 1900. It was run by R. Philip Gormully and Thomas Jeffery. Originally, they produced high-wheeled penny-farthings, but eventually developed a successful line of "safety" bicycles under the Rambler brand name. The company was acquired by the American Bicycle Co. in 1900. Two year later, Thomas Jeffery became an early pioneer in the U.S. auto industry when he began making Rambler runabouts at a factory 50 miles north of Chicago in Kenosha, WI.

Western Wheel Works also started out making penny-farthings and eventually operated the world's largest bicycle factory on the North Side of Chicago. During the 1890s, the company pioneered mass-production techniques such as sheet metal stamping and electric resistance welding. Western Wheel Works was the first American bike company to assemble its products, including the best-selling Crescent brand, out of stamped parts. After Western Wheel Works went out of business, the large multi-building factory complex, which still exists, was used by other manufacturers, including the Dr. Scholl's foot care company.

Chicago continued to dominate the bike industry through most of the 20th century because of the efforts of innovative companies such as Schwinn. Other local bike manufacturers that thrived well into the Baby Boom era included Mead Cycle Co., which was famous for its Ranger brand, and Monark Silver King Inc., which mass-produced a popular line of bikes that featured Art Deco styling, aluminum frames, stainless steel fenders, and balloon tires.

Many early manufacturers of bicycles, carriages, and wagons went out of business in the early 20th century as automobiles and trucks became popular. However, others morphed into that emerging industry. In fact, between 1895 and 1900, more than 20 local companies were formed. During the early 1900s, 28 companies produced 68 models of cars in the Chicagoland area. The city became a leading producer of electric automobiles thanks to the efforts of manufacturers like American Electric Vehicle, Borland-Grannis, Chicago Electric Motor Co., Crowdus Automobile Co., and C.P. Kimball & Co. The Woods Motor Vehicle Co. alone built more than 13,000 electric cars between 1896 and 1918.

By the early 1920s, more than 20 companies were building trucks and commercial vehicles in Chicago. And, the city was home to more than 600 firms making a wide variety of auto parts such as axles, carburetors, gears, lamps, and radiators.

A similar evolutionary pattern occurred with other manufacturers and industries in Chicago. For instance, the city excelled at producing radios, televisions, mechanical musical instruments, and coin-operated novelty machines. All of those products had one thing in common: they featured finely crafted wood cabinets. The expertise needed to produce them was honed by a long tradition of furniture manufacturing in Chicago.

CITY OF BIG FACTORIES

Chicago is known as the "city of big shoulders." But, at one time, it also was the city of big factories. Although there once were thousands of manufacturers in the Chicagoland area, three companies stood out among them. International Harvester, Pullman, and Western Electric employed the most people and operated some of the largest manufacturing complexes in the United States.

For decades, International Harvester was synonymous with manufacturing in Chicago. Between 1847 and 1972, it mass-produced all types of agricultural equipment in the city. The McCormick Reaper & Mower Works was the largest factory in Chicago by 1868. That year, the facility turned out more than 9,500 machines. However, it was destroyed in the Great Chicago Fire of 1871.

After the fire, the McCormick Reaper Works was rebuilt on the Southwest Side of the city. The factory quickly expanded to include 45 buildings spread out over 90 acres. As the factory became more mechanized, production volumes steadily increased in the late 1880s.

McCormick's archrival was William Deering and Co., which built horse-drawn grain binders and mowers at a large complex located on the north branch of the Chicago River bounded by Clybourn and Fullerton. The two firms eventually merged in 1901 to form International Harvester. By the early 1920s, the vertically integrated company had nine sites in the area, including its own steel mill on the Southeast Side. International Harvester's operations were based at two large facilities on the Southwest Side of Chicago. The McCormick Reaper Works in the Canalport neighborhood was open from 1873 to 1961. The nearby Tractor Works was an equally impressive part of the local industrial landscape from 1910 to 1972.

Those two complexes alone covered more than 170 acres and employed more than 6,000 people. Other International Harvester locations included the Deering Works on the North Side and the West Pullman Works on the South Side.

International Harvester Co. was a vertically integrated manufacturer that made many of its parts and components in-house. The company owned coal fields in Kentucky and iron ore mines in Michigan, Minnesota and Wisconsin. The agricultural equipment manufacturer owned and operated its own steel mill (Wisconsin Steel on the Southeast Side of Chicago) and a fleet of ore



Between 1882 and 1982, Pullman mass-produced passenger and freight cars on the South Side of Chicago. This photo shows the wheel and axle department. *Photo courtesy Library of Congress*

freighters. In addition to mass-producing farm tractors and agricultural equipment, the company made other products in Chicago, including construction equipment, portable gas engines, and large milk coolers used by dairy farmers.

The McCormick Works also included a twine mill that occupied 500,000 square feet and produced 30,000 tons of material per year. Workers processed it completely from raw fiber into packages of balled twine that were used with wheat binders and other types of farm equipment.

In 1880, George Pullman purchased 4,000 acres of land located near Lake Calumet along the right-of-way of the Illinois Central railroad. It was 14 miles south of downtown Chicago. He also built a controversial town for his workers near the factories that included homes, churches, parks, shopping areas, a hotel, and a library.

To power his production complex, Pullman purchased the Corliss steam engine that was the sensation of the 1876 Centennial Exposition in Philadelphia. The 700-ton behemoth was dismantled and moved to the South Side of Chicago in 35 railroad cars. From the main power shaft, 13,000 feet of overhead line shafts and 2 miles of belts powered machinery in the factory. The 2,500-horsepower engine operated at Pullman from 1881 to 1910. Over the next 100 years, the company built thousands of passenger and freight cars at the sprawling complex. In addition, Pullman mass-produced buses, streetcars (between 1908 and 1910, the company produced more than 900 for use in Chicago alone), mass-transit cars, and other types of products ranging from all-steel auto bodies to wood phonograph cabinets.

The company also built one of the most unusual products ever produced in Chicago: the Snow Cruiser. The 55-foot-long vehicle was 19 feet wide, 16 feet tall, and weighed 36 tons. It emerged from the Pullman factory in the fall of 1939 and was used by Admiral Richard Byrd on his 1940 Antarctic expedition. By 1910, Pullman employed 10,000 people at its multi-building complex, which stretched between 111th and 115th Streets. As railroad car construction switched from wood to steel, Pullman developed new production tools and techniques such as riveting and welding. It also pioneered lightweight materials like aluminum and stainless steel.

A merger in 1929 changed the company's name to Pullman-Standard, and expanded the company's production activity to an additional factory in nearby Hammond, IN. The company thrived during World War II, when it produced aircraft parts, artillery shells, cannons, tanks, ships and other vital war items. In the late 1940s and early 1950s, production activity spiked as many war-weary railroads ordered new fleets of lightweight, streamlined passenger cars. However, demand dwindled by the 1970s and the last rail car rolled out of the Pullman factory in 1981.

Much of the manufacturing complex and administration building was destroyed in a 1998 fire started by an arsonist. The State of Illinois reconstructed the latter building in 2005 and transferred it to the National Park Service in 2015 to serve as the anchor for Pullman National Monument, which is currently undergoing development. A visitor's center and exhibit area is scheduled to open next year.

Western Electric served as the manufacturing arm of the American Telephone and Telegraph Co. for more than 100 years. It specialized in telephones and switching equipment, but also produced many other types of products, including motion picture sound systems, dishwashers, sewing machines, and vacuums. Western Electric began manufacturing telegraph equipment in Chicago in the early 1870s and was acquired by the American Bell Telephone Co. (predecessor to AT&T) in 1881.

When Western Electric outgrew its factory located at Clinton and Van Buren Streets in 1904, it moved to west suburban Cicero and built a huge complex that became known as the Hawthorne Works. The facility eventually grew into a 5-million-square-foot operation that employed more than 40,000 people who designed, assembled, and tested a wide variety of switchboards, relays, switching systems, and other state-of-the-art telecommunications equipment. Over the years, it was home to many innovations, ranging from "talking" pictures to push-button telephones.

Western Electric once boasted that it manufactured "43,000 varieties of telephone apparatus." At one time, more than 50 percent of all telephones in the world were assembled there. In 1919, the Hawthorne Works produced the first desktop telephones equipped with rotary dials. Wire processing was an important activity inside Western Electric's Hawthorne Works. The factory turned 45,000 tons of copper into wire each year and accounted for more than 75 percent of all the lead cable manufactured in the United States.

Early telecommunications equipment required hundreds of complex, hand-assembled components. To keep operations running smoothly, the Hawthorne Works pioneered many types of quality control practices and principles. It was the first factory in the world to use widespread visual inspection and testing to detect manufacturing flaws and improve quality.

During the 1920s and early 1930s, the Hawthorne

Works also was the site of a series of landmark human behavior studies. Scientists from Harvard University examined how fatigue, monotony, and supervision on various assembly lines could dramatically affect productivity. The Hawthorne Works closed in 1983 and many of the buildings were demolished.

THE ARSENAL OF DEMOCRACY

After the United States entered World War II in 1942, Chicago area manufacturers converted their factories to build all types of military items. Plants that made appliances, farm implements, and toys were retooled to mass-produce guns, planes, and tanks.

The Windy City became one of the key cogs in America's Arsenal of Democracy. More than 1,400 local companies were involved in the war effort. By mid-1944, Chicago manufacturers were accountable for \$8 billion in war-related contracts. More than \$1 billion was spent on factory construction during the war, including more than 300 new buildings.

Several huge factories were constructed in Chicagoland to support the war effort, including the Dodge-Chicago Plant on the Southwest Side. It was the largest factory in the world when it was built in the early 1940s. The 82-acre facility occupied 30 city blocks and was operated by Chrysler Corp. The vertically integrated factory produced more than 18,000 aircraft engines between 1943 and 1945. The 18-cylinder engines powered the B-29 Superfortress bomber.

Douglas Aircraft Co. built a large factory in northwest suburban Park Ridge to produce C-54 Skymaster airplanes that were used to transport military cargo and troops. The 42-acre building was made entirely of wood and employed thousands of people who built more than 650 planes. In the early 1950s the land surrounding the factory, which included four runways, was turned into O'Hare Field.

General Motors' Buick division mass-produced Pratt & Whitney Liberator aircraft engines at a plant in west suburban Melrose Park. Each engine required more than 6,000 parts. Until recently, this factory was still in operation producing diesel truck engines for Navistar.

Every battlefront of World War II was fought using products that were made in Chicago factories. Trucks built on the Southwest Side rolled through the desert sands of North Africa; ships produced on the North Side patrolled the warm waters of the South Pacific; and walkie-talkies made on the West Side were carried by soldiers across the frozen fields and forests of Europe. During World War II, local companies made the majority of all electronics and communications equipment used by the U.S. military. Products ranged from advanced radar units and ship-to-shore radio sets to sonar systems and walkie-talkies.

International Harvester mass-produced cannon shells for the U.S. Army and torpedoes for the U.S. Navy at its Chicago factories. American Can Co. built more than 19,000 torpedoes at the Amertorp plant in south suburban Forest Park. The Pullman-Standard Car Manufacturing Co. made troop transport cars, but it also produced everything from cannons to ships.

Fifty Chicagoland manufacturers produced parts used in the B-29 bomber, the aircraft that's credited with ending the war. Victor Adding Machine Co. produced the Norden bombsight, the top-secret device that gave U.S. aircraft unprecedented accuracy. Even companies that made toys joined the war effort. Chicago Roller Skate Co. mass-produced small parts for guns and shells; Radio Flyer modified its wagon-stamping machines to make 5-gallon fuel cans; and Schwinn made metal aircraft components, ammunition, artillery shell casings, and electrical devices.

Many Chicagoland companies proudly displayed the blue and red Army-Navy "E" flag outside their factories. Only about 5 percent of the nation's 85,000 defense suppliers earned the coveted award for excellence in manufacturing. But, 10 percent of the recipients were in Illinois, including 233 in Chicago and 74 in the suburbs.

BOOM AND BUST

The golden age of manufacturing in Chicago lasted from approximately 1872 (a year after the Great Chicago Fire devastated the city) to 1972. Chicago reached the height of its manufacturing power in the late 1940s. The post-World War II economy was booming and factories were struggling to keep up with pent-up consumer demand. Classified pages of local newspapers were full of help wanted ads from companies that operated factories in all corners of the city.

