

Occupational Portrait of a Watchmaker, between 1840 and 1860



Courtesy of Library of Congress, "Occupational portrait of a watchmaker, three-quarter length, seated at table with watches," between 1840 and 1860

“Occupational Portrait of a Blacksmith,” between 1850 and 1860



Courtesy of Library of Congress "Occupational Portrait of a Blacksmith," between 1850 and 1860

“Occupational Portrait of a Woman Working at a Sewing Machine,” ca. 1853



Courtesy of Library of Congress "Occupational Portrait of a Woman Working at a Sewing Machine," ca. 1853

African-American Women Weaving Rug at Hampton Institute in Virginia, 1899



Courtesy of Library of Congress, Johnston, Frances B., "African-American women weaving rug in home economics class at Hampton Institute, Hampton, Va.," 1899

“Occupational Portrait of Two African American Chimney Sweeps,” between 1860 and 1870



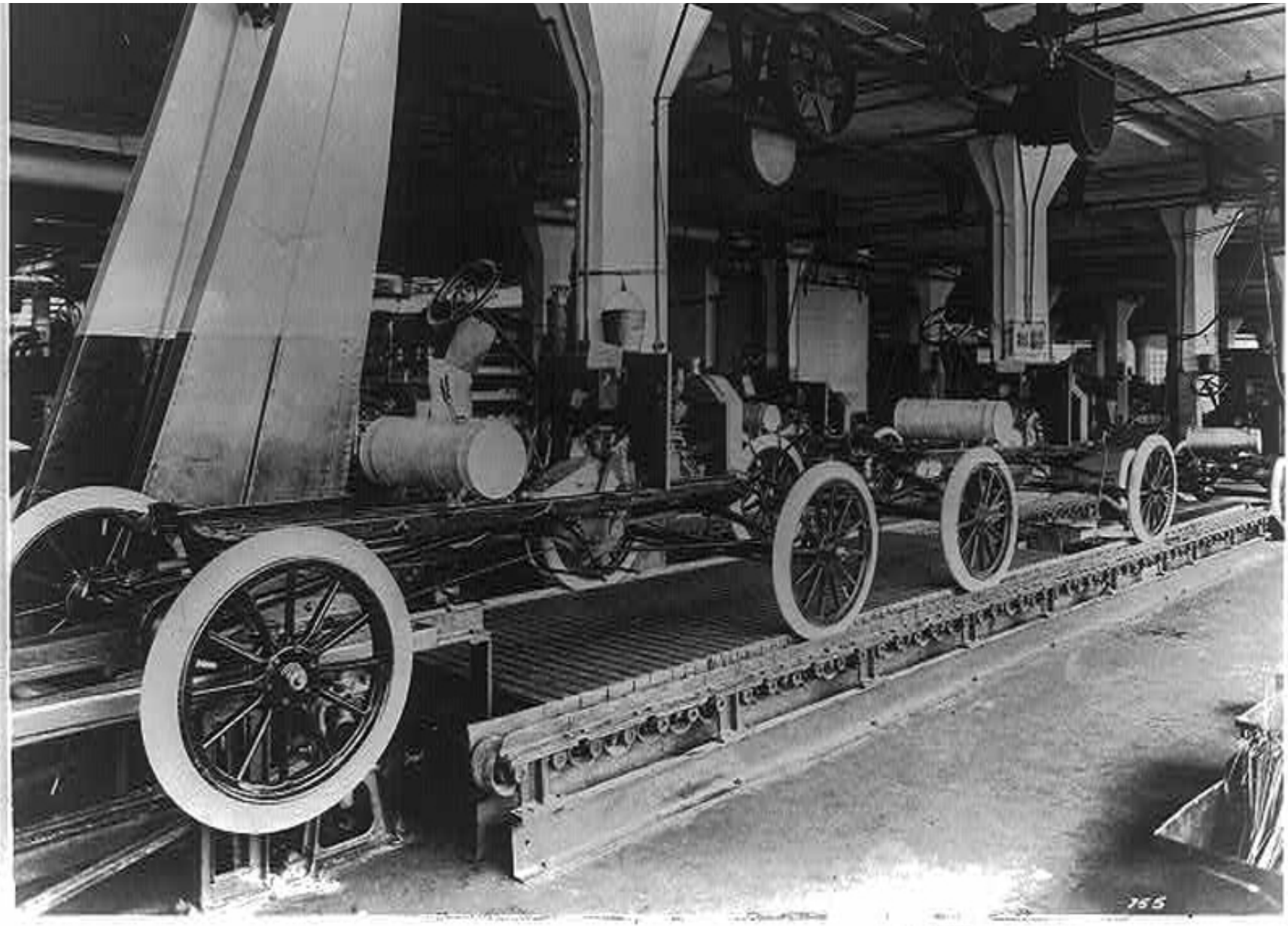
Courtesy of Library of Congress, “Occupational Portrait of Two African American Chimney Sweeps,” Charles D. Fredricks & Co., between 1860 and 1870

Sadie Pfeifer, Child Worker, at Lancaster Cotton Mills in South Carolina, November 30, 1908



Courtesy of Library of Congress, Hine, Lewis Wickes, "Sadie Pfeifer, 48 inches high, has worked half a year...", 30 November 1908

“Assembly Line at the Ford Motor Company’s Highland Park Plant,” ca. 1913



Courtesy of Library of Congress "Assembly Line at the Ford Motor Company's Highland Park Plant," ca. 1913.

Washing Machine Assembly Line in Maytag Plant in Newton, Iowa, 1949



Courtesy of State Historical Society of Iowa, "Washing Machine Assembly Line in Maytag Plant," 1949

“More Than Just Washing Machines” Article about Maytag Plant in Newton, Iowa, June 21, 2019 (pg.1)

More than just washing machines

Museum delves into Maytag's varied production history

By Christopher Braunschweig *Newton Daily News*

June 21, 2019

Surrounded by, at one time, nine similar businesses in Newton, a place that many folks considered to be the “washing machine center of the world,” the Maytag Corporation emerged on top as the premiere company that outlasted its competition, until it was purchased by Whirlpool Corporation in 2006 and subsequently closed its facilities.

As one might expect, the longtime manufacturer’s flagship products — wooden, aluminum and metal variants alike — take up a lot of space at the Jasper County Historical Museum, but as do its other, lesser known appliances and items.

Jack Streeter, board president of the Jasper County Historical Society, said the Maytag factories used to produce agricultural equipment and other home appliances. A seed grader and an old vacuum are on display at the local museum to prove it. One item the museum doesn't have is an old Maytag tractor, which are very difficult to come by. For now, a picture will suffice.

“We started out making farm equipment and made threshing machines and things like that, and *then* they dabbled into washing machines,” Streeter, 92, said Thursday. “And finally they found out the market for washing machines was a lot better than the market for farm equipment.”

Founded 126 years ago by F. L. Maytag, the Newton business was once the workplace of the 92-year-old Streeter, who became head of the maintenance department for Maytag Plant 2. He retired from the company after 39 years. Streeter’s mother and father had also worked at Maytag. Now, he gets to revisit his old employment and teach others about the company at the museum.

Maytag was the first company, Streeter added, to build a cast aluminum washing machine body in the 1920s, a style that was very popular among customers and would eventually kickstart the company into national recognition. Streeter said his parents had a similar model in their basement for “20-some years.”

Bill Perrenoud, executive director of the Jasper County Historical Museum, said Maytag was known for its dependability, at least that’s how the company sold itself as. Calling it a “top

“More Than Just Washing Machines” Article about Maytag Plant in Newton, Iowa, June 21, 2019 (pg.2)

notch business” back in its heyday, Perrenoud referred to a piece on display in the museum that says: “When you meet a Maytag salesman, you meet a gentleman.”

He added, “That was their image, and they portrayed that. The locations where they sold their washers appreciated that. They knew they were going to have gentleman; if they were to make an agreement they’d follow through on it. They Maytags hired good people (to make and sell products).”

Curiously enough, the gas-powered engines packed inside Maytag’s washing machines found other uses and could power other appliances like lawnmowers and pumps. Staff at the Jasper County Historical Museum have arranged the engines like marble busts inside its South 15th Avenue West facility.

A small race car on display at the museum, Street said, was not sold commercially, but rather was a promotional or sales item. And how did that car operate exactly? The gas-powered engine that was used in a Maytag-brand washing machine.

Researching new additions for its signature product was nothing new for Maytag either. Streeter pointed out a machine on display that was able to do more than wash clothes. With the right kind of attachment, it could churn butter and grind meat. Granted, it couldn’t do all three actions at once. Maytag had even tried adding an ice cream maker attachment.

Ironing machines, dishwashers, refrigerators and more. If Maytag determined a need for something, the company would make it. Staff said a Maytag room is currently under development that further highlight’s the Maytag family’s other ventures besides washing machines, like craft beer and blue cheese.

Maytag didn’t seem to be afraid to try new products, successful or not. However, Perrenoud said the choice in products was not random. The company, he said, likely put in a lot of research hours and listened to the needs of its customers to decide was appliance would be distributed.

“It was well-thought-out,” Perrenoud said. “You take a look at the different washing machines they produced and the changes they made from one model to the next would be looking for improvements. And before they made those improvements they tested them.”

When he toured Maytag many years ago, Perrenoud remembered seeing the company’s test facility where researchers were, among other things, analyzing “load after load after load” of laundry to see how well their machines held up. Niche items, he continued, didn’t seem to scare away Maytag.

“More Than Just Washing Machines” Article about Maytag Plant in Newton, Iowa, June 21, 2019 (pg.3)

Although Maytag Corporation is no longer in Newton, the company certainly left a lasting impression on the community. The family name is ingrained in the town's infrastructure. Perrenoud recalled an old Maytag advertising campaign in which the company's mascot repairman, Ol' Lonely, had a dog — a Basset Hound named Newton.

“One of the catchphrases was: ‘Newton needs Maytag,’” Perrenoud said. “... And I think there's a lot of truth to that. Newton would not have been half the community it would have.”

Editor's Note: “History Lesson” is a weekly series inspired by the Jasper County Historical Museum's 40-year anniversary. Newton Daily News will publish a story every Friday (until the museum is closed) featuring the people who work to preserve and promote the region's past endeavors, while also showcasing the historical and educational significance of artifacts and exhibits on display in the museum.

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Barrel Makers in Union, Iowa, Date Unknown



Courtesy of the State Historical Society of Iowa, "Barrel Makers in Union, Iowa," Date Unknown

“Rise of Industrial America: Work in the Late 19th Century” from Library of Congress

Rise of Industrial America

[Work in the Late 19th Century](#)

The late 19th-century United States is probably best known for the vast expansion of its industrial plant and output. At the heart of these huge increases was the mass production of goods by machines. This process was first introduced and perfected by British textile manufacturers.



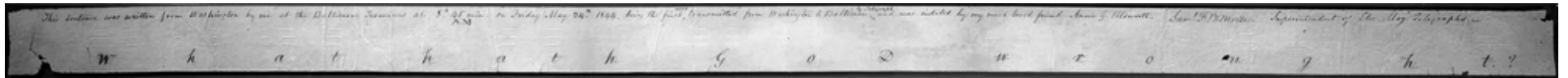
In the century since such mechanization had begun, machines had replaced highly skilled craftspeople in one industry after another. By the 1870s, machines were knitting stockings and stitching shirts and dresses, cutting and stitching leather for shoes, and producing nails by the millions. By reducing labor costs, such machines not only reduced manufacturing costs but lowered prices manufacturers charged consumers. In short, machine production created a growing abundance of products at cheaper prices.

Mechanization also had less desirable effects. For one, machines changed the way people worked. Skilled craftspeople of earlier days had the satisfaction of seeing a product through from beginning to end. When they saw a knife, or barrel, or shirt or dress, they had a sense of accomplishment. Machines, on the other hand, tended to subdivide production down into many small repetitive tasks with workers often doing only a single task. The pace of work usually became faster and faster; work was often performed in factories built to house the machines. Finally, factory managers began to enforce an industrial discipline, forcing workers to work set--often very long--hours.

One result of mechanization and factory production was the growing attractiveness of labor organization. To be sure, craft guilds had been around a long time. Now, however, there were increasing reasons for workers to join labor unions. Such labor unions were not notably successful in organizing large numbers of workers in the late 19th century. Still, unions were able to organize a variety of strikes and other work stoppages that served to publicize their grievances about working conditions and wages. Even so, labor unions did not gain even close to equal footing with businesses and industries until the economic chaos of the 1930s.

To find other documents in American Memory relating to this topic, you might use the terms work or workers, factories, or specific occupations such as miner, machinist, factory worker, or machine operator.

“First Telegraphic Message” from Samuel Morse, May 24, 1844



Building of the Boone Viaduct (Kate Shelley High Bridge), December 8, 1900



Courtesy of James H. Andrew Railroad Museum & History Center, 8 December 1900

First Flight of Wright Brothers in Kitty Hawk, North Carolina, December 17, 1903



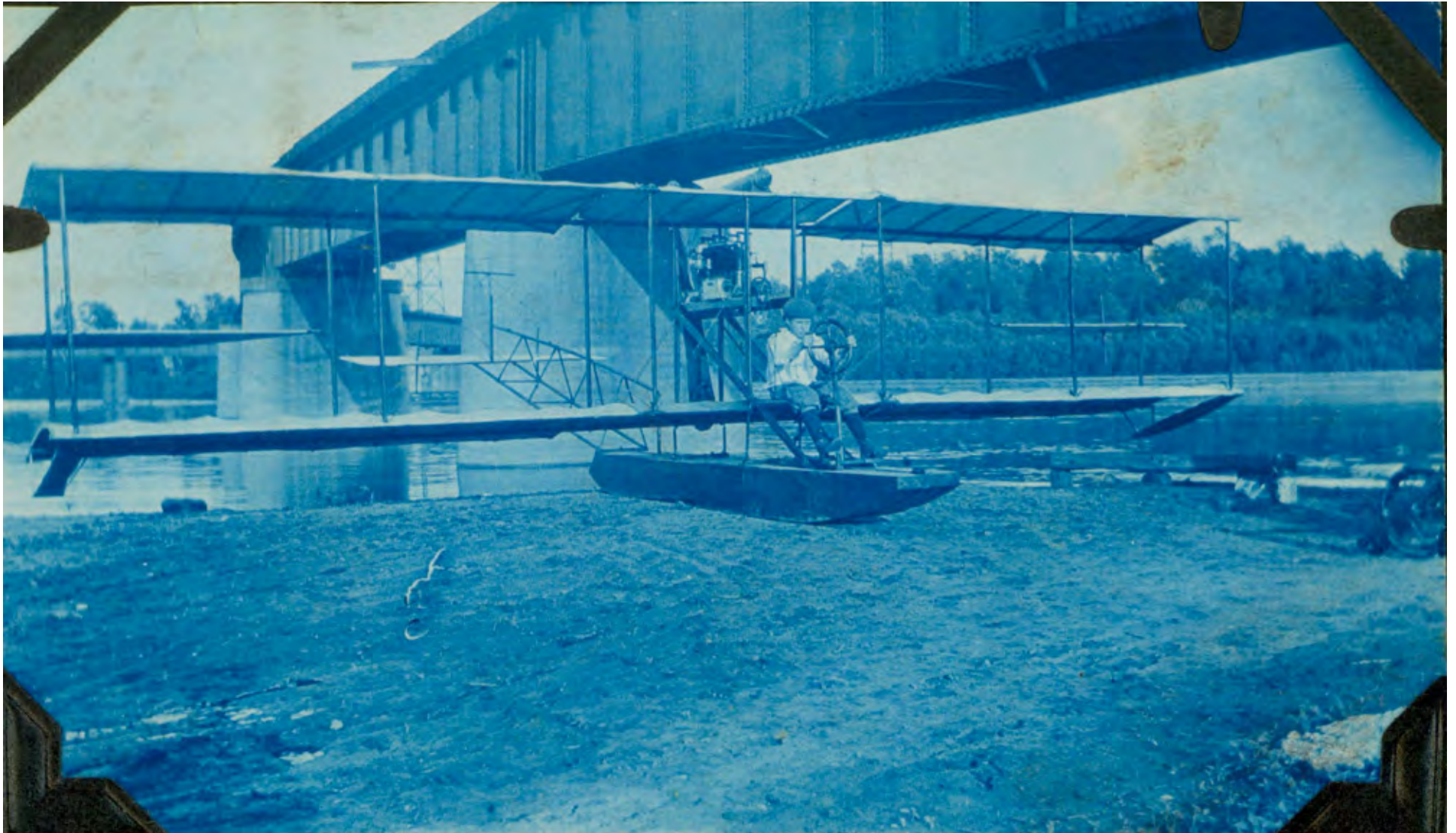
Courtesy of Library of Congress, Daniels, John T., "First flight, 120 feet in 12 seconds, 10:35 a.m.; Kitty Hawk, North Carolina," 17 December 1903.

Post Office in Solon, Iowa, ca. 1910



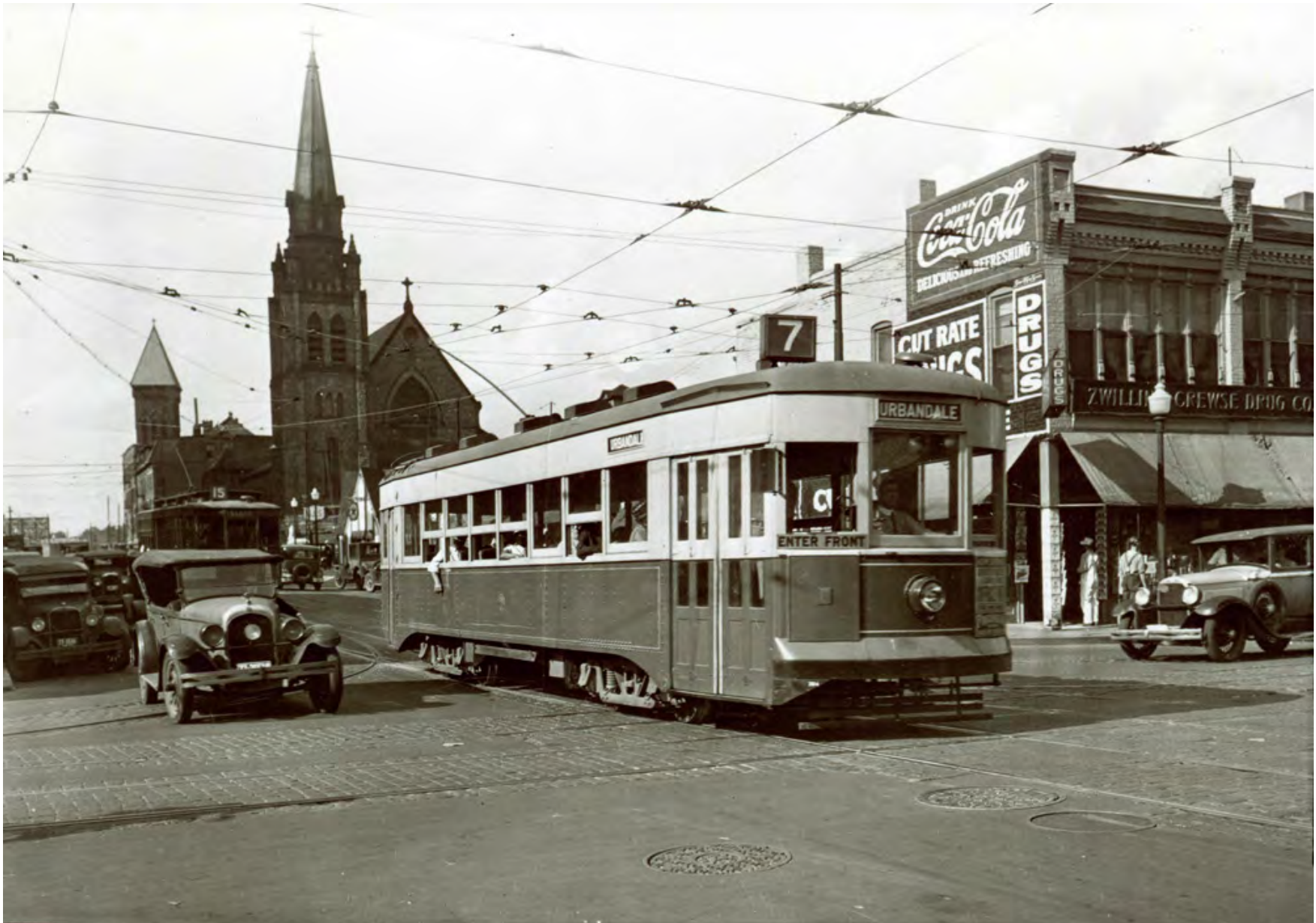
Courtesy of State Historical Society of Iowa, ca. 1910