For instance, in one 1947 issue of the *Chicago Tribune*, Bodine Electric (electric motors) needed first-shift drill press operators, Chicago Coin Machine (arcade games) wanted solderers, and Danly Machine Specialties (metalworking equipment) was looking for electrical assemblers. Dole Valve (beverage dispensing equipment) needed a development engineer, Irving Shoe (women's footwear) wanted a cutting foreman, and Monroe Stove (cooking appliances) was looking for spot welders. Rembrandt Lamp (light fixtures) needed polishers and buffers, Revere Camera (home movie cameras and projectors) wanted draftsmen, and Wilson Jones (office products) was looking for punch press operators.

Manufacturing in the city reached its zenith in 1947, when employment peaked at 667,407 workers. In the late 1940s and early 1950s, many manufacturers moved their operations to nearby suburbs such as Des Plaines, Franklin Park, Niles, Skokie, and Melrose Park. Companies replaced old, multistory factories in the city with modern, one-story buildings that improved production flow, made better use of floor space, and increased efficiency.

Unfortunately, manufacturing employment plummeted in the 1970s and 1980s for a variety of reasons, falling to 147,000 jobs in Chicago by 2000. In 1965, Cribben and Sexton closed its large oven manufacturing campus that it occupied on the West Side of Chicago since 1903. That same year, the Elgin National Watch Co., once the largest watch manufacturer in the world, closed its historic factory in northwestern suburban Elgin after 100 years of operation.

In 1972, International Harvester shut its massive Tractor Works on the Southwest Side, marking the end of its 125-year manufacturing presence in the city. Around the same time, local companies in the electronics industry began offshoring operations. For instance, in 1977 Zenith shifted production of circuit boards and other television components to factories in Mexico and Taiwan.

In 1982, Pullman shut its doors after 100 years of assembling railroad cars on the South Side of Chicago. That same year, Sunbeam announced that it was closing its large plant on the West Side of the city. At its peak in 1958, the factory employed 4,000 people. More bad news came in 1983 when Schwinn closed its bicycle factory on the West Side and Western Electric shuttered its famous Hawthorne Works complex. Automatic Electric Co. was another major manufacturer that closed in the early 1980s. At one time, the company made more than 75 percent of the world's dial-operated automatic telephone equipment and employed up to 8,000 people on the West Side.

Despite that trend, the Chicagoland region continues to thrive as a manufacturing center today, generating billions of dollars toward the local economy and still employing thousands of people. It ranks as the nation's leading producer of electrical equipment, fabricated metals, food, machinery, paper, and plastics.

CHICAGO INDUSTRY TODAY

Factories located within the city's borders have become



Ford Motor Co. has operated a large factory on the South Side of Chicago since 1924. Photo courtesy Ford Motor Co.

much less common over the last few decades. But, notable manufacturers still active in Chicago include Ford Motor Co. (Ford Explorer and Lincoln Aviator SUVs) on the South Side, Lyon & Healy (harps) on the West Side, and S&C Electric Co. (electrical distribution equipment) on the North Side. Small machine shops and light manufacturing plants also thrive in many corners of the city.

Other items made in the Windy City today include products as diverse as railroad crossing gates (Western-Cullen-Hayes Inc. on the Southwest Side) and bus seats (Freedman Seating Co. on the West Side). Old-school metal fabricators still going strong include Finkl Steel on the South Side and Anderson Shumaker Co. on the West Side.

In 2019, the first rail car factory in Chicago in more than 30 years is expected to open on the South Side, CRRC Sifang America. Despite that link to the past, the Windy City also has an active hand in the future of manufacturing, including local companies that are using cutting-edge production processes. Fast Radius on the West Side and Sciaky Inc. on the Southwest Side are leading players in the fast-growing field of industrial 3D printing. On the North Side, Goose Island is home to the Digital Manufacturing and Design Innovation Institute, a state-of-the-art facility that specializes in developing next-generation manufacturing technology that uses artificial intelligence, augmented reality, collaborative robots, digital twins, and predictive analytics.

The suburbs of Chicago also team with a diverse array of manufacturing activity thanks to companies such as Echo Inc. (edgers and leaf blowers) in Lake Zurich; Federal Signal (emergency lights and sirens) in University Park; Juno Lighting in Des Plaines (LED light fixtures); Middleby Marshall (pizza ovens) in Elgin; Morey Corp. (contract electronics manufacturing) in Woodridge; Northrop Grumman Corp. (military electronics) in Rolling Meadows; WeatherTech (floor mats and car accessories) in Bolingbrook; Weber-Stephen Products (barbecues) in Huntley; and Whiting Corp. (overhead industrial cranes) in Monee.

Chicago regularly plays host to major trade shows that attract thousands of manufacturers from around the world. Those events include the Assembly Show, the Automate Show, Fabtech, and the International Manufacturing Technology Show. Old factories still dot the local landscape, but serve a different purpose today. Many of them have been converted into commercial and residential lofts. Examples include the original Schwinn bicycle factory and buildings that once produced items such as Bell & Howell movie cameras, Eversharp pens and pencils, Florsheim shoes, Frederick Cooper lamps, Hart Schaffner & Marx suits, Ludwig drums, and Universal stoves.

Another remnant from Chicago's industrial past are the rooftop water tanks that were once ubiquitous with manufacturing activity in the city. Unfortunately, this remnant of the Windy City's rich industrial landscape is slowly fading away. At one time, thousands of wood tanks, each holding more than 10,000 gallons of water, sat atop numerous factories and warehouses. Barrel-making immigrants from Germany and Sweden built many of the iconic water tanks, which served as gravity-fed fire-suppression systems. Most were constructed out of California redwood and Gulf Coast cypress. Today, this once-dominant skyline feature of Chicago is becoming extinct. Fewer than 180 water tanks remain. Most tanks still in place were built during a wave of industrialization in the 1950s.

While some icons of Chicago manufacturing history such as water towers are disappearing, industrial production in the Chicago area continues to thrive to this day. The city and surrounding suburbs still feature a multitude of establishments making a wide array of products. Factories in the area have evolved and changed much over the years, but the city remains an industrial giant.

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TOUR SITES

TOUR SITES T-1: STEEL & OIL AUSTIN WEBER

Northwest Indiana, a short drive from Chicago, has been the center of the U.S. steel industry ever since Pittsburgh relinquished the title more than 30 years ago. According to the American Iron and Steel Institute, the region currently accounts for more than 25 percent of all domestic production. In fact, half the blast furnaces in the country are located in Lake and Porter counties, an industrial area long considered to be "The Workshop of America." Northwest Indiana is home to the nation's largest steel mill (U.S. Steel's Gary Works), North America's largest integrated steelmaking complex (ArcelorMittal Indiana Harbor), and the newest integrated steel mill in the country (ArcelorMittal Burns Harbor).

Our first stop on the tour will be at Chicago-based **ArcelorMittal's Burns Harbor** facility. This 2,000-acre complex has the distinction of being the only steel mill in the world that is surrounded on both sides by a national park (Indiana Dunes National Park). The Burns Harbor facility was built by Bethlehem Steel in 1964 and acquired by ArcelorMittal in 2007. Located on sandy marshland near Lake Michigan, the plant operates two blast furnaces, consumes 515 million gallons of water, and has the capacity to produce 5 million tons of steel annually.

Buildings in the complex are laid out to maximize flow and efficiency. Raw materials arrive by sea on the west side of the site. Coils of finished steel depart by rail and truck on the east end of the complex.

The Burns Harbor plant is a 100 percent continuous cast operation that primarily serves the automotive industry. It specializes in lightweight, high-strength steel favored by automakers and their suppliers. The facility makes different grades of steel that are used in a wide variety



The steel mills of Northwest Indiana specialize in lightweight, high-strength sheet material that's widely used in the auto industry. *Photo courtesy ArcelorMittal*



ArcelorMittal Burns Harbor can produce 5 million tons of steel annually. *Photo courtesy ArcelorMittal*



Ore unloaders along the Indiana Harbor Canal looking towards the former Youngstown Steel and Inland Steel mills (now part of ArcelorMittal), 1989. *Photo by Matthew Kaplan*

of auto parts, including body panels, chassis, control arms, cross members, frames, pillars, underbody structures, and under-the-hood components.

Principal products made at this location are hot-rolled sheet, cold-rolled sheet, and hot-dipped galvanized sheet. In addition to automotive customers, Arcelor-Mittal Burns Harbor supplies manufacturers of building materials, construction equipment, household appliances, pipes, ships, tractors, trucks, and tubes.

Following a drive-by look at the coke ovens and blast furnaces, our in-depth tour will head inside to see the casters, hot mill, finishing hot dip, and more steelmaking activity.

Next, we will drive past the **ArcelorMittal Indiana Harbor** facility in East Chicago, IN. This 3,000-acre facility was established in 1901 by the Inland Steel Co. The facility was later expanded with a landfill peninsula that juts out into Lake Michigan.

ArcelorMittal Indiana Harbor currently employs more than 4,000 people and operates three blast furnaces. It is a diverse facility capable of making a full range of flat products including advanced high-strength steels and other products used in the auto industry.

The sprawling steelmaking complex straddles both sides of the Indiana Harbor and Ship Canal. ArcelorMittal recently invested more than \$32 million to rebuild the walking beam furnaces at its 80-inch hot strip mill on the east side of the complex. "The Mighty 80," which stretches a half-mile long, turns red-hot steel slabs into rolls of coil after cooling the metal off a few hundred degrees by dumping an Olympic pool's worth of water from Lake Michigan on it in the course of a few seconds.

Next, we'll drive through **Marktown**, a planned worker community from 1917. This unique residential neighborhood in the shadow of industry was designed by Chicago architect Howard Van Doren Shaw for industrialist Clayton Mark, a leading manufacturer of tubular well cylinders, well points, and other products.

The original plan for Marktown was to cover more than 20 acres of land and feature housing for more than 8,000 workers and supervisors. It was based on the Garden City movement (planned, self-contained work-ing-class communities surrounded by greenbelts) that originated in England in the late 19th century.

In 1923, Mark sold his Indiana Harbor Works complex to the American Sheet and Tube Co., which was eventually absorbed into Youngstown Sheet and Tube. At the time



Marktown in 2017. Photo by Matthew Kaplan

of the sale, only four of the 32 original sections of the community were built, including 97 white stucco build-ings.

We will then do a perimeter tour of the nearby **BP Whiting Refinery**. This massive 1,400-acre facility bounded by Lake Michigan and the Indiana Harbor and Ship Canal was built by the Standard Oil Co. in 1889 and still ranks as one of the world's largest oil refineries. By the mid-1890s, the Whiting complex had become the largest refinery in the United States, handling 36,000 barrels of oil per day and accounting for nearly 20 percent of the total U.S. refining capacity. The facility was once a major producer of kerosene before demand for gasoline curtailed production, in addition to axle grease for industrial machinery and paraffin wax for candles.

Standard Oil chemical engineers patented a process called thermal cracking that enabled the refinery to double the amount of gasoline that could be made from a barrel of oil. The process, which became standard practice in the refining industry, helped avert a gasoline shortage during World War I. The refinery's strategic location on Lake Michigan enabled Standard Oil of Indiana to distribute its products by water throughout the Great Lakes region. Between 1912 and 1937, the company built a fleet of six steam-powered tankers that shipped Whiting-made products by sea until the 1980s. Today, this 430,000 barrel-per-day refinery is the largest in the Midwest and BP's largest facility in the world. It produces 10 million gallons of gasoline, 3.5 million gallons of diesel, and 1.7 million gallons of jet fuel each day, along with 5 percent of all asphalt in the U.S.

In 2012, BP finished a \$4 Billion, 5 years in the making expansion of the refinery, allowing it to refine tar sand crude oils from Alberta, Canada. This was the largest industrial project in Indiana's history.

BP recently completed a \$180 million flare gas recovery project that cuts down on the flaring that's long streaked over the lakefront. It has also built a \$235 million wastewater treatment unit and is in the process of building a \$300 million naphtha hydro-treating unit to reduce sulphur emissions to comply with federal environmental rules. Other oil companies also once operated refineries nearby. For instance, Sinclair Oil Co. and Atlantic Richfield Co. owned a 280-acre facility in East Chicago that was in operation from 1918 to 1976 (the site was demolished in 1984).



The 130-year-old BP Whiting refinery is still going strong. Photo courtesy BP.

The last stop on our tour will examine some of the archeological remains of the once-vast steel industry within the Chicago city limits, the **U.S. Steel South Works**, which operated from 1882 to 1992. This 570-acre facility stretched along Lake Michigan from 79th Street to the Calumet River and once employed 20,000 people.

The South Works was a major producer of structural steel used in numerous bridges and skyscrapers. It made the beams and girders used in many downtown Chicago buildings, including the 110-story Willis (Sears) Tower. One of the few remnants of this complex, which once featured 31 open-hearth furnaces, are the massive ore walls that run parallel to the North Slip. Ships would dock and unload their cargo of iron ore in this spot, which was piled high against the walls.

The South Works site remains undeveloped, but several projects have been discussed. One recent scheme from an Irish real estate developer called for the construction of 20,000 homes.

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T-2: ILLINOIS RAILWAY MUSEUM

AUSTIN WEBER

The Illinois Railway Museum in Union, IL, is located between Chicago and Rockford, two cities that were first connected by rail back in 1852. Today, this 150-acre facility features a vast collection, including more than 75 historic steam and diesel locomotives, 88 freight cars, and 71 passenger cars. In addition, there are 42 interurban cars, 27 rapid transit cars, and 25 streetcars.

Old and rare pieces are housed in 14 exhibit barns, while newer items are on display outdoors. Many of the cars and locomotives in the collection were built in the Chicagoland area by companies such as Pullman and General Motors' Electro-Motive Division (EMD).

The museum features historic pieces donated from railroads around the U.S. However, items that once ran locally on the Chicago & Northwestern and Milwaukee Road are highlighted.

The Illinois Railway Museum features a 5-mile line where vintage equipment operates through the countryside along the former right-of-way of the Elgin & Belvidere interurban railroad. Since it opened in 1965, many motion pictures have been filmed at the museum, including *The Untouchables* (1987), *A League of Their Own* (1991), Groundhog Day (1992), Flags of Our Fathers (2005), and Transformers 4 (2014).

One of the museum's gems is the streamlined, Art Deco "Nebraska Zephyr." The shiny, polished steel trainset consists of five articulated passenger cars that once operated between Chicago and Omaha on the Chicago, Burlington & Quincy Railroad. It features an E5 diesel locomotive dubbed the "Silver Pilot" that was made near Chicago by EMD in 1940.

The oldest locomotive in the collection is Illinois Central No. 201. The 2-4-4T "tank" was built in 1880 by the Rogers Locomotive and Machine Works of Paterson, NJ. The locomotive hauled commuter passenger trains in the Chicago area for more than four decades until the Illinois Central electrified its south suburban line in the mid-1920s. This locomotive, and similar machines, hauled millions of people to and from the 1893 World's Columbian Exposition in Jackson Park on Chicago's South Side.

The locomotive features an unusual configuration, with the coal bunker and water tank positioned over the trailing truck. The design is known as a "Forney" after its



This Illinois Central locomotive hauled millions of people to and from the 1893 World's Columbian Exposition. Photo courtesy Illinois Railway Museum


This North Shore Line interurban car was built by Pullman on the South Side of Chicago in 1928. The 129-year-old Spaulding Tower is in the background. *Photo by Austin Weber*

designer, Matthias Forney, who worked for the Illinois Central and was a founding member of the American Society of Mechanical Engineers. This type of design enabled the locomotive to easily operate in either direction and negotiate tight curves. Because of this feature, Forney's were used on Chicago's first elevated rapid transit trains in the 1890s.

Another museum highlight is the North Shore Line's Electroliner. This streamlined, articulated train was built in 1941 for high-speed service between Chicago and Milwaukee. The 155-foot-long trainset was totally restored to its 1950s appearance at a cost of more than \$150,000.

The Illinois Railway Museum claims that its 51-piece Chicago Collection is "one of the finest and most comprehensive representations of any transit company in the Western Hemisphere." It includes streetcars, trolley buses, rapid transit "L" cars, and track maintenance equipment. Highlights include a horse-drawn streetcar from 1859 and an open-end "L" car from 1898. The museum also has a large collection of street railway and interurban cars that once operated in Milwaukee. Other interesting items on display include an electric locomotive and rolling stock from the Chicago Tunnel Co., a private freight railroad that operated more than 60 miles of narrow gauge track 40 feet below downtown Chicago from 1903 to 1959.

In addition to locomotives and rolling stock, the Illinois Railway Museum features an interesting assortment of historic structures and restored vintage signs.

The East Union Depot was built in 1851 to service the nearby town of Marengo, IL, on the Galena & Chicago Union Railway. Today, it is the oldest active railroad station west of Pittsburgh and serves as the embarkation point for rides on diesel, electric-, and steam-powered equipment. A train trip on the museum's five-mile railroad takes between 35 and 45 minutes.

The Spaulding Tower served a busy junction near



The Illinois Railway Museum features restored trains that operate on a 5-mile track. *Photo courtesy Illinois Railway Museum*

Elgin, IL, for more than 90 years. It housed a 36-lever, hand-operated interlocking machine that controlled all the track switches and signals at the Spaulding junction of the Milwaukee Road and Elgin, Joliet & Eastern Railway.

After it closed in 1978, the 50th Ave. "L" station and island platform were dismantled in Cicero, IL, and moved to the Illinois Railway Museum where they were eventually restored and placed back in service. The historic wood-frame clapboard structure was built in 1910 for use on the Douglas Park branch of the Metropolitan West Side Elevated. Today, historic maps and artifacts decorate the interior.

The museum campus is also dotted with restored signs such as the large "Santa Fe" letters that once graced



Vintage baggage carts create a nostalgic scene at the 168-year-old East Union Depot as a Chicago, Aurora and Elgin interurban train glides past in the background. *Photo by Austin Weber*

the Railway Exchange Building on Michigan Avenue in Chicago.

The Illinois Railway Museum is currently in the process of building a main entrance that will recreate a circa-1958 Midwestern Main Street scene. It also recently acquired a 150-foot-long turntable that once operated at the Denver & Rio Grande Western Railroad's Burnham shop complex in Denver, CO. Future plans call for the construction of a 28-stall roundhouse and an attached back shop that will house the museum's collection of steam locomotives.

SOURCE

A Museum in Motion. Union, IL: Illinois Railway Museum, 2004.

T-3: CHICAGO LOOP ARCHITECTURE WALKING TOUR

AUSTIN WEBER & WARD MILLER

Chicago is a living museum of architecture. The city boasts some of the most innovative and beautiful buildings in the world, representing multiple architectural styles and genres that range from earliest buildings around the time of the Great Fire of 1871, to the world-renowned structures of The Chicago School or Chicago Commercial Style, to Art Deco-Art Moderne, Modern and Post-Modern styles. These structures house a wide range of uses including offices, apartments, churches, and even rail terminals, retail stores, and theatres.

Some of the more notable buildings located in downtown Chicago include the following:*

Auditorium Building (430 S. Michigan Ave.) This 1889 building was by far the largest commission of architects Dankmar Adler and Louis Sullivan. At the time, it was the tallest, largest and heaviest structure in Chicago and the rival of the world's cities. The Auditorium Building houses a 4,300-seat Auditorium Theatre that is still in active use and is famous for its rich ornamentation, acoustics, inventiveness and its sheer beauty. The building also once contained offices and the Auditorium Hotel, which were later transformed into classrooms for Roosevelt University. Frank Lloyd Wright served as a draftsman on the project, which he proclaimed the Auditorium Theater to be "the greatest room for music and opera in the world."

Chicago Board of Trade (141 W. Jackson Blvd.) This Art Deco-Art Moderne gem was designed by Holabird & Root and opened in 1930. The 45-story skyscraper anchors the south end of the LaSalle Street "canyon." The peak of the roof is topped by a 32-foot aluminum sculpture of Ceres, the Roman goddess of agriculture.

Chicago Cultural Center (78 E. Washington St.) This imposing building across from Millennium Park served as the home of the Chicago Public Library from 1897 to the mid-1970s. Today, it is used for a variety of exhibitions, lectures, and concerts. The building is famous for housing the world's largest stained glass Tiffany dome, which measures 38 feet in diameter and con-



The Auditorium Building in 1890. Courtesy Library of Congress

tains 30,000 pieces of glass. Another equally impressive dome by Chicago art glass artisans Healy & Millet is also located in the building. It is 40 feet in diameter and contains 50,000 pieces of glass.

Chicago Theatre (175 N. State St.) This former vaudeville movie palace is well-known for its iconic marque. Designed by legendary theatre architects Cornelius and George Rapp--Rapp & Rapp, (the duo also designed many other venues, such as the nearby Nederlander Theatre on Randolph Street) in 1921, it features an interior inspired by the French Renaissance.

Chicago Water Tower (806 N. Michigan Ave.) This tall, slender castellated stone structure is beloved by generations of Chicagoans, and is celebrating its 150th anniversary this year. The castle-like building, designed by W. W. Boyington, is constructed from Joliet limestone, and survived the Great Chicago Fire of 1871. It was built to disguise a 3-foot-diameter, 140-foot-tall iron standpipe that was needed to provide water pressure for the nearby buildings of the City's North Side. A matching Gothic Revival style pumping station located on the east side of Michigan Avenue, also by W.W. Boyington, is still in use today and also houses the Lookingglass Theatre.

Civic Opera House (20 N. Wacker Dr.) This Art Deco skyscraper designed by Graham, Anderson, Probst & White was the brainchild of Samuel Insull, a controversial electric utility magnate in the 1920s. It was dubbed "Insull's

^{* -} Due to time constraints, not all of these buildings will be included on this tour.

Throne," because of its armchair like appearance from the Chicago River. The building houses a large theatre that hosts opera and theatrical productions.

Dearborn Station (47 W. Polk St.) This is one of only two remaining classic railroad stations in Chicago (the Windy City once had six major terminals). At one time, the Romanesque Revival style building, which opened in 1885, was the second busiest train station in Chicago, serving passengers traveling on the Erie, Grand Trunk Western/Canadian National, Monon, Santa Fe, and Wabash railroads. For decades, Dearborn Station was associated with glamorous movie stars and other celebrities traveling to and from Hollywood on legendary trains such as the "Super Chief." After the last train pulled out in 1971, the historic head house and its distinctive red clock tower were preserved and converted into offices, restaurants, and shops. A massive train shed, which was one of the largest in the Midwest, was demolished in 1976.

John Hancock Building, also known as 875 N. Michigan Ave. This 100-story building anchoring the top end of the Magnificent Mile was formerly known as the John Hancock Center. Designed by Skidmore, Owings & Merrill in the late 1960s, this iconic tapered structure features exterior X-shaped bracing that is designed to withstand strong winds. A popular observatory on the 94th floor called 360 Chicago provides spectacular views of the city by day or night.

James R. Thompson Center (100 W. Randolph St.) This Helmut Jahn-designed office building has been controversial since it was built by the State of Illinois in the mid-1980s. The curved glass-walled structure is famous for its futuristic styling and a 17-story atrium topped by a skylight. Its grand plaza houses a remarkable 20th Century sculpture by Jean Dubuffet, titled "Man with Standing Beast."

Marshall Field & Company Building, now home to Macy's State Street (Block bounded by State, Randolph, Washington and Wabash Avenues) This building once housed Chicago's world-famous Marshall Field's department store. The landmark designed by Daniel Burnham is well-known for its two massive 7-1/2 ton outdoor clocks that have served as a local meeting point for Chicagoans---"Meet me under the (Marshall Field) Clock" a famous spot since their installation in 1907, and perhaps even before with an earlier clock. Inside, the building contains a 13-story atrium topped by a skylight and another spectacular 5-story atrium topped by a large vaulted ceiling that contains more than 1.6 million pieces of iridescent glass--the largest Tiffany mosaic in the world.