Alfred Solbrig Sitting on His Aviator Father's Curtiss Hydroaeroplane, ca. 1912



Courtesy of State Historical Society of Iowa, ca. 1912

Downtown Intersection in Front of William Crewse Drug Company in Des Moines, Iowa, 1930



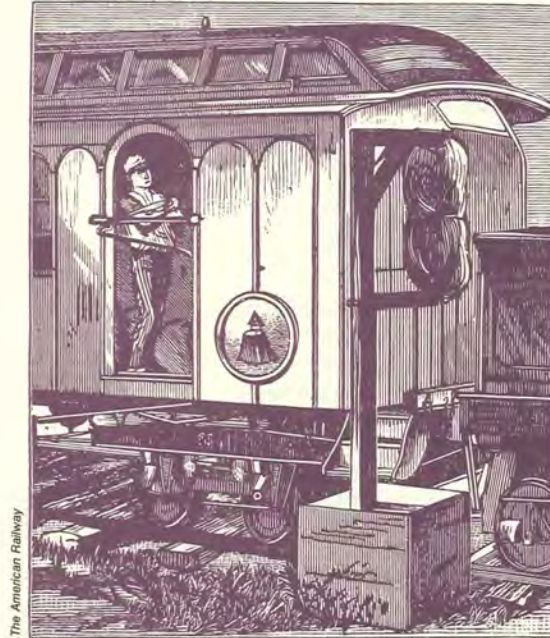
Courtesy of State Historical Society of Iowa, 1930

“Carrying the Load” Essay from *The Goldfinch*, November 1983

Carrying the Load

As soon as railway lines began running, express companies quickly switched from stagecoaches to the faster, more reliable railroad cars. With such good transportation available for shipping goods, a new way to buy things developed. Stores in large cities began to sell their goods through a mail-order business. Large picture-filled catalogs became “wish books” for people who did not get to the cities. It was exciting to choose from the many wonderful things in the catalog and receive packages from far away at the nearest railway depot. This new way of shopping created competition for merchants in towns that could not be ignored.

Railroads replaced stagecoaches in another way. The United States Post Office officials decided mail should travel by rail instead of the slower stagecoach. The mail was sorted and sacked at post offices and placed on the railroad for delivery to another point. As the number of letters increased, delays occurred at the sorting centers. To solve this problem, a special car was built for use as a traveling post office. Mail clerks sorted the mail as the train raced through the countryside. The first regular railway post office began on the Chicago & Northwestern road from Chicago to Clinton, Iowa in 1864. The railway postal car system grew rapidly in the West. But even the railway postal cars were eventually replaced. In the 1960s the post office officials decided to use trucks and airplanes to move the mail.



Railroad trains did not always stop at stations to pick up the mail. Catching posts at small stations held mail pouches that were caught by postal clerks as the train passed by.



Clerks sort mail inside a railway postal car.

Excerpt from “Getting Away From It All” Essay from *The Goldfinch*, November 1983

Getting Away From It All



Spirit Lake and the Okoboji

Children play in the sand on the shore of Spirit Lake in 1901.

Railroad companies looked for ways to encourage people to use trains. Sometimes they built resort hotels and then built railroad lines for people to use to get there. The railroad companies advertised their resorts and the special train service for vacationers.

The Burlington, Cedar Rapids & Northern Railway built a resort hotel at Spirit Lake in 1883. The following year the company opened the beautiful Hotel Orleans at the lake. Some said it was the finest hotel in the upper Midwest. The hotel had two hundred rooms, bowling alley, billiard hall, tackle shop, and boat house. Soon another railroad company, the Chicago, Milwaukee & St. Paul, ran a line near Lake Okoboji. The lakes quickly became a favorite summer resort with campgrounds, cottages, and hotels on the beautiful shores of

the lakes.

Railroad travel was certainly a big improvement over travel by wagon or stagecoach, yet it was not always pleasant. In 1893 Carrie Carson wrote about the train trip home from her vacation in a summer cottage at Lake Okoboji:

We boarded the train for Des Moines at twelve o'clock; at one-thirty we reached Ruthven, where we had dinner. The ride was very hot and dusty and before we had been on the train an hour, we had breathed in more dust than we had seen in a month. We ate once more at Des Moines. We had expected to leave Des Moines on a train which would get us home about one o'clock, but found that it did not stop at Marengo, so we had to wait for a train which left at one o'clock. We

were so tired that we went to Munger's, [a hotel] and went to bed. We rested and were called in time for our train. Just before reaching Newton we ran into a derailed freight car, and had to wait until it was removed. We had to wait a long time and grew very cold, but at last we started on and reached home an hour and a half late. It was between four and five in the morning when we reached Marengo.

The trip had taken about fifteen hours.

In the 1890s train travel may not always have been pleasant or fast—trains averaged about 25 miles per hour with all the stops to let off or take on passengers. Railroad passenger service, however, made it possible for lowans to travel places they would not have been able to visit before.

“Railroads in Iowa” Essay from *The Goldfinch*, November 1983 (pg.1)

Railroads in Iowa

There was a time, not long ago, when the sound of engine whistles wailed across the Iowa farmlands. People could tell the time of day by the trains that chugged through the countryside. Before dirt roads were paved and widened so cars and trucks could easily travel over a smooth and fast surface, railroads provided the fastest transportation for both people and goods.

Iowa's earliest settlers came before the railroads did. They traveled by horse or oxen-drawn wagons, on foot, by stagecoach, or by steamboat. Wagon and stage travelers may have traveled as many as twenty miles a day. Steamboat passengers traveled sixty to one hundred miles a day, although sandbars, low water, or snags often caused long delays.

For the first twenty years of

settlement, rivers and streams were the main highways in Iowa. Farm people hauled their grain in wagons or on animals to the nearest market center along a river. Small boats then carried the grain to Mississippi or Missouri River market towns. From those points it was loaded on large boats and carried to St. Louis or New Orleans.

Farmers with hogs or cattle to sell drove their livestock to market—a trip that might take several days. After reaching the market a meat packer bought and slaughtered the animals, then packed and pickled the meat in barrels for shipment down the river.

In winter the rivers froze and the boats had to stop. To travel overland was not much easier. Snow often covered the dirt roads, making it hard for teams of horses to pull heavy loads.

While this weather lasted, people, goods, and news could not easily get in or out of the state.

Most people came to Iowa to take up farming. As Iowa and other Midwest areas filled with farmers, a whole new region of the United States began to produce food. About the same time industries began to grow in the East, and manufacturers in cities hired people to work in factories. Cities grew larger as people moved there to work. Most of the people in the cities did not raise their own food, so they bought food brought to the city in wagons from nearby farms. City people began to depend more and more on the food grown by farmers.

It was not long before the steam engine that powered factory machinery provided the power for railroad trains to bring food to the cities. The trains then returned to the countryside with manufactured goods for people to buy. Gradually train tracks pushed into the great farm regions of the South and Midwest.

In 1854 the first train reached the Mississippi River at Rock Island, Illinois. Soon other railroad lines from Chicago reached the great river. Ferryboats carried the freight and passengers across the river from the railroad cars to the cities in Iowa.

On the Iowa side of the river, short railroad line construction began, and in 1855 the first engine was ferried across the Mississippi from Illinois. Just one year later a wooden bridge



Das Illustration Mississippi

This drawing of Bellevue, Iowa shows the modes of transportation before the railroads came. A Mississippi River steamer churns up the river, a ferryboat carries people, animals, and goods across the river, and a horse-drawn wagon moves around the bend of the dirt road.

“Railroads in Iowa” Essay from *The Goldfinch*, November 1983 (pg.2)

spanned the wide river so freight and passenger cars could travel right on across. By then one railroad line reached as far west as the state capital at Iowa City.

For a long time people had talked of a railroad to link the western and eastern states from coast to coast. This would provide a better way to transport goods between distant cities. Goods usually had to travel by ship around the tip of South America. Iowa's location in the central part of the nation meant railroads from east to west would pass through the state.

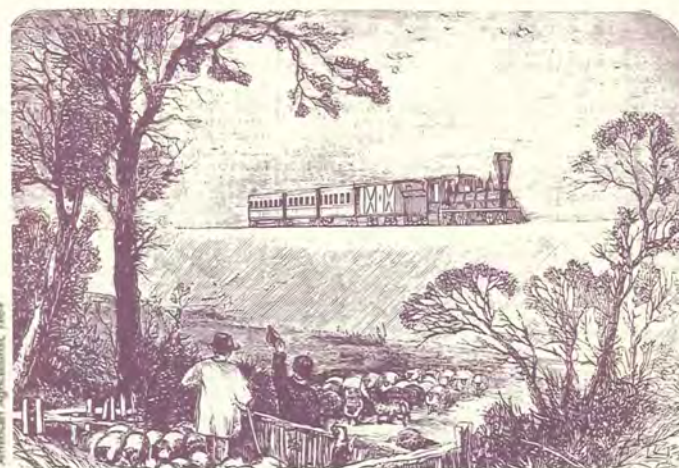
Building railroads cost a lot of money. The railroad from Davenport to Iowa City cost \$15,000 per mile. To encourage railroad companies to build, the United States Congress passed laws that gave land to companies that promised to build railroads. In 1856 the Congress gave public land in Iowa to build four east to west railroads. These railroads would eventually become part of the **transcontinental** railroad. Four railroad companies had just begun to build across the state when the Civil War interrupted progress.

After the war the builders raced across the state. Smaller railroad companies soon linked the towns and cities of Iowa with the main-line railroads. The parts of Iowa where only a few settlers had been living began to fill with people as the railroad arrived. Railroads became the key to the growth and success of towns and cities. The places the

transcontinental adj. — going across a continent.



A winter journey in 1830.



A winter journey in 1864.

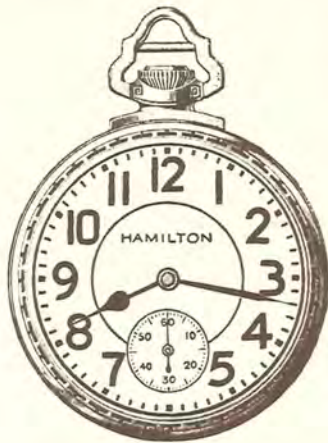
railroads bypassed remained small or sometimes faded away.

Railroads carried Iowa butter, meat products, and grain to cities. They hauled Iowa coal. They brought back farm implements, salt, and ready-made clothes. Railroads brought settlers seeking a new home in Iowa. The railroads took people almost anywhere they wanted to go.

In this issue of the *Goldfinch*, we will learn about the changes railroads brought to the lives of people in Iowa.

“What Time Is It?” Essay from *The Goldfinch*, November 1983

What Time Is It?