Marina City. Photo by Eric Allix Rogers

Marina City (300 N. State St.) The twin reinforced concrete were revolutionary when built in the early 1960s on the site of a former Chicago & Northwestern Railway freight yard. Since then, the 65-story residential towers designed by Bertrand Goldberg, have been the site of several spectacular stunts. In 1979, during filming of The Hunter, a movie starring Steve McQueen, a car plunged off a 17th floor parking lot into the Chicago River (the scene was repeated in 2006 for a TV commercial by Allstate Insurance Co.). In 2014, daredevil Nik Wallenda walked across the Chicago River on a tight rope suspended from the west tower of Marina City to the Leo Burnett building on Wacker Drive. After he returned to the west tower, he crossed to the east tower blindfolded. The entire complex is now a Designated Chicago Landmark.

Merchandise Mart (222 W. Merchandise Mart Plaza) When this massive Art Deco building along the Chicago River opened in 1930, it was the largest structure in the world. The building designed by Graham, Anderson, Probst & White (formerly Daniel Burnham's firm and Burnham & Root), contains 4 million square feet of offices, design centers, and wholesale showrooms. At night, the facade is used for a projection-based light show called Art on theMART.

Monadnock Building (53 W. Jackson Blvd.) This 16-story masonry structure by architects Burnham & Root was considered a modern marvel when it was built in 1891. The building is famous because it marked a historic transition in the development of structural methods where masonry was replaced by steel. Several important



Tribune Tower. Photo by Eric Allix Rogers

bridge engineering firms once had offices in this building, including the Scherzer Rolling Lift Bridge Co. and the Strobel Steel Construction Co.

Palmolive Building (919 N. Michigan Ave.) This often-overlooked Art Deco skyscraper designed by Holabird & Root in the late 1920s is famous for its shallow setbacks and gently tapering design. The top of the 37-story limestone-sheathed building features a 65-foottall aluminum-clad steel tower that houses a beacon designed by Elmer Sperry (the inventor of the gyroscope). At one time, it was the most powerful aviation beacon in the world and was visible to aviators up to 300 miles away.

Reliance Building (32 N. State St.) This 14-story building designed by Burnham & Root and Charles Atwood opened in 1895. It is famous for its soaring metal skeletal frame and its use of large bay windows, its undulating façade and delicate white terra cotta ornamentation.

The Rookery (109 S. LaSalle St.) This sturdy 12-story, reddish-colored office building was designed by Burnham & Root in 1888. It is famous for its massive and beautifully articulated facades, along with its stunning interior, which features a large light court covered by a skylight and an 8-story spiral staircase. From his office on the 11th floor, Daniel Burnham designed many famous buildings, including the spectacular "white city" of the 1893 World's Columbian Exposition in Jackson Park.

Sullivan Center-Schlesinger & Mayer Store-Carson

Pirie Scott Store (1 S. State St.) Formerly the home of the Carson Pirie Scott & Company department store, this building is situated at an intersection that was once called "the world's busiest corner." Louis Sullivan designed the building in 1899-1904, and it is considered to be his greatest work. The structure exemplifies the Chicago School of Architecture, with its bold design and delicate facades, which also feature broad "Chicago Windows". Sullivan's use of bright white ornamental terra cotta—and its elaborate cast-iron ornamentation inspired by nature and the seed-germ are remarkable.

Chicago Tribune Tower (435 N. Michigan Ave.) This 36-story skyscraper inspired by gothic European cathedrals was the winner of a famous architecture competition in the early 1920s to design "the most beautiful and distinctive office building in the world." The outside of this historic building is embedded with fragments from more than 100 of the world's most famous structures and historic sites, including the Great Pyramid of Cheops, the Great Wall of China, Notre Dame Cathedral, the Parthenon, and Westminster Abbey. The *Chicago Tribune* vacated the building last year and it's currently being converted into high-end condominiums.

Union Station (210 S. Canal St.) This busy transportation hub has served local commuters and long-distance, overnight rail passengers since it opened in 1925 along the Chicago River. The classical-revival Beaux-Arts style structure was designed by Graham, Anderson, Probst & White (Daniel Burnham's former firm) and once served legendary streamlined trains such as the Burlington "Zephyr" and the Milwaukee Road "Hiawatha." It featured a stunning glass and metal-enclosed passenger Concourse Building that was demolished in 1969. However, the historic Great Hall remains in use as a waiting room and a popular spot for private parties. It features massive columns and a fully-restored 219-foot-long barrel-vaulted skylight that is 115 feet above the floor.

Sears Tower- Willis Tower (233 S. Wacker Dr.) This building, formerly known as the Sears Tower, was the tallest in the world when it opened in 1973. Designed by Skidmore, Owings & Merrill, it features a tubular construction method. The Skydeck and Ledge on the 99th floor is a popular tourist destination. Wrigley Building (400 N. Michigan Ave.) This iconic building designed by Graham, Anderson, Probst & White is famous for its large clock tower and gleaming white facade. It was built in the early 1920s to serve as the corporate headquarters of the Wrigley Company (makers of Wrigley's chewing gum) and the gateway to the Magnificent Mile.

ALSO WORTH A LOOK

Historic architecture thrives a short walk away from McCormick Place. Two areas to check out on your own are Motor Row and Prairie Avenue.

Motor Row (2200 to 2500 S. Michigan Ave.) This historic district features buildings that once housed early automobile dealers and fancy showrooms for brands such as Buick, Cadillac (2309 S. Michigan Ave.), Fiat, Federal (2337 S. Michigan Ave.), Ford (2229 S. Michigan Ave.), Graham-Paige, Hudson (2222 S. Michigan Ave.), Marmon (2232 S. Michigan Ave.), Locomobile (2401 S. Michigan Ave.), Packard, Peerless, Pierce-Arrow, and Stutz.

Some of the buildings were designed by notable archi-

tects such as Alfred Alschuler (Hudson, Marmon, and Thomas Flyer), Albert Kahn (Ford and Packard), and Holabird & Roche (Cadillac). Chess Records, the recording home of many famous blues musicians, such as Bo Diddly and Muddy Waters, was located nearby at 2120 S. Michigan Ave. Motor Row was added to the National Register of Historic Places in 2002.

The **Prairie Avenue Historic District** was home to Chicago's wealthy elite in the late 19th century. Residents included Philip Armour, Marshall Field, William Kimball, and George Pullman. Several homes, including their period interiors, have been preserved, such as the Henry B. Clarke House (1855 S. Indiana Ave.) and the **Glessner House** (1800 S. Prairie Ave.).

The **Clarke House** is the oldest building in Chicago, dating back to 1836, a year before the city was incorporated. When the house was moved to its present site in 1977, it required a remarkable feat of engineering that included lifting the structure up and over nearby "L" tracks. The 1886 Glessner House, designed by H.H. Richardson, was the family home of John Glessner, one of the founders of International Harvester Co.

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THE PLANT – 1400 WEST 46th STREET

The Plant is a former 1925-vintage Peer Foods meatpacking plant in the Back of the Yards neighborhood of Chicago that has been repurposed as an incubator for food and farming businesses. The 93,500 sq. ft. facility is a collaborative community of small food businesses, all focused on growing, producing, and/or sourcing a variety of food products and bringing jobs to a disinvested community. The Plant currently houses over a dozen small businesses, including indoor and outdoor farms, kombucha and beer breweries, a bakery, a cheese distributor, a coffee roaster, and other emerging food producers and distributors.

As of early 2018, there were approximately 85 full-time equivalent job positions based at the facility. The Plant is still under construction and is approximately 70% leased up. They anticipate reaching full build-out in 2019.

Founded on a model of closing waste, resource, and energy loops, The Plant is working to show what truly sustainable food production and economic development looks like by growing and producing food inside a repurposed industrial building. A planned anaerobic digester is a key feature at The Plant, designed to solve several critical issues by reusing what is conventionally considered "waste" while creating several valuable outputs. Waste from the building will be a fraction of the volume of waste processed by the digester, yet the digester will demonstrate that even food production businesses, which are typically waste and energy intensive, can operate sustainably by closing waste loops. While the digester project has been on hold due to a financing gap, progress on sitework was made in 2018 and it is hoped that installation of equipment will recommence in 2019.



The Plant is located in the 1925 Peer Foods meatpacking plant. Photo by Serhii Chrucky

F-1: NORTH SIDE INDUSTRY AND TRANSIT **HISTORY**

JACOB KAPLAN

Skokie Shops - 3701 Oakton Street, Skokie, Illinois

The Skokie Shops are the Chicago Transit Authority's primary railcar heavy maintenance facility. While eleven shops are located at the end of the individual transit lines, all heavy repair work and overhaul takes place here. Skokie is the Chicago equivalent to New York's Coney Island Shops.

Chicago's elevated system has a storied history beginning in 1892 with the opening of the South Side Elevated. Three additional elevated rail companies followed shortly thereafter, serving the city's north and west

sides. Later, these companies combined to form the Chicago Rapid Transit Company (CRT).

The CRT expanded rapidly with new lines in the 1920s. One of these lines was designed to serve the community of Niles Center, now Skokie. The line opened in 1925, and since the CRT was in need of a new large maintenance facility, a location in the wide open spaces of Niles Center seemed ideal. Thus, the Skokie Shops were born.

In the late 1920s, a paint shop was opened here. It would be the first of 10 buildings to eventually occupy the 15-acre site. In 1930, a second building was added to handle general rehabilitation activities.

When the Chicago Transit Authority formed in 1947 and took over the CRT's operations, much of the physical



Car house under construction at CRT Skokie Shops in 1927. Courtesy Chicago Transit Authority



The CTA Skokie Shops in the 1970s. Courtesy Chicago Transit Authority

plant of the elevated system was dated and in disrepair. Many of the individual shops at the ends of the elevated lines were crumbling. The Skokie Shops was the newest CRT facility. The CTA decided to enlarge it and make it into a truly expansive site. When the Niles Center line ended service in 1948, the Skokie Shops remained in use and the trackage to it was maintained, later to be served by the Skokie Swift (now Yellow Line) beginning in 1964.

For a time, buses were even maintained at Skokie Shops as the CTA centralized many operations here. The maintenance activities for railcars evolved over the years, switching from carpentry on wooden cars to aluminum and stainless steel fabrication on modern rolling stock for instance. In the mid to late 1990s, the CTA conducted a large renovation and modernization of the facility. The original 1926 shop building was demolished as part of this effort.

S&C Electric Company – 6601 N Ridge Boulevard, Chicago, Illinois

Chicago has long been a leader in electrical equipment manufacturing. Switches, fuses, line equipment and all types of distribution technology have been produced in the city, owing to Chicago's central location and position as a transportation hub. S&C Electric Company is one of the city's most storied manufacturers of this equipment. The firm was founded in 1911 by Edmund O. Schweitzer and Nicholas J. Conrad – thus the moniker S&C. They were both employed at the time by Chicago's electric utility, Commonwealth Edison. During their time at ComEd, they developed a solution for high-voltage arcing which often caused fires – the Liquid Power Fuse, a spring-loaded fuse inside a glass tube filled with a fire-suppressing liquid, carbon tetrachloride. The two went into business manufacturing these fuses as well as other products and switches, selling much of the equipment to large utilities.

S&C grew from there. First located in the Ravenswood neighborhood, they moved north to Rogers Park in the 1950s and began assembling land for their growing enterprise. The company was a large military contractor during World War II and then grew even larger in the postwar years. In 1961 they opened the Conrad Laboratory and began offering testing opportunities for their products and customers. By the mid-1970s they employed over 1,400 people in the Chicago area, and would grow this number to 1,700 by the early 2000s. They also had manufacturing facilities and research and development operations around the world.

While remaining a major manufacturer of electrical switches, the company has recently become a leading manufacturer of "Smart Grid" technology. These products help maintain power during peak loading times, and



The S&C labs in the 1970s. Courtesy S&C Electric Company

operate so that even if a portion of the power grid goes down it can quickly be bypassed to keep customers supplied with power. The firm recently opened an Advanced Technology Center (ATC) to help continue their development and testing of new highly sophisticated power distribution technologies.

Life Fitness – 10601 Belmont Avenue, Franklin Park, Illinois

The diversity of manufacturing operations in the Chicago region is exemplified by this facility. Life Fitness manufactures exercise equipment such as stationary bikes and treadmills. The Franklin Park factory building it is located in was once home to Bally Manufacturing, the well-known manufacturer of pinball machines and arcade games. In fact, the building we will be touring once made all of the Pac-Man and Ms. Pac-Man machines during the arcade craze of the 1980s.

The Chicago area has long been central to the pinball and video game industry. Many of the companies involved in this field of manufacturing got their start making mechanical games, jukeboxes, slot machines and similar mechanical equipment. Bally is no exception. Chicago's central location, large furniture industry necessary for the cabinets that hold this equipment, and large precision manufacturing workforce all contrib-



The S&C cutout production line at the Rogers Park plant in 1954. *Courtesy S&C Electric Company.*

uted to the growth of this industry. Once the video game era came about in the late 1970s, even though many of the games themselves were programmed in California or Japan (though some were also designed here), many were manufactured in the Chicago area by Bally and other companies.

This leads us to the history of Life Fitness. The Lifecycle, a computerized stationary exercise bicycle, was created by Keene P. Dimick in 1968. In 1977, Augie Nieto and Ray Wilson established the company Lifecycle to make this bike. In the early 1980s, Chicago-based Bally was diversifying and entering the fitness market. They purchased Lifecycle and renamed it Bally Fitness Products. Thus, Lifecycle products began to be manufactured in the same Franklin Park Bally facility that previously made arcade and pinball games.

Later renamed Life Fitness, the company would go through two ownership changes. It was sold to private equity firm Mancuso & Company in 1991, the same year it expanded into treadmills. Then it was purchased by Brunswick Corporation in 1997, which it remains a division of to this day. The company still manufactures treadmills and exercise bikes in the same facility that once made Bally pinball machines and video games 35 years ago.



The Life Fitness production line. Courtesy Life Fitness

Former Metropolitan "L" Bridge – Kinzie Street west of Paulina Street, Chicago, Illinois

One of Chicago's four original private elevated railroad companies, the Metropolitan West Side Elevated began service in 1895, running from downtown into four west side neighborhoods – Garfield Park, Douglas Park, Humboldt Park and Logan Square. This now-abandoned bridge dates from the original elevated route to Logan Square and Humboldt Park.

The Metropolitan or "Met" ran west from downtown

(later the Loop Elevated when it opened in 1897) in the general route of the Congress (now Eisenhower) expressway. When it reached Marshfield Junction, it split into three lines, with one route turning north towards Logan Square. This route required a bridge over the mainline of the Chicago & North Western and Milwaukee Road tracks out of downtown Chicago. Thus, a stationary Camelback pin-connected through truss bridge was constructed and placed into service in 1895. It is a very unique bridge for the Chicago area, which does not have many examples of this type of bridge, and its lightweight truss members make it more like a highway bridge than a railroad bridge.



The 1895 Met "L" bridge. Photo by Serhii Chrucky

The "Met" bridge served "L" trains for 50+ years, through the consolidation of the four elevated companies into the Chicago Rapid Transit Company (CRT) in 1924, and the creation of the publicly owned Chicago Transit Authority (CTA) in 1947. Its days by then were numbered. A new subway was under construction, the Milwaukee-Dearborn subway, which would provide a faster route to downtown and replace much of the original "Met" route including this bridge. After the subway opened in 1951, regular service over this bridge ended. However, the original route remained operational for work trains and fan trips. Finally, in 1964, the original route between Division Street and Lake Street was demolished. This bridge, however, remained, and serves as a signal bridge for today's Metra commuter rail service, as well as one of the last reminders of a long gone original "L" routing.

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F-2: SOUTHWEST SIDE AND CENTRAL MANUFACTURING DISTRICT

JOSEPH SCHWIETERMAN, MATTHEW JACQUES & JACOB KAPLAN

Vienna Beef – 1000 West Pershing Road, Chicago, Illinois

Our historical tour of Chicago will include a rare visit to this famous hot dog manufacturer. Vienna Beef has called Chicago home since the Columbian Exposition of 1893, and their current headquarters resides at the intersection of Elston, Damen, and Fullerton Avenues, on the Chicago River. Although their factory was originally located in the same facility as the headquarters, the factory was relocated to 1000 W. Pershing Road in Chicago's Bridgeport neighborhood in the summer of 2016.

Vienna Beef got its start when Emil Reichel and Sam Ladany opened their first store on Chicago's Near West Side at 417 South Halsted Avenue. The pair emigrated from Vienna, Austria, to Chicago in the early 1890s, and first sold their hot dogs during the Columbian Exposition.

By 1900, Vienna Beef started selling and delivering, supplying other restaurants and stores in and around Chicago. By the end of the decade there were horsedrawn carriages delivering Vienna Beef products all throughout the city as the company expanded to meet newfound demand.

By 1930, Vienna Beef retired its horse-drawn fleet, making the change to automobiles. During the Great Depression, many Vienna Beef vendors started advertising their hot dogs had a "salad on top," which gave way to the popularity of the traditional Chicago-style hot dog. Don't forget: always tomatoes, never ketchup.

In the post-war era, the company began distributing throughout the country, starting with the Midwestern states and local supermarkets. Before long, demand for Vienna Beef started sweeping the nation, becoming a staple in many markets.

In 1972, Vienna Beef took up residence on Chicago's North Side, at 2501 North Damen Avenue, where its headquarters remain to this day. In 1982, Jim Eisenberg and Jim Bodman purchased the company from the Ladany family, and Vienna Beef is still led by them today.

Vienna Beef moved into its state-of-the-art production plant on Pershing Road in 2016, with its corporate offices and original factory store remaining on Damen Avenue.



The Vienna Beef smoke house, 1913. Photo credit: Vienna Beef



The plant on Halsted Street. Photo credit: Vienna Beef

In 2018, for its 125th Anniversary, the company celebrated by opening the Vienna Beef History Museum at Damen Avenue. The venue hosts memorabilia and artifacts highlighting the company founders and timeline, an interactive memory wall, classic manufacturing equipment, as well as old advertising & sponsorship affiliations since its inception. Further, Vienna has launched a special "anniversary edition" replica vintage delivery truck from 1929, classic package, and product wrappings.

On our tour, we will go inside the factory to take a look at some of their modern manufacturing equipment. We will also reflect on this staple of the city, and how its manufacturing and distribution has evolved from its early days located not far from the famous Chicago stockyards.



The Union Stock Yard, 1947. Courtesy Library of Congress

Union Stock Yard & Gate – Halsted Street and Exchange Avenue, Chicago, Illinois

Chicago's famous moniker "Hog Butcher to the World" came about as a result of the famous Union Stock Yard. It opened on Christmas Day 1865 and consolidated several smaller stockyards located around the city. By the mid-1870s, meatpackers began to locate next to the stockyards in so-called "Packingtown." Companies such as Armour, Swift and Wilson commenced massive operations that employed thousands of people in the area.

The stockyard itself was successful because of innovations in transportation; namely, the refrigerated railcar. This also resulted in its demise. The move to trucking, direct sales from breeders to packers, and decentralization meant by the 1950s it was already on its way out. Most of the packinghouses had closed by then. The Stock Yard itself closed on August 1, 1971 after handling more than 1 billion animals. Most of the buildings were demolished, and the site became a large industrial park – essentially, a modern version of the Central Manufacturing District. It was and continues to be a huge success with many light manufacturing operations.



Union Stock Yard Gate. Photo by Serhii Chrucky

The main remnant of the Stock Yard is the gate, probably designed by John Wellborn Root of Burnham and Root. Constructed in 1879 of Joliet limestone, the gate and a since-demolished gatehouse were the only two structures to survive the massive 1934 fire that leveled



Wheatland Tube. Photo credit: Serhii Chrucky

the Yards. Restored in the 1970s, it was designated a Chicago Landmark in 1972. The city's main memorial to firefighters killed in the line of duty is directly behind it, significant because of the number of major fires in the Stock Yard over the years.

Wheatland Tube – 4435 South Western Boulevard, Chicago, Illinois

Wheatland Tube, owned by Zekelman Industries (formerly JMC Steel Group prior to 2016), has been a part of the American industrial landscape for more than a century.

In 1877 in Philadelphia, Pennsylvania, Irish immigrant John Maneely launched a pipe distribution business selling pipe, valves and fittings.

In the 1920s, the John Maneely Company grew to become one of the largest independent distributors of steel and iron pipe on the East Coast. John's son, Edward Maneely, selected the town of Wheatland, Pennsylvania, as the site for the company's first plant, and by 1931 Wheatland Tube Company produced its first piece of pipe.

From the 1940s through the 1960s Wheatland Tube saw massive expansion and improvements, with upgrades in manufacturing methods leading to additions to the product line. By the late 60's, the success of Wheatland's conduit sales prompted management to consider a companion product to rigid conduit, a thinner wall tubular product known as Electrical Metallic Tubing, or EMT. In 1969, JMC acquires the assets of International Conduit Company (ICC) a Chicago, Illinois based independent manufacturer of EMT. These assets include an electric resistance weld (ERW) tube mill and EMT finishing line on Chicago's South Western Boulevard.

Within a year of purchase, Wheatland Tube Company Chicago Division established itself as a producer of high quality EMT. In 1975, Wheatland extended the product line to include the manufacture of couplings and fittings. The Wheatland Tube Chicago facility started production on intermediate metal conduit (IMC) production in 1987, and the next decade saw even more growth for the Chicago division with the completion of the Mechanical Tube Division of Wheatland.

The Carlyle Group, a private equity firm in Washington DC, purchased John Maneely Company in March of 2006, and the JMC Steel Group was formed. By 2011, the Zekelman family acquired a majority stake JMC.

In 2016, the JMC Steel Group changed its name to Zekelman Industries, and today, Wheatland is a division of Zekelman Industries, the largest independent steel pipe and tube manufacturer in North America.

For a century, Chicago was the center of the industrial heartland, and Wheatland was a significant player in steel production. On our tour, we will put on our hard hats and explore the site of one of the city's most historic companies and consider how their practices have evolved over the decades.

McKinley Park – 2210 West Pershing Road, Chicago, Illinois

Located next to Brighton Park and Back of the Yards,



The CMD Pershing Road development, pictured in the 1960s. Courtesy Epstein Global

McKinley Park boasts over 70 acres of public space, with physical structures including two gyms, a gymnastics center, kitchen, and auditorium. Visitors are welcomed by a swimming pool, sports fields and courts, an ice skating rink, and a playground, which was renovated by Mayor Rahm Emanuel in 2014 as part of the Chicago Plays! Program.

In October of 1901, just one month after William McKinley was assassinated, Chicago's South Park Commission (SPC) named a new and incomplete park after the deceased 25th President.

At the time, it was unheard of to place a park in a neighborhood, rather than in a central location, because the city's existing parks were typically not located near the dirty, loud, congested tenements. However, the visionary SPC Superintendent J. Frank Foster had a new idea for a new sort of park, one that would provide much-needed social services and green space in these oft-forgotten areas.

By purchasing up property near the Union Stock Yards that had previously been the Brighton Park Race Track, the SPC set in motion this experiment to reshape the city through park planning. From the beginning, McKinley Park contained ballfields, space for lawn tennis, a swimming and wading lagoon, and a classically inspired bathhouse.

The experiment into unchartered territory proved wildly

successful as over 10,000 people showed up for the park's official dedication ceremony on June 13, 1902. So successful, in fact, that the next year the SPC undertook a whole new program dedicated to creating a network of South Side neighborhood parks, and 10 were opened to the public by 1905. Many attribute the success that began with McKinley Park as a major influence toward new park development in other metropolitan areas throughout the United States of America.

McKinley Park doubled its size in 1906, when the SPC expanded the park by more land acquisition nearby. This allowed for a playground, a plaza, open-air gyms, and a field house. Today the park continues to serve neighborhood residents and its lasting impact led to the naming of the entire neighborhood after this experimental and influential park.

As we tour the park, we will consider the space's remarkable legacy, both around Chicago and across the nation.

Little Englewood – 601 West 63rd Street, Chicago, Illinois

Although the Little Englewood station no longer stands, its canopies and the bridge that takes CTA Green Line "L" trains over the site remain. This station is located just a few blocks west of the much larger Englewood Station at 63rd and State. Little Englewood served the Erie Railroad, Monon Railroad, Wabash Railroad, Chicago and Eastern Illinois Railroad, and Chicago and



The original CMD development, pictured in 1915. Courtesy Library of Congress

Western Indiana Railroad. Famous trains, including the Erie's Lake Cities, C&EI's Dixie Flagler, and the Wabash's Banner Blue used this station.