Before the railroads stretched iron rails across the nation, each city or town kept its own local time. Clocks in each place were set at twelve noon when the sun reached the highest point in the sky. This local time, or sun time, depended on the **longitude** or

longitude n. — distance east or west of the prime meridian, measured in degrees.

meridian of the town. For every degree of longitude there is a four-minute difference. This worked very well when people traveled from one place to another only at the slow-moving pace of steamboats or horse-drawn wagons.

When railroads came, the differences in time caused problems. Each railroad used the local sun time of its major city. When it was noon solar time in Chicago, it was 12:07 in Indianapolis, Indiana, 11:50 in St. Louis, Missouri, 11:48 in Dubuque, Iowa, 11:41 in St. Paul, Minnesota, and 11:27 in Omaha, Nebraska. The solution to this problem was to divide the world into twenty-four standard time zones. On November 18, 1883, at twelve noon the United States railroads adopted a system for standard time zones. Cities, too, began to use standard time. Eventually standard time zones were adopted by nations of the world. Iowa is in the Central Time Zone.

meridian n. — lines on a map representing either half of the circle that passes through the north and south poles.



courtesy of Robert J. Dietrich

Twenty-five steam whistles sound off in the Creston yards to announce the adoption of standard time at 12:00 noon, November 18, 1883.

14

The Jewelers Will Change Time

At present the jewelers of Burlington are using almost exclusively Chicago time but on Sunday will adopt standard time. Among the jewelers visited by an Hawkeye representative yesterday was Mr. G.H. Waldin, who stated he would change his time to conform to the new schedule of time just formulated for the use of the railroads by the railroad time convention recently held in Chicago. He further said: "Burlington time is now fourteen minutes slower than Chicago time. According to the new standard it will be five minutes slower than Chicago time. According to the new standard it will be five minutes faster than present city time. We get the correct time from Chicago every morning at 2 minutes past 10 o'clock and we receive it here in the store, being connected by wire. Next Sunday we will adopt the new time. We have always used railroad time; the public demands it and we must supply the demand. Very few people in Burlington use the city time."

Upon a request for determining the accurate time in Burlington, the following reply came from the Smithsonian Institute, Washington, D.C.,

Dear Sir — In reply to your letter of June 7, I would state that the longitude of Burlington, Iowa, is 91°07', and that of Chicago, Illinois is 87°38'; the difference therefore is 3°29'. At 4 minutes to 1°, or 4 seconds to 1', this gives a time difference of 13 minutes and 56 seconds. It is proper to observe that as 1' of longitude at this latitude is more than half a mile, different points in the two cities, would differ by several seconds.

Yours very respectfully,
Spencer W. Baird,
Secretary,
Smithsonian Institute

It is very probable the city will adopt the new standard time, as it will be generally used in Burlington anyway. So Sunday at noon, if you have correct Chicago time, set back your clock nine minutes, and you will have standard time.

—*The Daily Hawkeye*
15 November 1883

Chicago & North Western Railway Viaduct at Boone Data Papers, August 1995 (Pg. 1)

CHICAGO & NORTH WESTERN RAILROAD VIADUCT
(Boone Viaduct)
(Kate Shelly High Bridge)
(Boone High Bridge)
Iowa Bridges Recording Project
Spanning Des Moines River
at Chicago & North Western right-of-way
Boone Vicinity
Boone County
Iowa

HAER No. IA-44

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BLACK & WHITE PHOTOGRAPHS

TYPOGRAPHIC COPIES OF COLOR TRANSPARENCIES

WRITTEN HISTORICAL & DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
Department of the Interior
P.O. Box 37127
Washington, D.C. 20513-7127

Jackson, Robert W., "Chicago & Northwestern Railroad Viaduct, Spanning Des Moines River at Chicago & Northwestern Railroad tracks, Boone, Boone County, IA," Historic American Engineering Record, National Park Service, August 1995. [Courtesy of Library of Congress](#)

Chicago & North Western Railway Viaduct at Boone Data Papers, August 1995 (Pg. 2)

HISTORIC AMERICAN ENGINEERING RECORD
CHICAGO & NORTH WESTERN RAILROAD VIADUCT
(Boone Viaduct)
(Kate Shelly High Bridge)
(Boone High Bridge)

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HAER No. IA-44

Location: Spanning Des Moines River at Chicago & North Western Railroad, 4.5 miles west of Boone; Boone County, Iowa
UTM: 15.419320.4656540
USGS: Boone West, Iowa quadrangle (7.5 minute series, 1965; photorevised 1976)

Date of Construction: 1901

Designers: E.C. Carter, chief engineer;
W.H. Finley, principle assistant engineer;
George S. Morison, consulting engineer

Builders: Chicago & North Western Railroad, Chicago, Illinois;
American Bridge Company, Chicago, Illinois

Present Owner: Union Pacific Railroad Company, Chicago, Illinois

Present Use: Railroad bridge

Significance: This bridge is one of the last projects of noted bridge engineer George Morison, who died two years after the structure was built. The bridge was the longest and heaviest viaduct of its time, and may be the longest extant double-track railroad viaduct in the world. It is listed in the National Register of Historic Places.

Historian: Robert W. Jackson, August 1995

Project Information: This document was prepared as part of the Iowa Historic Bridges Recording Project performed during the summer of 1995 by the Historic American

Chicago & North Western Railway Viaduct at Boone Data Papers, August 1995 (Pg. 3)

CHICAGO & NORTH WESTERN RAILROAD VIADUCT
HAER No. IA-44
(Page 2)

Engineering Record (HAER). The project was sponsored by the Iowa Department of Transportation (IDOT).

In December 1898, plans were drawn in the chief engineer's office of the Chicago & North Western Railroad (C. & N.W.) for a new high level double track line to be built between Boone and Ogden, Iowa, a distance of approximately 7.4 miles. The construction of this line would require the erection of a very high viaduct over the Des Moines River. The 11.3 mile line then in service ran southwest from Boone down the east bank of the river to a low level crossing near the little town of Moingona, then up the west bank of the river to Ogden. The grade at the level of the river crossing was two hundred feet below the level of the main plateau, which required that helper engines push the increasingly heavier trains then coming into use up each side of the river. This line had been in service since 1866, one year before the C. & N.W. became the first railroad to span the state.

As designed, it was anticipated that the Boone-Ogden cut off, as the planned diversion came to be known, would cost approximately \$931,000; \$251,000 for right of way and grading, \$124,000 for track, \$10,500 for engineering and miscellaneous expenses, and \$545,000 for the bridge itself.¹

The construction of a high bridge across the river valley had been contemplated ever since the rail line had been built across this part of the state, but it was not financially feasible to build such a structure at the time the railroad first crossed Boone County. The considerable growth in traffic and the enormous increase in train loads would have required the construction of this bridge eventually, but its erection became an immediate necessity due to progress the company made in converting its Chicago to Council Bluffs roadway from a single track to a double track system. Moreover, the financial position

¹Chicago & North Western Railway Co., W. Fernie, delineator, "Plan of Proposed High Level, Double Track Line Between Boone & Ogden, Iowa" (Chicago: Chief Engineer's Office, Chicago & North Western Railway Co., 13 December 1898), a document on display at the Museum of the Historical Museum Society of Boone County, Boone, Iowa (an organization different from the Boone County Historical Society, which has its own museum).

Chicago & North Western Railway Viaduct at Boone Data Papers, August 1995 (Pg. 4)

CHICAGO & NORTH WESTERN RAILROAD VIADUCT
HAER No. IA-44
(Page 3)

of the company at that time was such that the expenditure of the sums involved seemed prudent.²

The maximum gradients of the new line would be 1 in 160, as compared to 1 in 66 on the old line; the sharpest curves would be of 2,865 feet radius instead of 955 feet; the total length of the curves would total only half a mile instead of nearly six miles; and the new line would be shorter overall by about three miles. The new line was designed to run directly west from the Boone depot and strike the bluffs overlooking the river at a point where the distance across the valley was approximately 3,000 feet. These figures indicate the operational advantages of the planned improvements, as well as the scope of the task in construction of the most important part of that line, the new bridge.

Because the Des Moines River at the proposed bridge site was neither particularly wide nor deep compared to the width and depth of the river valley, the bridge was planned as a viaduct.

²During construction and after the bridge was completed, the Chicago & North Western Railroad made construction drawings and a description of the bridge available to many of the leading engineering journals of the day. Unless otherwise noted, the information in this report has come mainly from the bridge articles printed in those journals, as follows: "The Des Moines Steel Viaduct," Engineer (London) 94 (24 October 1902) 392-393; "Boone Cut-Off and Des Moines River Viaduct, Chicago & Western Ry.," Supplement to Engineering News (22 August 1901), n.p.; "The Boone Viaduct," Engineering Record 44:8 (24 August 1901), 171-173; "The Boone Viaduct, Chicago & Northwestern Ry.," Railway and Engineering Review 41 (25 May 1901), 330-331; "The Boone Viaduct, Chicago & Northwestern Ry.," Railway and Engineering Review 41 (6 July 1901), 462-465; "The Boone Viaduct," Engineering Record 44:2 (13 July 1901), 29-31; "Double-Track Railway Viaduct Over the Des Moines River," Scientific American (1 June 1901), 340. In addition, a report by Chicago & North Western resident engineer W.C. Armstrong, "The Boone Viaduct," Iowa Engineer 1:1 (June 1901), 6-19, was consulted for a least one of these journal articles and for this report. See also James G. Gallup, History, Description and Illustrations, of the Great Boone Viaduct (Boone, IA: W.H. Gallup), an undated commemorative booklet published in 1901, contained in the files of the Maime Eisenhower Birthplace Museum and Library, Boone, Iowa. This document was reprinted with additional illustrations and photographs as: James Gallup, "Des Moines River Viaduct: Kate Shelly Bridge - Still An Engineering Marvel," North Western Lines 8:2 (April 1981), 8-21.

Chicago & North Western Railway Viaduct at Boone Data Papers, August 1995 (Pg. 5)

CHICAGO & NORTH WESTERN RAILROAD VIADUCT
HAER No. IA-44
(Page 4)

This type of bridge was described by C. & N.W. resident engineer W.C. Armstrong as:

That form of bridge construction evolved in accordance with a minimum of limiting conditions. It is usually employed in building structures over deep and wide chasms where the question of waterway is only of secondary importance; where the designer can place his piers wherever he wishes, make his spans of any length he desires, and where there are no limits imposed except those of safety and economy.³

To this definition it might be added that the lack of limiting conditions allows the designer to support the bridge spans on individual towers composed of two or more bents braced together, which makes for a very strong and stable structure.