We'll learn about the significance of the network for stations along 63rd Street, including their role as major connecting points for Chicago passengers, linked by the 63rd Street streetcar. We'll also learn about the massive investments being made near 75th Street to unclog traffic on the rail line that passed through Little Englewood. It is remarkable that the canopies for Little Englewood still stand, despite being unused since May 1971, when the last intercity passenger train departed.

Central Manufacturing District and Ace Industries – 3433 West 48th Place, Chicago, Illinois

The Central Manufacturing District, or CMD, is the first planned industrial district developed in the nation. It was founded in 1905 by Frederick Henry Prince, an east coast investor who also owned the Chicago Junction Railway, a switching line that served the nearby Union Stock Yard. Prince wanted to expand his operations and had the idea to create a planned industrial park on land he owned adjacent to the railway. Prince's Central Manufacturing District was an all-encompassing planned effort. The company provided everything a factory owner needed, including banking and security services. Streets were privately maintained, landscaping was provided for and there was even a private club for business executives. It was essentially a turnkey operation for those that wanted to open a new factory or branch plant in Chicago; architectural services were provided as well. There were incubator buildings available as well as new sites for plants in the development.

The CMD was a huge success. By 1915, 200 firms were located here making a wide range of products. Over 40,000 people worked in the area at the time when combined with the Union Stock Yard. It was so successful that it soon outgrew its original location. Within ten years of opening, Prince began construction on a second development in 1915, on Pershing Road directly across from McKinley Park. This 90-acre development was even more advanced, and it included a combined freight house that was connected to all of the adjacent factory buildings by underground tunnels served by small electric trucks. The centerpiece of this development is an iconic multi-story brick tower concealing a water tower. The CMD inspired similar industrial developments in Chicago and elsewhere. The Clearing Industrial District on the southwest side near Midway Airport developed similarly around a huge railyard. Both Clearing and CMD built additional industrial parks throughout the Chicago area.

The CMD constructed additional developments in the city, including the 60-acre Kedzie District in 1919, home to Ace Industries, which we will tour today.

Ace Industries is a third-generation, family owned 42,000 square foot electroplating and metal spinning facility with an in-house tool and die facility. A family business, it is now in its third generation of ownership. After years of working as a foreman in a metal finishing factory, Stanley Holewinski struck out on his own in 1962 and started Ace Plating Company with electroplating equipment purchased from a failed company. Ace-plated finishes include brass, bronze, copper, nickel and chrome. The company also provides polishing and buffing services. Stanley's son Mike took over in 1987, and upon his death in 2016, his son Jeff carries on the family business.

Acme Spinning Company was acquired by Ace in 1987. Ace Industries, as the combined company is named, provides electroplating services of a decorative nature, as well as metal spinning and stamping. Acme spins a variety of metals and produces a multitude of parts including kettles for Salvation Army, lava lamps, pans for gold panning and musical instruments. Acme has a large collection of proprietary tooling. In 2000, F&S Stamping was merged into Acme Spinning. F&S had a tool and die operation, so this gave Ace Industries the



1947 map of CMD developments. Author's collection.

ability to create their own tooling. Today, approximately 98 percent of the tooling required to make products is created in-house.

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F-3: STEEL, WATER AND PULLMAN

TOM SHEPHERD & JACOB KAPLAN

ArcelorMittal Riverdale – 13500 South Perry Avenue, Riverdale, Illinois

The ArcelorMittal Riverdale plant is a compact strip mill that began operations in 1918 as Acme Steel.

Acme Flexible Clasp Co. was founded in Chicago in 1884. Its name was changed to Acme Steel Goods Company in 1907. It opened the Riverdale plant in 1918, and then changed its name to Acme Steel Company in 1925. By the mid-1930s, Acme employed about 1,400 Chicago-area workers.

This plant is ideally located, along both the Little Calumet River at the aptly named "Acme Bend," as well as the Illinois Central mainline tracks.

In 1964, Acme Steel combined with Cleveland-based Interlake Iron Corporation to form the Interlake Steel Corporation. Interlake operated both a coke plant and a blast furnace several miles to the north along the Calumet River. By the mid-1970s the combined company had 3500 workers in the Chicago area. A new Acme spun off from Interlake in 1986. It had trouble staying afloat and went through numerous rounds of layoffs. In 2002 the International Steel Group bought Acme Steel and reopened it as ISG Riverdale Inc. It was then acquired by ArcelorMittal later that year. The 114-acre site was upgraded in 1996 with a state-ofthe-art hot rolling mill. The mill includes two basic oxygen furnaces, a continuous thin slab caster, ladle metallurgy facility, tunnel furnace and hot strip mill. The tunnel furnace has a capacity of 193 rolls. The facility primarily serves suppliers in the automotive, saw blade and strapping markets. The light gauge capabilities and tight gauge tolerances are desired characteristics for line pipe and structural and mechanical tubing producers. Principal products made at this plant include hot-rolled black bands in a full range of grades, including high carbon and alloy.

Calumet Water Reclamation Plant & TARP – 400 East 130th Street, Chicago, Illinois

This plant is the oldest water reclamation plant in the Metropolitan Water Reclamation District (MWRD). The MWRD began its existence as the Sanitary District of Chicago. The issue of wastewater treatment and stormwater management has been an ongoing struggle in the Chicago area since the city was founded. With the goal of permanently reversing the flow of the Chicago River in order to move wastewater "downstream" and away from Lake Michigan, the Sanitary District was created in 1889 (later to become known as the Metropolitan Water Reclamation District in 1989). Today, its service area consists of 883-square miles.



The Acme Riverdale plant in 1922. Courtesy Illinois Digital Archives



A section of "Deep Tunnel." Courtesy Metropolitan Water Reclamation District

The District quickly moved to construct the Sanitary and Ship Canal which reversed the flow of the Chicago River. After that massive engineering project was completed in 1900, additional canals were built. The Cal-Sag Channel was completed in 1922, reversing the flow of the Calumet River away from Lake Michigan. This coincided with the opening of the Calumet Water Reclamation Plant in 1922, the District's first such facility. This was followed by six other treatment plants around Cook County. By 1970, Chicago had the largest wastewater treatment facilities in the world.

Attention soon switched to stormwater management. Large rain events still sometimes resulted in raw sewage being dumped into Lake Michigan and other waterways. The Tunnel and Reservoir Plan (TARP), or "Deep Tunnel" began in 1972 to work to solve this issue. Since the majority of the area has combined sewers carrying both waste and storm water, tunnels were constructed to divert the flow and reservoirs created to hold water until storm waters recede. Most of the tunnels were constructed under existing waterways. One of the largest public works projects in American history, today three reservoirs and 109 miles of tunnels are in operation, providing 20.55 billion gallons of storage capacity. The system is still under construction with a target completion date of 2029. On our tour, we'll get to head 365 feet below ground to the Calumet TARP pumping station, the lowest inhabitable point in Chicago. This station houses the pumps that move water back out of the reservoirs and tunnels and into the treatment plant after storm events.

The Calumet plant serves residents and businesses in the southern portion of Cook County. It has been enlarged several times over the years and currently treats an average of 354 million gallons of sewage per day. Six years after it opened in 1922, the plant served a population of 155,000. At the present time, the plant's service population is over one million people in an area of about 300 square miles. In 2015, Calumet WRP opened a tertiary treatment disinfection facility that uses chlorination/dechlorination treatment that neutralizes or kills bacteria and microorganisms to reduce health risks. It only takes about eight hours for wastewater that enters the plant to be converted from raw sewage to clean water.



The Thornton Reservoir. Courtesy Metropolitan Water Reclamation District



Workers exiting the Pullman factory in 1893. *Courtesy Library* of Congress



Late 19th c. rowhouses built for Pullman workers. Photo by Serhii Chrucky

Pullman – 11141 South Cottage Grove Avenue, Chicago, Illinois

Perhaps the most famous planned community in the United States, Pullman is now home to the recently-designated Pullman National Monument. Founded by George M. Pullman as a place to manufacture his Pullman Palace Car sleeping and parlor railcars in 1880, the first residents started settling here in 1881. It became the archetypical company town. Totally self-contained, the factory workers were relegated to living in company housing, patronizing the company store, and otherwise expected to be subservient to the Pullman Company. Schools, parks, a library, theater, educational programs and other activities were provided for.

Designed by architect Solon Beman, the town and factory were designed in a coherent manner with rowhouses and a high standard of architectural design. At the time, the area was at the far reaches of the Chicago region, south of the city along Lake Calumet. The hope was that this distance would keep it far away from the influence of Chicago's labor organizers, but this proved to be irrelevant as the workers went on strike in 1894, protesting cuts in wages while rents and dividends remained unchanged.

Pullman was incorporated into the city of Chicago as part of Hyde Park Township in 1889. In 1898, the Illinois Supreme Court ordered Pullman to divest the company of residential property, and the dismantling of the community as a company town began, though the influence of Pullman remained for years.

The Pullman Car Works would produce its last car in 1981. A decade later the state of Illinois purchased a section of the plant, along with the Hotel Florence, the largest public building in Pullman, with the hope of creating a museum featuring the history of the community and the company. By this time, the community had been fighting to preserve its heritage, seeking landmark status for the rowhouses, Hotel Florence and factory buildings. Unfortunately, in 1998 a massive fire swept through the vacant clock tower and construction shops, destroying much of the historic factory. Since then, parts of the building have been reconstructed and preserved and they will be the centerpiece of the new Pullman National Monument. Much of the town itself remains intact.



The main Pullman factory after fire damage. Photo by Serhii Chrucky

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F-4: ENERGY RESEARCH AND THE NUCLEAR AGE

DANIEL J. O'ROURKE

Fermilab National Accelerator Laboratory – Pine Street and Kirk Road, Batavia, Illinois

Fermilab is America's particle physics and accelerator laboratory. Established in 1967, Fermilab has worked to answer fundamental questions about the universe and to enhance our understanding of everything we see around us. Fermilab scientists work on the world's most advanced particle accelerators and dig down to the smallest building blocks of matter. These scientists also probe the farthest reaches of the universe, seeking out the nature of dark matter and dark energy. Fermilab hosts a range of cutting-edge experiments and develops and builds technologies that support particle physics research at locations around the world, including deep underground laboratories in South Dakota and Canada, the Large Hadron Collider in Europe, and the South Pole Telescope.

At the center of Fermilab is Wilson Hall. The building is

very unique, with natural lighting and live plants. From the 15th floor you get an overview of all of Fermilab. In Wilson Hall there are posters and exhibits to help explain the science that is being done. Other locations to see at Fermilab include the Linear Accelerator and the Main Control Room. Additionally, there is the remote operating center for neutrino experiments, as Fermilab is the premier science laboratory in the world for these experiments.

Science at Fermilab

Fermilab is bringing the world together to discover the role neutrinos play in the universe. More than 1,000 scientists from over 30 countries are building the Deep Underground Neutrino Experiment, hosted by Fermilab. The new Long-Baseline Neutrino Facility will send a neutrino beam from Fermilab through Earth to a giant neutrino detector at the Sanford Underground Research Facility in South Dakota.



Aerial view of Fermilab. Courtesy Fermilab



Wilson Hall at Fermilab. Courtesy Fermilab

The Short-Baseline Neutrino Program, including the ICARUS and SBND detectors, will use Fermilab's particle accelerators to find out whether there are more than three types of neutrinos.

The PIP-II project, which includes the construction of a 700-foot-long superconducting linear particle accelerator, ensures the long-term future of Fermilab's accelerator complex. It will power the world's most intense beam of high-energy neutrinos for experiments.

Using the cosmos as a laboratory, Fermilab scientists explore dark matter and dark energy, which constitute 96 percent of the universe. Scientists analyze the data of the Dark Energy Survey, which mapped one quarter of the southern sky and recorded 300 million galaxies, 100,000 galaxy clusters and 4,000 supernovae.

From medical treatments to quantum science, innovative technologies from particle physics help transform the way we live. Fermilab is a world-leading center for superconducting magnets and radio-frequency cavities, crucial technologies for accelerators that also have potential in quantum computing and materials science. Fermilab's computing innovations have led to multiple applications, driven by our need to process massive amounts of information, store it and transmit it effectively.