At the time the Boone Viaduct was originally planned, there had only been three viaducts built in the world that compared to the proposed bridge in terms of height, length, or weight. In 1882 the Erie railroad built a 1,400 ton viaduct over the Kinzua Creek Valley near Kushequa, Pennsylvania. This single-track structure was approximately 302' high and 2,052' long. It was rebuilt for heavier loads in 1900 with an increased weight of 3,352 tons. In 1882, English engineers working for the Antofagasta Railway in Bolivia built the 1,115 ton Loa Viaduct over a narrow, but very deep canyon. This single-track, narrow gauge bridge was approximately 800' long and about 336' high. The Southern Pacific Railroad Viaduct, stretching about 320' above the Pecos River in Texas, was built in 1892. It was an approximately 2,180' long, single-track bridge weighing 1,820 tons. In comparison the Boone Viaduct, as designed and built, was approximately 2,685' long, about 185' above the water, weighed approximately 6,196 tons and featured a double track.

The immense weight of the Boone Viaduct as compared to the three which preceded it is attributable not only to the fact that it is a double track structure, but also to the great increase in weight of locomotives and rolling stock that took place towards the end of the century. This increase is reflected in the necessity of rebuilding the Kinzua Viaduct, and in the weight of the 4,310 ton Gokteik Viaduct built in 1900 in Burma by the Rangoon Mandalay Railway. This structure was 2,260 feet long and 335 feet high.

The Boone Viaduct has an approximately 300' long, 60' deep deck channel span composed of two deck Pratt trusses with the panels

³Armstrong, 6.

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divided into five sub-divided panels by means of sub-verticals which support the middles of the top-chord sections. It is carried on A-shaped towers at the ends, each about 80' high, which are supported by eight cylindrical steel piers about 10' in diameter; four under each end of the span. The piers consist of a steel shell 5/8" thick, made in sections about 5' in height (except for the bottom section which was 8' high), which were added and riveted as the piers were sunk. The piers were sunk by the pneumatic process to a sandstone stratum 42' to 62' below the surface. The piers were all filled with concrete.

The trusses of the channel span are seated on ordinary shoes, which are pin-connected to the lower ends of the end vertical posts and are riveted to the tops of the steel towers. The ends of the stiff lower chords engage the 10" shoe pins with slotted holes 14 1/2" long which permit expansion and contraction due to temperature changes. The end longitudinal struts also have slotted holes for the pins through the middles of the vertical posts, but there is no provision for expansion or contraction in the top chords. The end posts at one end of the trusses were constructed as rocker bents, fixed at the bottom but allowing the pins at the foot of these posts to slide longitudinally back and forth in slotted pin holes of the bottom chord.

There are four lines of plate-girders, two under each track, of a uniform depth of 7'. Beginning on the east end there are two 75' plate-girder spans on a rocker bent; then six 45' plate-girder spans, alternating with six 75' plate-girder spans; then thirteen 75' plate-girder spans. The 45' plate-girder spans are carried on and form the tops of towers consisting of four columns each, rigidly braced together on all sides. The 75' plate-girders span the opening between consecutive towers. The 75' girders were designed for a live load of 6,100 lbs. and a dead load of 1,400 lbs., per lineal foot of track. The 45' girders were designed for a live load of 7,600 lbs., with a dead load of 1,250 lbs. per lineal foot of track. All material is of soft steel, as specified by the railroad. Rivets, unless otherwise specified, were 7/8" in diameter.

There are thirty-six viaduct trestle bents, braced together in pairs to make towers 45' long and 75' apart, which are 19-1/2' wide on centers at the top and batter 1:6 transversely on each post, giving a width of 69'-7" between centers of pedestals of the tallest tower. The tower columns are made of three I-beams placed together in the form of the letter H. Two 20" beams form the sides, and one 15" beam makes the connection between the sides. The longitudinal and sway braces are all stiff members made of two 12" channels laced together. All braces are diagonal and intersect each other at the center. There are no horizontal

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struts, except at the bottom of the tower, where all four columns are connected by 15' channel struts.

According to resident engineer W.C. Armstrong, the common practice at the time of construction was to make the tower span of a viaduct about half the length of the open span. But a difficulty arises in terms of the depth of the girder when this ratio is adopted. The longer the span the deeper the girder for structural capacity must be. Therefore it is necessary to make a 60' span much deeper than a 30' span, which usually creates some problems in connecting the two spans to the same column. It is possible, however, to vary the depth of a girder up to a foot from the theoretical economic depth with a very slight sacrifice of material; and by reason of this fact it was sought to overcome this problem by adopting the 45' and 75' lengths of the girder spans. Each was made uniformly 7' deep as a medium economic depth.

The floor beams are seated on the top chord, and the stringers are placed on top of the floor beams. This was done in order to reduce the height of the towers supporting the span to a minimum. The floor beams are knee-braced to the top chord by bent angles riveted to each side at both ends, and their bottom flanges are riveted to horizontal tie-plates projecting inside the top chords and receiving the pairs of angles which form the top lateral diagonals. The floor was originally constructed of 8" square yellow pine ties, 12' long and spaced 12" center to center. To their ends were bolted 10" x 12" yellow pine tie guards, and on either side of each rail there was a 4" x 10" planks spiked longitudinally. Between the rail and the inner plank there was a 6" x 4 1/2" spiked angle iron, which served to protect the ties in case a derailed truck crossed the bridge. The tracks were originally 13' apart on centers, and it was 35' from out-to-out of the two cantilevered sidewalks and hand-car refuges, of which there were four on each side. On each side of the floor there was a railing supported by a brace running from the lower flange of the plate-girder.

The abutments are rectangular blocks of masonry, 50' x 30' at the base, with reinforcing buttresses at the front. The piers supporting viaduct towers are 5' square at the top. They were built with a batter of 2" per foot, and the bases vary from 12' to 20' square, according to their height or the pressure they exert on the foundation material. The masonry was all of Mankato limestone laid in Portland-cement mortar. The pedestal blocks supporting the steel columns on top of the piers are of Ableman's sandstone, secured to the coping by anchor bolts through the column bases.

Work in preparation for actual construction of the Boone Viaduct

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was begun in the spring of 1899. After the grounds were cleared of trees and brush, a temporary service track for the distribution of material was built alongside the line of the permanent structure. This temporary line included a bridge on pile and trestle bents built about twenty-five feet above the water. A power plant with two 60 horsepower boilers, pumps, an electric light dynamo, and two Ingersoll-Sergeant air compressors was established on one side of the river and the pipes and wires were carried across to the opposite side under the roadway of the service bridge.

Next, three gasoline powered drills were used to sink test holes for the purpose of determining the character of the underlying material upon which the foundations would rest. The material found was characteristic of coal regions such as Boone County with a great deal of clay, shale, sandstone, fireclay and coal. Great care was taken to determine the amount and character of surface deposit and the stratified material underneath, and to locate the "surface of erosion" between the two. It was feared that if inclined piers such as the ones which were to be used on the valley slopes were founded on the super-imposed surface material that slipping might occur.

The abutments and piers supporting the low towers were constructed in pits dug in clay to a depth of 12' or 14' and founded on beds of concrete from 4' to 6' in depth. The area of the concrete base was made such that the pressure per square foot would not exceed two tons. Farther down the valley slopes, where stratified material was nearer the surface, the excavations went down into the stratified material and usually rested on black shale. The foundations were prepared in the same manner as for those resting on clay but with an allowed pressure of three tons per square foot. Near the river, where sand overlaid the stratified material, and where the surface of erosion was approximately level, wooden piles were driven and then cut off at the water surface. Concrete was then poured around and on top of the piles to provide a masonry foundation with an allowed pressure of fifteen tons per pile.

Construction of the foundations located in the river channel required the use of a pneumatic caisson. The eight cylindrical piers supporting the approximately 300' channel span had a bottom section 8' in height, with a steel diaphragm framed in one foot from the upper edge, which formed the roof of the 7' high working chamber below. Through the center of this diaphragm there was a hole 3' in diameter for the air shaft, which was a steel tube of the same diameter. At the top of the shaft there was a Moran air

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lock, through which excavated material was hoisted, and through which workers passed from the open air to the working chamber.⁴

The Moran air lock differs somewhat from the type usually used in bridge caissons, and was especially adapted to pneumatic work where, due to limited space, only one air shaft can be used for both men and material. In large bridge caissons two air shafts are usually used with an air lock on each. But the Moran design is a double lock with one compartment for passing out material and one for the men. It also has the advantage of being removable and reusable, whereas bridge caissons usually are abandoned and filled with concrete when the proper depth is reached.

After the working chamber is placed in position a section of the air shaft was then bolted in place with the air lock on top. A section of the outer steel shell of the pier was then rivetted on, and the air pipes connected. Enough concrete to sink the chamber was then filled in between the outer shell and the air shaft, and on top of the roof of the working chamber.

The upper and lower doors of the air lock are not placed with their vertical axis in the same line. To begin operation of the lock the upper door is open and the lower one is closed. A bucket is then let down into the lock, moved to one side, and the upper door is closed. The rope passes through a hole in the door frame. A valve is opened allowing air from the shaft and working chamber to enter and pressurize the air lock, and as soon as the pressure in the top chamber nearly equals that of the chamber below, the lower door opens and the bucket is free to let down. The lower door remains open as long as the bucket is below. Men who have entered the working chamber through the air lock dig up the material from under their feet and shovel it into the bucket, which is hoisted out through the top compartment of the air lock. The lower door is closed, and the valve turned to connect the lock with the outside air, thus allowing the pressure in the upper lock to drop to an ambient level. The upper door is then opened and the bucket is hoisted out. Both doors are circular gasketed steel plates operated by exterior counterweights. The upper door is sometimes provided with a stuffing box to permit the passage of the hoisting rope when the door is closed.

At the Boone Viaduct site the maximum air pressure of 23 lbs. per square inch above atmospheric was used. It was found that any

⁴A detailed description of the Moran Air-lock is contained in Henry S. Jacoby and Roland P. Davis, Foundations of Bridges and Buildings (New York: McGraw-Hill Book Co., 1914), 352-355.

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man of sound condition could labor several hours under this pressure without harm, and the work proceeded rapidly.⁵ When one pier had been sunk until the top of the concrete filling was about to the water surface, the air lock would be removed and placed on another pier and the process would be repeated. A rate of progress as high as 16' per day was made through the sand that lay near the surface, but in the hard shale and other stratified material encountered at depth it averaged only about 2' per day. The caisson work began on February 7, 1900 and the piers were all completed and the coping set on June 6.

The superstructure was erected from both ends simultaneously by overhead traveling derricks running on top of the structure as it was completed, each lifting and lowering the metalwork into position. There were also four derricks for unloading material from cars as it arrived, with two at each end of the bridge, and two gasoline-powered air compressors for running the pneumatic riveting machines, with one on each end. The traveling derricks consisted of a steel framed bent about 50' high made of three posts framed together and mounted on a platform carrying a hoisting engine, coal, water, and the hundreds of feet of rope used in handling the steel. At the bottom of this bent were attached two booms; one called the 90-foot boom and designed to carry ten tons at the extreme end, and the other called the trolley boom and designed to carry sixteen tons at the end.

The 90-foot boom, so called because it was 90' in length, was made of two 9" channels laced together, and stiffened against buckling vertically and sideways by longitudinal truss rods. It was made to swing through a vertical arc of 75 degrees from the horizontal position, and was arranged for a lateral swing of about the same extent. It was raised and lowered by means of

⁵By the turn of the century, bridge builders had become knowledgeable about caisson's disease, otherwise known as decompression sickness or "the Bends." This debilitating and occasionally fatal condition is caused by the formation of gas (mainly nitrogen) bubbles in the body because of rapid transition from a high-pressure environment to one of lower pressure. The greater the pressure under which a worker labors, and the greater the length of time the worker is in a high-pressure environment, the longer the period of decompression required to prevent illness or pain. In the case of caissons sunk to great depths, the pressure required to keep water out of the caisson was so great that men could only work for short periods of time without having to endure lengthy decompression. The builders of the Boone viaduct found that at the relatively low caisson pressure required in the shallow Des Moines River, there was essentially no decompression required for fit men who only worked a few hours.

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block and tackle connecting the end of the boom with the top of the braced bent and operated by the hoisting engine. The side movement was controlled by hand lines run to the ground, which was also the method used for the horizontal trolley boom.

The trolley boom was 51' long and was made of two 18" I-beams, the upper flanges of which formed a track upon which were run two carriages or trolleys on which the material was run forward. This boom was given a lateral swing of about 30 degrees and was supported in the horizontal position by means of stay rods extending from the end and from two intermediate points to the top of the braced bent. The trolley boom was used for lowering and setting the girders in place and also for lowering material for the towers from the deck of the structure to the ground, where it was picked up with the 90-foot boom and raised to its place in the tower.

The river span was the only part of the structure built on falsework. This falsework was very heavy and made of 8" x 16" Oregon fir. The span was assembled by one of the travelers running on the top chord of the assembled trusses and setting two panels in advance. The field rivets for this and all other spans were driven by pneumatic hammers operated by gasoline powered compressors. The erection of the superstructure was begun in November 1900 and the first crossing by a construction train was on May 16, 1901. Several men were killed during construction.

The testing of the completed bridge was conducted on May 18 by a method commonly used at that time. Several cars were heavily loaded with sand and then started across the bridge at a high rate of speed. At a given signal the emergency brakes were set and the wheels of the engine reversed, stopping the train within 60 feet. First one train and then two trains at the same time were used for the test. The next day the new line was officially opened, and on May 28 the bridge was crossed by the special train of President William McKinley, who was on a trip through the region.

The new line would bypass the old route and thus take out of regular service the Kate Shelly Bridge, which was the former main railroad crossing of the Des Moines River near Moingona. This bridge was named in honor of the fifteen year old heroine who, on the night of July 6, 1881, risked her life in crossing the bridge to warn an oncoming train of a washout into which an engine had already run and been wrecked. Ms. Shelly, who still lived within a short distance of both bridges in 1901, was in attendance at the opening ceremonies of the new viaduct and it was named the Kate Shelly Bridge in her honor. The old bridge continued in limited service until the 1930s and the track was torn out in the 1950s. The bridge no longer exists, and it is generally assumed

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by knowledgeable individuals in Boone County that the bridge was partially destroyed by severe flooding in 1954.

There have been a variety of figures reported for the final cost of the Boone Viaduct, with the most commonly quoted figure being in the neighborhood of \$1 million. This figure is almost certainly too high, given that the total cost of the entire Boone-Ogden cut off was projected in 1898 by the C. & N.W. chief engineer's office to be \$931,000. The railway company had a great deal of experience in laying track, and thus it is reasonable to assume that their projections for right-of-way and grading (\$251,000), track (\$124,000) and engineering (\$10,500) were fairly accurate. The cost of the bridge, which was the one component of the total cost they had no experience with, having never built a structure of this magnitude, was the one figure likely to have gone over budget. Even though the bridge was built under contract by the Chicago office of the American Bridge Company, it is likely that the contract contained provisions that would allow the bridge company to recover cost overruns from the railroad.

The final cost of the entire cut off was reported by Poor's Manual of Railroads in 1902 as precisely \$1,108,326.96. If this figure is assumed to be correct, and all of the cost overrun is applied against the bridge, it may be estimated that the cost of the bridge was approximately \$722,000. Applying less than 100% of this overrun to the bridge cost would, of course, reduce this figure. An article in the May 25, 1901, edition of The Railway and Engineering Review gives a figure of \$625,000 for the cost of the bridge and a sum of \$1,250,000 for the total cost including approaches. The sum quoted for the aggregate cost is far above any other given, and may have been a projection arrived at before final accounting. The best guess is that the final cost of the bridge is therefore in the range of \$625,00 to \$700,000.

Although George Morison was consulting engineer for this bridge it is unknown just how much direct involvement he had in its design. His name is only mentioned in passing in the several articles published in contemporary engineering periodicals, and a June 1901 article published by resident engineer W.C. Armstrong mentions neither Morison nor any other designer. Given Morison's early experience as engineer in charge of construction of the Portage Viaduct over the Genesee River (1875), and his general experience with railway bridges and large river spans, it is probable that he had considerable input into the bridge's design. However, none of the biographies or obituaries that list Morison's work include mention of the Kate Shelly Viaduct, which is unusual given that it was the heaviest and longest viaduct built by 1900 and should have stood as one of the last great achievements of a long and distinguished career.

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The Kate Shelly High Bridge still serves the needs of the Chicago and North Western Railroad, with numerous train crossing each day. The Viaduct remains in essentially original condition, possesses a high degree of historical and structural integrity, and stands as one of the most significant railway viaducts in the United States.

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APPENDIX IMPLICATIONS FOR FURTHER RESEARCH

Several questions concerning the Kate Shelly High Bridge arose during the research and writing of this report. Some of these questions, due to limitations in the scope of the Iowa Historic Bridges Recording Project, have remained unanswered. It is suggested that scholars interested in this bridge consider pursuing the following:

1. How much, exactly, did construction of the bridge cost?
2. What role did George Morison play in the design of the bridge?
3. What impact did construction of the Boone-Ogden Cut Off have on the operations of the Chicago & North Western Railroad, if any?

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ADDENDUM TO
CHICAGO & NORTHWESTERN RAILROAD VIADUCT
(Boone Viaduct)
(Shelly, Kate, High Bridge)
Iowa Historic Bridges Recording Project
Spanning Des Moines River at Chicago & Northwestern Railroad
Boone vic.
Boone County
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HISTORIC AMERICAN ENGINEERING RECORD
CHICAGO & NORTHWESTERN RAILROAD VIADUCT
(Boone Viaduct)
(Shelly, Kate, High Bridge)

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This appendix is an addendum to a 14-page report previously transmitted to the Library of Congress.

APPENDIX: ADDITIONAL REFERENCES

Interested readers may consult the Historical Overview of Iowa Bridges, HAER No. IA-88: "This historical overview of bridges in Iowa was prepared as part of Iowa Historic Bridges Recording Project - I and II, conducted during the summers of 1995 and 1996 by the Historic American Engineering Record (HAER). The purpose of the overview was to provide a unified historical context for the bridges involved in the recording projects."

Workers Assemble Recreational Vehicles at Winnebago Industries in Forest City, 2013



Courtesy of The Globe Gazette, Schuessler, Arian, *The Globe Gazette*, 2013

Assembly Line Workers Under an RV at Winnebago Industries in Forest City, Iowa, March 2016



Courtesy of The Globe Gazette, Zoeller, Chris, *The Globe Gazette*, March 2016

“Forest City-based Winnebago Industries turns 60” Newspaper Article, May 6, 2018 (pg.1)

Forest City-based Winnebago Industries turns 60 (with photos)

By Mary Pieper

May 6, 2018

FOREST CITY | Winnebago Industries started 60 years ago with a dozen workers building travel trailers in a facility shared with a hatchery.

Today, the Forest City-based company is a leading U.S. recreation vehicle manufacturer with 4,200 employees.

"There's this rich spirit of innovation and entrepreneurship that seems to have grown up here fostered by our location and the people who have worked here," said Chad Reece, director of marketing at Winnebago.

In late 1957, citizens of Forest City contributed to a fund drive to start the new industry. Residents could invest money in \$100 increments.

The fund drive raised \$50,000, with 208 residents contributing.

Reece said this speaks to the "grass-roots" background of Winnebago, which has made it such an iconic brand.

Marlen Hanson was one of the original 12 employees who started work on Jan. 28, 1958.

He was just 18 and it was his first full-time job.

At that time jobs in the Forest City area "were not easy to come by," he said.

Although Winnebago only paid him \$1 an hour, which was the minimum wage at the time, he considered himself lucky.

That first group of employees set up the plant for production.

The first Winnebago plant was at the intersection of Highways 9 and 69, where Forest City Ford is now located.

Work was slow at first, according to Hanson. He said half the building was occupied by a hatchery, so there wasn't a lot of room for building trailers.

The also didn't have many tools.

Hanson said there was tremendous excitement in the community about opening the plant.

“Forest City-based Winnebago Industries turns 60” Newspaper Article, May 6, 2018 (pg.2)

As the company grew, "it put a lot of people to work," he said.

Hanson left Winnebago after six months to work for Forester Trailer, which had just started. He stayed with Forester until it closed 19 years later.

Hanson returned to Winnebago in 1983 and stayed until his retirement in 2002.

By 1961, the company had grown so much that the old canning factory in the west part of town was purchased and converted to production.

Harlan Rodberg started working at that new plant in February 1964. He was farming at the time and thought he would just work for a few months until the start of field work in the spring.

"Fifty springs later I was still there so I must have liked it," said Rodberg, who retired from the company in 2014.

In September 1964, a fire broke out at the plant. Rodberg remembers lots of local fire departments came to fight the blaze, but the wooden building was destroyed.