Argonne National Laboratory – 9700 Cass Avenue, Lemont Illinois

Argonne National Laboratory (Argonne) is a multi-disciplinary laboratory located 30 miles southwest of Chicago. Argonne traces its origins to the Manhattan Project and the Metallurgical Laboratory (Met Lab) at the University of Chicago. The Met Lab team was led by Enrico Fermi, who created the first controlled nuclear chain reaction and would go on to form the core of Argonne National Laboratory's staff. Officially created by the Atomic Energy Act of 1946, Argonne became the first national laboratory in the United States. Research during the 1940s-1960s focused on both basic research and the development of technologies that harnessed the power of the atom.

Starting in the 1970s, Argonne began to diversify the



Argonne in the 1940s. Courtesy Argonne National Laboratory

scope of it research into other topics such as the environment and digital computing. The laboratory also developed several user facilities such as the Argonne Tandem Linear Accelerator System (ATLAS), the Intense Pulse Neutron Source (IPNS), and the Advanced Photon Source (APS) among others where researchers could investigate the nature of the universe. Argonne is currently developing with Intel the first supercomputer with a performance of one exaFLOP called Aurora that will be delivered to Argonne in 2021.

The APS is a U.S. Department of Energy Office of Science user facility. The APS is one of the most technologically complex machines in the world. This premier national research facility provides ultra-bright high-energy X-ray beams to more than 5,700 scientists each year from every U.S. state, the District of Columbia, Puerto Rico, and many countries around the world. These scientists come to the APS from academia, industry, medical schools, and other research institutions to carry out experiments that promise new discoveries in nearly every scientific discipline, including materials science; pharmaceutical and life science; chemistry; environmental, geological, and planetary science; and physics. The X-ray beams provided by this remarkable facility enable the collection of data in unprecedented detail and in amazingly short time frames. The knowledge these researchers gain at the APS has a real and positive impact on our technologies, our health, our economy, and our fundamental understanding of the materials that make up our world.

The APS Upgrade Project, currently under development, will create the world's ultimate three-dimensional microscope. It will enable researchers to view and manipulate matter at the nanoscale in order to solve even more complex science problems across multiple disciplines.

ATLAS is the world's first ion accelerator using superconducting devices for the energy gain. It is capable of accel-



ATLAS at Argonne. Courtesy Argonne National Laboratory

erating ions of all elements, both stable and radioactive, from hydrogen to uranium for research into the properties of the nucleus, the core of matter, the fuel of stars. The Nuclear Energy Exhibition Hall at Argonne showcases Argonne's rich heritage in the development of nuclear reactors and its current role in the development of next-generation reactors and fuel cycle technologies. The Laboratory continues to advance the design and operation of nuclear energy systems and is applying its nuclear energy-related expertise to current and emerging programs of national and international significance.

S-1: CALUMET RIVER/INDIANA HARBOR CANAL BOAT TOUR

AUSTIN WEBER

First part of tour – Calumet River North of Crowley's, Lake Michigan and Indiana Harbor Canal

As we leave Crowley's Yacht Yard and head up the Calumet River toward Lake Michigan, we'll pass under the **Ewing Avenue** (92nd Street) bascule bridge, dating from 1914. The last bridge we'll encounter on this stretch of the Calumet River is also the newest. The 242-foot-wide **Elgin, Joliet and Eastern Railway lift bridge** was built in 1974 by the American Bridge Co. to replace an old swing bridge.

The area on the left side of the boat was once dominated by **U.S. Steel's South Works**, which stretched along Lake Michigan from the Calumet River to 79th Street. This 570-acre facility operated from 1880 to 1992 and once employed 20,000 people. Iroquois Landing on the right was occupied by **Youngstown Sheet** & Tube Co. from 1890 to 1967 (since the late 1970s, this parcel of land has been part of the Illinois International Port District). As we exit the mouth of the Calumet River, we'll enter Lake Michigan. If it's a clear day, you can enjoy a fine view of the downtown Chicago skyline off in the distance to the left.

As we proceed east toward the mouth of Indiana Harbor, you'll see a large patch of vacant land on shore that was once home to **Commonwealth Edison's State Line gen**erating station, one of the last coal-powered plants in the Chicagoland area. The huge Art Deco structure built in the late 1920s was designed by Graham, Anderson, Probst & White, the same architectural firm that created Chicago landmarks such as the Civic Opera House, the Field Museum of Natural History, the Merchandise Mart, Union Station, and the Wrigley Building. From 1929 to 1954, this facility had the distinction of housing the



The Indiana Harbor Canal from Dickey Road in 1989. Photo by Matthew Kaplan



The banks of the industrial Calumet River contain old conveyors and cranes. Photo by Austin Weber

world's largest electric-power generator, which was capable of producing 208,000 kilowatts. Despite being named a National Historic Mechanical Engineering Landmark by the American Society of Mechanical Engineers, the structure was demolished in 2014, two years after it closed.

We will also get a great view of the **BP Whiting Oil Refinery**. This massive 1,400-acre facility bounded by Lake Michigan and the Indiana Harbor and Ship Canal was built by the Standard Oil Co. in 1889 and still ranks as one of the world's largest oil refineries. By the mid-1890s, the Whiting complex had become the largest refinery in the United States, handling 36,000 barrels of oil per day and accounting for nearly 20 percent of the total U.S. refining capacity. The facility was once a major producer of kerosene before demand for gasoline curtailed production, in addition to axle grease for industrial machinery and paraffin wax for candles.

Next, we'll enter Indiana Harbor, which ranks No 1 in tonnage among the 25 largest commercial harbors on Lake Michigan and second in tonnage of the 55 commercial harbors on the entire Great Lakes. We'll continue down the **Indiana Harbor Ship Canal**, sailing past ore bridges and traveling cranes. This Y-shaped industrial waterway connects Lake Michigan and the Grand Calumet River. It was built in the early 1900s to support a new complex created by the Inland Steel Co. This industrial waterway is maintained by the Chicago District of the U.S. Army Corps. of Engineers and serves the massive **ArcelorMittal Indiana Harbor steel mill**. The facility on the left side of the boat was originally owned by Inland Steel, while the infrastructure on the right side previously belonged to LTV Steel Co., and heritage firms such as Jones & Laughlin Steel Co. and Youngstown Sheet & Tube Co. In addition to serving the ArcelorMittal steel mill today, the Indiana Harbor Ship Canal handles barge traffic for other industries, such as BP's Whiting oil refinery. On land, this industrial area is also served by the Indiana Harbor Belt Railroad.

We will pass under and near numerous ore unloaders, vintage rail bridges and the **1992 Dickey Road bascule bridge**. We will also pass near the site of the Cline Avenue highway bridge, built 1982-83. It had numerous structural issues and failures and was closed in 2011. A new toll bridge replacement is under construction.

Second part of tour – Calumet River south of Crowley's

We will head south along the Calumet River until we are six miles inland from Lake Michigan and both sides of the Calumet River will become increasingly industrial. We'll encounter an area that was once the industrial bowels of Chicago. Many remnants of the past remain, including docks, slips, loading cranes, and grain elevators.



Barges and ocean-going ships are a common site along the Calumet River. Photo by Austin Weber

We'll see a wide variety of barges, tugboats, Great Lakes freighters ("lakers"), and ocean-going cargo ships ("salties") along the way. That's because Chicago remains one of the busiest inland ports in the world. The industrial corridor we are traversing on the city's Southeast Side handles a wide variety of bulk materials, such as asphalt, cement, coal, coke, fertilizer, limestone, manganese, petroleum, rock, salt, sand, and scrap metal. The river banks are lined with freight storage facilities, terminals, warehouses, and material handling equipment operated by companies such as S.H. Bell and North American Stevedoring Co.

The Calumet River is also crossed by numerous bascule and lift bridges that carry roads and railroad tracks. The oldest date from 1913, while the newest were built in the early 1970s. Some old bridges are abandoned in place, but many are still heavily used; they get lowered and raised thousands of times a year to accommodate the busy maritime traffic on the river. The **95th Street bridge** ahead (1958) was made famous by the *Blues Brothers* movie in 1980. During an early scene in the film, Elwood and Jake decide to test their new "bluesmobile" by jumping over the bascule bridge while it's being raised.

Next, we'll sail past several impressive vertical lift bridges that once belonged to the Lake Shore and Michigan Southern Railway (New York Central) and the Pittsburgh, Fort Wayne and Chicago Railway (Pennsylvania). Today, only one of the three bridges (a forth bridge was demolished in 1965) remains in operation, but it's frequently used by Amtrak passenger trains and Norfolk Southern freight trains. The other two bridges are permanently raised, abandoned in place since the late 1960s. The bridges were designed by Waddell and Harrington and built between 1912 and 1915. Alongside these impressive structures are the remains (on the right bank) of a Strauss bascule bridge constructed in 1913 for the Baltimore & Ohio Chicago Terminal Railroad. The bridge's 230-foot leaf collapsed when a freighter collided with it in 1988 (the accident forced the U.S. Coast Guard to close the Calumet River for 10 days). Today, only the counterweight and the mechanical frame of the bridge remain.



Inland Steel and the canal, 1959. Courtesy Indiana University Northwest Calumet Regional Archives

After we go under the 125-foot-tall cantilever truss **Chicago Skyway (I-90) bridge** (part of a 7.8-mile long toll bridge opened in 1958), the area on the left once contained a malting facility operated by the Falstaff Brewing Corp. that closed in the mid-1970s. The top portions of the 15-story grain elevators were painted to resemble giant beer cans; they were a familiar sight to motorists on the Chicago Skyway until they were demolished in 1997. For decades, another important industry on the banks of the Calumet River was shipbuilding. The site on the left bank now occupied by Morton Salt Co. is where the American Ship Building Co. once mass-produced cargo ships. The facility operated from the early 1890s to the late 1950s. However; it remained in business as a repair yard until the late 1970s.

After we pass under the 1927 100th Street bascule bridge we'll pass by a series of grain elevators on the right. **General Mills** operated a large cereal factory nearby that produced Cheerios, Wheaties, and other brands from 1924 to 1995. Grain elevators on the west bank of the river were also the scene of a massive explosion and fire in 1939 that killed nine workers at the Rosenbaum and Norris Grain Co. Five elevators and 4 million bushels of grain were destroyed in the tragedy, which was one of the largest fires in Chicago history. After passing under the 1930 **106th Street bascule bridge**, we enter an area that was once populated with huge steel mills. The Calumet River was famous for its mills. Both sides of the river were lined with large facilities that operated blast furnaces and rolling mills 24 hours a day. The first firm in this area was the Joseph Brown Iron and Steel Co., which opened in 1875.

Over the next two decades, other companies flocked to the banks of the river and built large facilities, including Republic Steel, U.S. Steel, Wisconsin Steel, and Youngstown Sheet & Tube. They were attracted to the cheap land and the strategic network of rail lines. Proximity to Lake Michigan provided a source for vast quantities of fresh water needed for steel production and an easily accessible form of transportation for moving large loads of iron ore from mines up in Minnesota and northern Michigan. At its peak, the Southeast Side of Chicago employed 200,000 people in steel mills and industries related to metal fabrication, such as rail car manufacturing. In the early 1950s, Chicago surpassed Pittsburgh as the nation's largest steel producer with an annual output exceeding 20 million tons.

The **Wisconsin Steel Works** (right side) was owned by the International Harvester Co. This huge facility sup-



The Calumet River is lined with many types of bascule and lift bridges. Photo by Austin Weber

plied International Harvester's factories with steel to produce the company's farm implements, refrigerators, tractors, and trucks. The slips where freighters once unloaded iron ore and other raw materials are still visible today, but the large unloading cranes are long gone. The **Republic Steel mill** (left side) was the site of a violent labor battle in 1937. On Memorial Day, a group of striking workers clashed with police in a bloody confrontation near the main gate of the facility. Ten workers died in the controversial incident and 60 were injured. Today, a metal sculpture and memorial plaque honor the victims.

We pass under a few more bridges, including the only vertical lift bridge that is part of a Chicago street (the 1938 **Torrence Avenue bridge**). Part of Ford Motor Co.'s large factory will be visible on the left side of the boat.