Work began that fall on what would become known as the north plant.

Rodberg said everyone worked together to make that happen because the community wanted to the company to succeed.

In the spring of 1965, Rodberg and the other employees went to work at the new building.

Winnebago built its first motor home the following year.

"It took us quite a while to build that first one," Rodberg said.

In a few years there wasn't enough room at the north plant, so work began on the new site, nicknamed "Big Bertha."

"It was the biggest building we had ever seen," Rodberg said.

The company then started building 600 motor homes a week, he said.

The first Winnebago motor homes were 19-foot long. The company now is manufacturing 45-foot-long motor homes.

It takes a lot of work to design one of those big motor homes, according to Rodberg.

“Forest City-based Winnebago Industries turns 60” Newspaper Article, May 6, 2018 (pg.3)

He said he appreciated the pay and benefits at Winnebago.

"When you retired you didn't need to starve to death," he said.

Rodberg also appreciated his co-workers.

"I made a lot of good friends down there," he said.

Larry Kearney, maintenance supervisor at Winnebago, will celebrate his 50th anniversary with Winnebago in June. He's only the second employee to reach that milestone.

Of all the current employees, he's been there the longest.

Kearney started out on a glue machine making sidewalls, then moved into routing.

"And then Uncle Sam had my hand up and wanted me to join the Army," he said.

He was allowed to take a leave of absence so he could serve his tour in Vietnam. When he returned he was allowed to work in any department he wanted.

Kearney chose the warehouse and became a supervisor there in 1973. In 1985 he moved to the maintenance department.

Kearney supervises mowing and snow removal. He said he has a crew of 19 people who have to start work in the middle of the night when it snows so employees can get into the parking lots.

He said the company has changed tremendously since he started working there in 1968.

He estimates Winnebago had fewer than 600 employees at that time.

In the 1970s business really "blew up," according to Kearney.

"The buildings, they just kept popping up," he said.

Kearney said he's had good bosses over the years, including company founder John K. Hanson.

Although he was the CEO, "he was a common guy," according to Kearney.

He said once someone in management wanted to get Hanson "a fancy golf cart with all kinds of bells and whistles," but Hanson declined.

“Forest City-based Winnebago Industries turns 60” Newspaper Article, May 6, 2018 (pg.4)

"He said, 'I want a golf cart like the rest of the guys,'" Kearney said.

Today Winnebago has locations in four states.

However, Reece said the vast majority of the employees work in North Iowa at the facilities in Lake Mills, Charles City and Forest City, which remains the biggest campus by far.

"The center of our universe is in Forest City," Reece said.

Even as Winnebago celebrates its 60th anniversary, company officials are looking toward the future, according to Reece.

"There are brighter days ahead of us," he said.

Elevation of Truss, from North, with Train, Date Unknown



Courtesy of Library of Congress, Historic American Engineering Record

Breaker Boys at the Woodward Coal Mines in Kingston, Pennsylvania, ca. 1900



Courtesy of Library of Congress, "Breaker Boys, Woodward Coal Mines, Kingston, Pa.," Detroit Publishing Co., ca. 1900.

Push Cart Vendors on the East Side of New York, New York, 1900



Courtesy of Library of Congress, Kleine, George, "Push carts--East side," 1900

Tenement Yard in New York, New York, between 1900 and 1910



Courtesy of Library of Congress, "Yard of Tenement, New York, N.Y.," Detroit Publishing Co., between 1900 and 1910

Young Girls at Spoolers at Lincoln Cotton Mill in Evansville, Indiana, October 1908



Courtesy of Library of Congress, Hine, Lewis Wickes, "Lincoln Cotton Mill, Evansville, Ind. Young Girls at Spoolers. Location: Evansville, Indiana," October 1908

Newsies in Hartford, Connecticut, March 7, 1909



Courtesy of Library of Congress, Hines, Lewis, W., "Hartford, Conn. 6 A.M. Sunday...," 7 March 1909

People Picking Cranberries in Pemberton, New Jersey, September 1910



Courtesy of Library of Congress, Hine, Lewis Wickes, "Jim Waldine, 1023 Carpenter St., Philadelphia...", September 1910

Mortaria Family Makes Silk Flowers in New York, New York, February 1912



Courtesy of Library of Congress, Hine, Lewis W., "Family of Peter Mortaria," February 1912

"Hymn for the Working Children," ca. 1913

Hymn for the Working Children*

[Tune, "Autumn," or Austrian National Hymn.]

*There's a voice that now is calling,
Loudly calling, day by day;
'Tis the voice of right and justice,
And its tones we must obey.
We must hasten to the rescue
Of the children young and frail,
Who are weary of their burdens,
And too soon their strength will fail.*

*In our stores and shops we find them,
'Mid the bloom of early spring;
But the Lord is watching o'er them,
And their calls to Him we bring.
Though their parents bid them labor
And deny their needed rest;
Yet our faith believes the promise,
That their wrongs will be redressed.*

*Men of rank and high position,
Men who guard our native land,
In the name of our Redeemer,
Come and lend a helping hand.
Come at once; the plea is urgent,
And the hours are waning still;
Make these children glad and happy,
And the law of love fulfil.*

FANNY J. CROSBY.

Copyright, 1912, by The Biglow & Main Co.

*This hymn was especially written for the National Child Labor Committee by Fanny J. Crosby, the blind hymn writer, 92 years old. In sending it, Mrs. Crosby wrote "I never was asked to write a hymn that I have more cheerfully written than this."

Tenement Kitchen in Hamilton County, Ohio, December 1935



Courtesy of Library of Congress, Mydans, Carl, "Tenement Kitchen, Hamilton Co., Ohio," December 1935

“Kids at Work” Essay from *The Goldfinch*, 1996 (pg. 1)

by Bridgett M. Williams

Kids at work

Iowa's kids have held all types of jobs, from chores at home to working on farms, in factories, and in underground mines. Their wages often helped support their families.



Boys as young as nine once worked alongside grown men in Iowa's mines.

Most kids in the past, like now, helped out around their homes and learned by working closely with their parents. Their jobs — whether picking berries for jelly, helping set fence posts, or watching younger siblings — made their homes better places to live. Everything a kid made, planted, fed, or fixed was one less thing parents had to buy or do.

Rural families sometimes hired out kids to neighbors who needed laborers. Only older boys usually inherited land or money from parents, so other children needed to make their own way in the world.

Hired girls cooked, cleaned, and took care of children. They also emptied chamber pots, did laundry, tended gardens, and canned fruits and vegetables.

Girls received little pay for all this work — about \$1.50 a week at the turn of the century.

Although girls gave most of their money to their parents, they sometimes kept a few dollars for themselves. Earning money made them feel independent.

Hired boys (also known as “plowboys”) also received low wages. Boys chopped wood, hauled water, sorted seed, and

“Kids at Work” Essay from *The Goldfinch*, 1996 (pg.2)

took care of livestock. They sometimes worked beside their employer, planting, plowing, and hoeing. At haying time, they would pitch hay until every muscle ached. Still, they hoped to save enough money to buy their own farm someday.

Why work?

Some boys and girls worked to put themselves through school. Frank Wilson, a 12-year-old who lived near Sioux City, hated farming. He wanted to go to high school instead. He arranged to work as a hired hand for a town family so he wouldn't have to ride his bicycle 20 miles a day to school. To pay for books, he took an extra job at a boarding house. He made beds every morning and waited tables every evening. Frank even found time to write a high school news column for the *Sioux City Journal*.

Other children, however, were not as lucky as Frank. They worked to earn money so their families could survive. Odessa Booker, the daughter of a coal miner in Buxton, Iowa, peddled fresh vegetables around her town for a quarter a basket. Odessa's brothers

started working around the mines when they were ten years old. By the age of 16, they worked underground with their father. All the Booker children gave their money to their parents. Because they started work so early in life, they didn't graduate from high school.

Farm to factory

City children also worked. Some kids had jobs that did not pay wages. Many kids walked along railroad tracks and picked up coal for the family fireplace. Others sorted through garbage piles looking for stuff to fix up or sell.

Other jobs paid cash. Boys as young as seven years old could sell papers on street corners. Young girls might sell candy or magazines. Older children worked as delivery boys, clerks, cigar rollers, and **soda jerks**.

Factory work, although dangerous, employed thousands of Iowa kids in the early 20th century. Children routinely lost limbs and fingers to the whirring machinery. The 1902 Factory Act prohibited all children under the age of 16



E.M. Clark/SHSI (Iowa City)

Hired boys and girls often worked for other families and helped with daily chores. This girl washes dishes, 1910.

from cleaning machines in motion, but allowed most kids to go on working. By 1915, a stricter set of laws made it illegal for most kids to skip school in order to work. Safety conditions were not much improved, but younger children were barred from factory work.

Today, children work in a variety of jobs. Some work as babysitters, others mow lawns and work in fast-food restaurants. Most kids help with household chores. Their labor contributes to Iowa's economy, just as it has in the state's past. ▲

soda jerk — clerk at a
soda fountain

“Progress and Unemployment” Excerpt from *The Goldfinch*, 1996

industries grew around the state as people manufactured goods and shipped them across the country to be sold.

By the turn of the century, more and more Iowans left rural areas to find jobs in cities. In 1900, Iowa boasted more than 14,000 manufacturing businesses statewide. In these factories, workers made everything from buttons and butter to meat products and overalls. Factory work was hard and working conditions were often very poor, leading to many work-related accidents and deaths. Workers formed unions and demanded better wages and working conditions.

Progress and unemployment

Inventions and other technological advances often put people out of one line of work, and into another. With the introduction and growing popularity of the automobile, blacksmiths and carriage makers soon had to find other ways to earn their keep. Often, they converted their shops into garages and learned how to fix cars and motorized farm equipment.

Everett Ludley, who grew up

in northeastern Iowa, remembers how the automobile changed the businesses district in Manchester, Iowa.

“Hennesey’s Livery Stable was converted to a car agency,” he wrote in 1989. “Billie Burk’s Blacksmith Shop became a machine shop. In both, the smell of horse manure was replaced by the smell of oil and grease.”

New technologies also created new jobs. Frederick Maytag made washing machines in Newton beginning in 1909. As Maytag perfected the machines, the demand for the product increased, and more and more people found jobs in the Maytag factory.

Industries have continued to grow throughout the state’s history. From coal mining and meat packing to insurance and publishing, Iowans have worked in a variety of manufacturing and service positions and have marketed Iowa products throughout the world.



New inventions meant new jobs. The car drove blacksmiths, like E. Bennet, whose Jasper County shop is pictured above, out of business when it replaced horses as primary mode of transportation.