The 95-year-old **Chicago Assembly Plant** currently produces the Ford Explorer, Lincoln Aviator, and Police Interceptor. It is Ford's oldest continuously operating factory, dating back to the Model T era. Between 1914 and 1924, Ford operated a smaller, six-story assembly plant in Chicago that was located at 3915 S. Wabash

Ave. Ford built its new factory (the largest outside of Detroit at the time) here in the early 1920s because of its strategic location: it was easily accessible by rail and water, and it was near numerous steel mills. The Chicago Assembly Plant has mass-produced many types of vehicles over the years, including Model T coupes (1920s), Model A sedans (1930s), M8 and M20 military armored cars (early 1940s), Crestlline sedans (1950s), Galaxie sedans (1960s), Gran Torino coupes (1970s), and Taurus sedans (1980s and 1990s). Ford is currently in the process of modernizing the facility, and a nearby metal stamping plant, in preparation for the 2020 editions of its popular sport utility vehicles. The \$1 billion investment includes an all-new body shop and paint shop, in addition to major modifications to the final assembly area of the plant.

Next we cross under the **Norfolk Southern vertical lift bridge**, which is one of the newest movable structures on the Calumet River. It was built in 1971 by the American Bridge Co. to replace an old swing bridge. **Lake Calumet** will be visible straight ahead. This large body of water contains numerous docks, elevators,

FORGOTTEN CHICAGO

Calumet River

Notable Locations

- 1. Calumet Harbor, Iroqouis Landing
- 2. Great Lakes Dredge & Dock Co. buildings
- 3. Chicago Skyway Toll Bridge
- 4. KCBX Terminal
- 5. 106th Street Bridge
- 6. Site of Wisconsin Steel
- 7. Continental Grain Elevator
- 8. Republic Steel buildings

to LAKE CALUMET

9. Ford Motor Co. Assembly Plant



NORFOLK SOUTHERN

Map of notable locations along the Calumet River. Courtesy Forgotten Chicago

piers, and tank farms. About one mile north of here is **Pullman**, the historic company town where railroad cars were mass-produced from 1881 to 1981, and is now a National Park Service-designated National Monument. **Sherwin-Williams** also operated one of the largest paint factories in the U.S. there from 1888 to 1980.

George Pullman built his railroad car manufacturing complex on the west shore of the lake in the early 1880s. During World War II, the Pullman-Standard Car Manufacturing Co. operated a large shipyard at the south end of Lake Calumet that produced patrol craft and medium landing ships for the U.S. Navy. Boat sections were made at the company's 111th Street shops in nearby Pullman and then moved by rail to the shipyard, where they were welded together. Cargo traffic on the congested Chicago River peaked in 1889. By 1906, the Calumet River surpassed the old Port of Chicago (located along the Chicago River near its mouth) in tonnage. To alleviate growing congestion on the Chicago River, the Illinois legislature eventually authorized the city to build a deep-water port 20 miles south at Lake Calumet.

After the new Port of Chicago officially opened in 1953, business thrived for two decades due to the newly constructed St. Laurence Seaway. But, traffic volume declined sharply in the mid-1970s because of mismanagement, increased competition, and other factors. In the early 1990s, this area was the site of a controversial \$10 billion proposal that called for the construction of a third airport in Chicago. Today, many facilities here operate under the auspices of the Illinois International Port District. With hundreds of ships and thousands of barges unloading and reloading cargo each year, Chicago remains the largest inland port in America. The harbor is home to two of the largest grain storage facilities in the Midwest, with a capacity of 14 million bushels. It also boasts a large tank storage farm that can hold 800,000 barrels of petroleum products.

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S-2: CHICAGO RIVER BRIDGES WALKING TOUR

AUSTIN WEBER

In addition to elevated trains and skyscrapers, Chicago is famous for its iconic bridges. The Windy City has more varieties of moveable bridges—including bascule, lift, and swing styles—than anywhere else in the world. Those structures, including some more than 100 years old, carry roads and railroad tracks over the Calumet River, the Chicago River, and the Chicago Sanitary and Ship Canal. Other moveable bridges can be found elsewhere in the Chicagoland area, such as along the Des Plaines River in the southwest suburb of Joliet.

During the late 19th and early 20th centuries, Chicago was home to some of the world's top bridge engineers and innovators, such as brothers Albert and William Scherzer, Ralph Modjeski, and Joseph Strauss. Over the last 150 years, Chicagoans have contributed more than 120 of the approximately 350 U.S. patents on drawbridges. Chicago engineers have also generated more than 60 percent of the bascule bridge U.S. patents, by far the highest percentage from any city in the world.

Because of this abundance of talent, many innovations, materials, and technologies were pioneered and developed in Chicago. Among the more notable moveable bridge achievements were the following:

- The first turntable pontoon bridge (1849)
- The first all-iron swing bridge west of the Alleghenies (1856)
- The first large-scale vertical lift bridge (1894)
- The first rolling-lift bridge (1895)
- The longest single-leaf bascule bridge (1908)

Up until the last 20 years or so, the bridges along the main stem of the Chicago River were raised and lowered hundreds of times a year. Today, they are raised fewer than 50 times annually. Most activity occurs in the spring and autumn to accommodate people moving their sailboats to and from boatyards located along the south branch of the river.

During the 19th century and early 20th century, the Chicago River was clogged with maritime traffic that consisted of barges, cargo steamers, passenger side-wheelers, sailing ships, and tugboats. For instance, in 1887, more than 21,000 ships arrived and departed from the Chicago River. Every day, hundreds of schooners arrived with lumber from the forests of northern Michigan and Wisconsin. Other ships loaded grain and other cargo from elevators, factories, and warehouses that lined the



Early 20th century bascule bridges line the Chicago River looking west from Dearborn Street. *Courtesy Patrick McBriarty*

river banks. By 1880, there were 33 bridges crossing the Chicago River and its branches. All were center-pier swing bridges. By 1890, the City of Chicago was responsible for 44 swing and eight fixed bridges. Between 1900 and 1940, 50 moveable bridges were built over the Chicago River and the number of working drawbridges peaked at 73 in 1960.

The first moveable bridge built across the Chicago River was a hand-operated double-leaf drawbridge at Dearborn Street completed in 1834, but was torn down just five years later. It resembled a medieval drawbridge and was raised by ropes and block and tackle utilizing the gallows frames at each approach. The early wood pontoon swing bridges typically lasted five to ten years. By 1849, all five of Chicago's bridges at Clark, Kinzie, Madison, Randolph, and Wells were of this variety. However, pontoon swing bridges took up to 30 minutes to open or close using chains and ropes. They also were prone to damage due to early thaws and spring time flooding.

Between 1852 and 1858, several pivot bridges were designed to replace the problematic pontoon swing bridges. They used timber Howe trusses for extra rigidity resting atop a circular masonry and piling pier in the center of the river channel holding a turntable consisting of a center pivot surrounded by friction rollers. Beginning in 1856, the introduction of rim-bearing turntables provided swing bridges with additional stability by more evenly distributing the weight of the structure and enabled bridges to turn more easily. Most swing bridges were hand operated and took between 10 and 15 minutes to open or close. Bridge tenders used a T-bar called a "key" that was 4 to 6 feet long and was inserted



The Wells Street swing bridge in the 1870s. *Courtesy Patrick McBriarty*

into the center of the bridge deck to turn a shaft and pinion gear connecting with the turntable below.

By the 1880s, most of Chicago's downtown bridges were operated by steam power. They were refitted to operate on electrical power by the mid-1890s and opening and closing a bridge took as little as 40 seconds, or approximately 20-percent faster than steam power.

After the Great Chicago Fire of 1871, which destroyed seven wood bridges, all-iron construction was preferred as swing bridges proliferated for another two decades. The third Rush Street Bridge was destroyed in the fire and rebuilt and later damaged by a ship collision in 1883. The fourth Rush Street Bridge replacing it, a 240-foot-long all-iron Pratt-truss structure, was the second-largest swing bridge in the world. It also was the last swing bridge built across the main stem of the Chicago River. The bridge remained in operation until 1920, when it was replaced by the double-deck Michigan Avenue bascule bridge still in use today.

Starting in early 1890s, there was a push to replace all the swing bridges to improve navigation on the narrow and busy Chicago River. Double-leaf drawbridges proved to be a practical solution to the problem. Today, the oldest bridge in downtown Chicago is the Washington Boulevard bridge from 1914. This pony truss bascule bridge replaced a swing bridge built in 1891. To its immediate north is the newest bridge along this stretch of the Chicago River. The Randolph Street bridge opened in 1984 and replaced a double-leaf Scherzer rolling lift bascule bridge.

Four bridges in downtown Chicago are unique because of their double-deck designs. The Michigan Avenue and Lake Shore Drive bridges carry road traffic on two levels. The Lake Street and Wells Street bridges carry "L" train tracks on top and roadways on the lower level. The Lake Street bridge was the first double-deck bascule bridge built in Chicago-and perhaps in the world. It was constructed in 1916 to replace an older swing bridge. Originally, a vertical lift bridge was planned for this location, but the bascule design was selected for aesthetic reasons. The Wells Street bridge near the Merchandise Mart was built in 1922 to replace an 1888 steam-powered double-deck swing bridge that carried the Northwestern Elevated Railroad on its upper deck. The Lake Shore Drive bridge was built during the Great Depression and was dedicated by President Franklin Roosevelt in 1937. At the time, it was the longest and widest bascule bridge in the world, with each of its leaves weighing more than 6,000 tons.

The Michigan Avenue bridge is one of the most photographed in the city, because of its proximity to iconic skyscrapers such as the Tribune Tower and the Wrigley Building. It is officially called the DuSable Bridge in honor of Jean Baptiste Point de Sable, Chicago's first permanent resident. Shortly after the bridge opened in the early 1920s, it was the scene of a dramatic chase involving a gangster and Chicago police. On August 31, 1922, Vincent "the schemer" Drucci approached the bridge in his car just as it was being raised. He drove through the warning gates and jumped over the bridge, followed by two undercover detectives in hot pursuit. However, Drucci got stuck in traffic on the other side of the bridge and fled on foot before being apprehended.

Today, the southwest tower of the Michigan Avenue bridge is home to the McCormick Bridgehouse & Chicago River Museum, which celebrates the city's iconic movable structures. The five-story exhibit space and its "twin" on the northeastern corner of the bridge are purely aesthetic. However, they feature bas-relief sculptures on the outside that depict historic events and locations in Chicago history, such as Fort Dearborn, which was located nearby. The museum contains exhibits that explain the dynamic relationship between the city and its river. At water level, visitors can get an up-close look at the massive gears and trunnion that drive the two-level bridge.

Another widely photographed structure in downtown Chicago is the Kinzie Street railroad bridge on the north branch of the river near the Apparel Center. This Strauss-designed bascule, which is permanently raised at a 60-degree angle, was built by the Chicago & Northwestern Railway (today, the bridge is maintained by Union Pacific). When the 170-foot-long bridge opened in 1908, it was the longest and heaviest bascule leaf in the world. It replaced a bridge built in 1879 (one of the first all-steel bridges in the U.S.). This was also the site of the Windy City's first railroad bridge, which was built in 1852 for the Galena & Chicago Union Railway.

The south bank of the Chicago River has witnessed numerous changes over the years. Up until Wacker Drive was built in the 1920s, this area was full of warehouses and crowded produce markets. In the last few years, however, this stretch of river has been transformed into the popular Riverwalk.

On a more somber note, the south bank of the river between the Clark and LaSalle Street bridges was the site of one of the worst maritime disasters in U.S. history. On the morning of July 24, 1915, a 275 -footlong excursion vessel called the Eastland was loaded with more than 2,500 passengers ready to embark for a day of fun across the lake in Michigan City, IN. The ship was carrying workers and their families on their way to the annual employee picnic sponsored by Western Electric's giant Hawthorne Works in west suburban Cicero. The ship was known to have potential stability problems. overloaded and not balanced correctly. The mooring lines broke when the ship rolled. Passengers rushed to one side. The unstable ship suddenly capsized, throwing people into the river and trapping others inside the hull. More than 840 people lost their lives in the tragedy.

Another ship that deserves a mention played havoc with bridges on this stretch of the Chicago River in the 1970s. On numerous occasions, the aptly named *Medusa Chal*-



Old and new together – the Rush Street swing bridge and its replacement behind, the double-deck Michigan Avenue bascule bridge. Photo circa 1921. *Courtesy Patrick McBriarty*

lenger, a 562-foot cement ship built in 1906, would cause bridges to malfunction and get stuck, snarling road traffic and frustrating pedestrians.

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