In 1994, 1,508,000 Iowans were employed in the state. That’s enough people to fill the seats in Des Moines’ Sec Taylor Stadium ten times! Of that number, 94,000 were young people between the ages of 16 and 19.

Young people under age 16, who are not included in official labor statistics, also work hard. Like kids in the early part of Iowa’s history, they do chores at home, hold part-time jobs such as delivering newspapers and baby-sitting, and participate in other wage-earning activities. ▲

“Working the Environment” Essay from *The Goldfinch*, 1996

by Bridgett M. Williams

Working the environment

Making a living sometimes means making difficult choices.

Many of Iowa’s best-known industries are extractive. An extractive industry takes things out of the ground or water that cannot be replaced.

Fur trading is one of Iowa’s oldest extractive industries. Native Americans hunted deer and trapped beaver to trade with other groups. As European Americans increased the demand for furs in trade, overhunting eventually had a devastating effect on wildlife.

The lumber industry also changed Iowa’s landscape. When Isaac Kramer moved to Linn County from Pennsylvania in 1838, linn trees grew everywhere. Soon, however, people cut and sold timber to build homes, furniture, fences, and barns, without replanting. By the time Isaac was an old man, the groves of his childhood were history.

Iowa’s coal mines boomed in the 19th and early 20th century. Miners either tunneled to remove coal or “churned the earth,” turning good soil under-

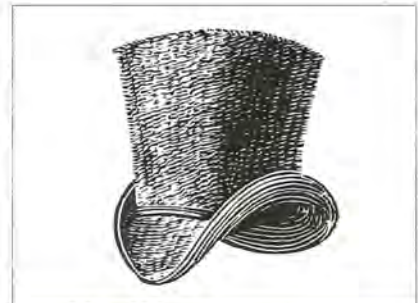
neath and leaving poor soil on top where nothing would grow. When coal companies quit because there was little coal left to mine, and better quality coal could be found elsewhere, miners had to find other work.

Farming can be considered an extractive industry. Crops take nutrients out of the soil and farmers use chemical fertilizers to restore them.

Movement and markets

Even the way we connect buyers and sellers changes the environment. In 1846, for example, there were few roads. Native American traders used rivers and footpaths to reach customers. Canoe and foot travel were easy on the environment.

European-American settlers, however, wanted to go where rivers didn’t. They built roads to transport goods. Herds of cattle and wagons packed down the earth. The dust, smell, and noise drove away wild animals. To widen roads, people sometimes cut down trees. Without tree roots to hold it, soil eroded.



Beaver furs were once made into hats, like the one pictured here.

By the 1870s, railroads crisscrossed Iowa, creating new jobs and connecting farms and factories across the nation. Engines burned smoky coal, polluting the air. Sparks started prairie fires. Railroads also promoted expansion of agriculture; because farmers could move more grain to Chicago easily, they farmed more land.

Today, trucks and cars speed down Interstate 80 and 35, moving workers and what they produce around Iowa and the nation. How do highways and automobiles transform our environment today? ▲

“Iowa Inventors and Inventions from A to Z” Excerpt from *The Goldfinch*, 1998 (pg.1)

Iowa Inventors and Inventions from A to Z

An invention begins with someone’s good idea. Sometimes those ideas happen by accident. More often, inventions result when creative people work hard to solve a problem or to make life’s chores a little easier.



Air-tight Mailbag

Bags stuffed with letters were piled atop stagecoaches to travel between stage stop post offices in the 1850s.

The problem: Dust and dirt blown into the bags soiled the mail. Rain and snow leaked in, reducing letters to a soggy mess.

The solution: Charles A. Robbins and Harvey Allen designed an air-tight mailbag to protect mail from dust and water. Robbins constructed

the prototype by crimping in elastic material at the mouth of the bag. He was one of the first Iowa City residents to apply for a patent, which was granted on September 7, 1852.

Robbins’s inventions didn’t stop when he solved the soggy mail problem. He also patented a ditching and excavating plow for turning prairie sod.



Stagecoaches carried people and mailbags!



Basic Skills Tests

Sharpener your #2 pencil and blacken the oval of the correct answer:

Everet F. Lindquist, a professor of education at the University of Iowa, devised:

- a the Iowa Tests of Basic Skills in 1935
- b the Iowa Tests of Educational Development in 1942
- c the first electronic scoring machine
- d all of the above

The correct answer is d all of the above.

Born in Gowrie, Lindquist earned national recognition for his innovations in testing. Schools across the nation used tests he developed, sending them in by the thousands for grading. Scoring them one by one was a tedious job. Lindquist dreamed of an easier way—then invented the first electronic scoring machine in 1952, even though he had no special training in electronics.

Now, when your teacher tells you it’s time for basic skills tests, you’ll know whom to thank!

“Iowa Inventors and Inventions from A to Z”

Excerpt from *The Goldfinch*, 1998 (pg.2)

Corn Picker



Patrick J. Lawler was a farm kid who didn't like the hard work of farming. Picking corn by hand left him exhausted. But he liked tinkering with machines and dreamed of an easier way to get the job done.

By 1880, Lawler had drawn his ideas for a corn picking machine on paper. With the help of John F. Barry, a lawyer from Chicago, Lawler built a working model of his dream. Then, on a sunny afternoon in 1885, a crowd gathered at the Lawler farm near Wall Lake to watch the strange machine pick corn. Neighbors were amazed as the horse-drawn picker poured out a stream of husked ears.

A Chicago manufacturing company offered Lawler money for the rights to produce his machine, but he and Barry wanted to manufacture the corn picker themselves. They purchased a blacksmith shop and built two machines but were unable to sell them. Lawler's first corn picker was sold for scrap in 1932.

A little boy standing in Christian Nelson's ice cream shop in Onawa in 1920 couldn't make up his mind. Should he buy ice cream or a chocolate bar?



Nelson's sweet treat has been in production for almost 80 years!

Inspired by the child's dilemma, Nelson experimented with chocolate and cocoa butter until he found just the right mixture for a coating that would freeze on a slice of ice cream. He patented his creation, originally called the "I-Scream-Bar."

PHOTOS: SHSI (IOWA CITY)

Delicious Apple

Jesse Hiatt was a farmer who experimented with new varieties of apples, berries and flowers. He could do curious things like grafting several varieties of fruit on one tree. He planted a new type of red raspberries that bore fruit even in hot summer months. Then he discovered what would become the most popular apple variety in the world—by accident.

Hiatt found the unusual seedling in his orchard near Peru in Madison County. Each time he tried to chop it out, the stubborn seedling grew back. So he let it grow, later discovering qualities he liked in the fruit. Hiatt called the apple variety "Hawkeye" and entered it in a fruit show at the 1893 Missouri State Fair. When a judge bit into the apple and proclaimed it "delicious," the name stuck. A descendant of the original tree still stands just north of Peru.



Hiatt's tree in 1922

Eskimo Pie

Soon he teamed up with Russell Stover to produce what became known as the Eskimo Pie.

The Eskimo Pie became a national sensation. More than one million sold daily at the height of its popularity. Demand for the frozen treat was so strong that it helped lift cocoa- and chocolate-producing countries out of an economic depression.

Not bad for a simple idea from an inventor in Onawa!

“Kids used to hang around, just to eat his failures.”

—Mrs. Fred Otto, January 1955, recalling Nelson's ice cream shop.

“Iowa Inventors and Inventions from A to Z” Excerpt from *The Goldfinch*, 1998 (pg.3)

F

Frank-A-Matic

Do you like hot dogs? Did you know that most of the frankfurters and sausages consumed around the world today are produced on a machine created by an Iowa inventor?

Ray Townsend introduced the “Frank-A-Matic” in 1964. His invention stuffed and linked 30,000 frankfurters and sausages per hour.



This Frank-A-Matic is in the SHSI (Des Moines) Collection.

This machine was one of Townsend’s many innovations to boost the meat-packing industry. Born in Des Moines in 1913, Townsend is the inventor or co-inventor listed on more than 70 U.S. patents.



John Froelich

Gasoline Tractor

In 1892, John Froelich built the first gasoline-powered tractor that propelled itself backward and forward. His invention helped pave the way for modern farming.

John grew up in Froelich, a Clayton County town named after his father, Henry. John ran a feed mill and elevator, and tinkered with machines. Mounting a gasoline engine on a well-drilling rig gave him the idea to mount an internal combustion engine on a tractor. A few weeks later, the tractor—a forerunner of today’s John Deere tractors—was shipped to South Dakota, where it threshed

72,000 bushels of wheat in 52 days.

Froelich, with other investors, founded the Waterloo Gasoline Traction Engine Company in 1893. This company eventually became the John Deere Tractor Works.

Like many inventors, Froelich received little recognition for his work during his lifetime while others profited from his creations.

H

Helicopter

August Werner had a vision. He wanted to be the first person to invent a heavier-than-air craft that could actually fly—with a person in it!

In 1880, Werner and his wife, Martha (Mattie), moved to Imogene, a settlement with fewer than 200 people. Werner built and operated a boarding-house and a restaurant. He also served as the town’s furniture dealer, cabinet maker, and undertaker—occupations that often went together in the 1880s since the town cabinet maker had the skills needed to also make coffins.

But Werner lost interest in his work. He didn’t finish coffins time, the restaurant ran short of food, and he neglected orders for cabinets. Instead, his attention was focused on the small model helicopters he designed and built in his carpenter shop. Werner believed he could build a full-sized helicopter that would carry him into the air.

Driven by a wooden crank and spring that powered a propeller, the helicopter models flew up to the ceiling of his workshop. For months, Werner secretly worked on his inventions. Finally, early in 1886, he announced plans to build a full-

“Iowa Inventors and Inventions from A to Z” Excerpt from *The Goldfinch*, 1998 (pg.4)



August Werner

sized helicopter and fly to Washington D.C. to have lunch with the president of the United States!

On July 4, 1886, Werner and a passenger, Imogene resident John Barker, got into the helicopter. As they worked the hand cranks and foot pedals, the helicopter blade began to rotate faster and faster. Finally, according to several witnesses, the machine rose about four feet off of the ground before one of the wooden cogs gave way and the helicopter crashed into a heap. Depressed and humiliated, Werner never again attempted to fly.

Although Werner's flight did not take him to see the president, it represented a great accomplishment. His four-foot flight took place **seventeen years** before the Wright brothers took their historic first flight at Kitty Hawk. Werner's vision and courage made him a pioneer in aviation.

—by Jan Wolbers



Incubator

When Rebecca Johnson's husband died, the Maxwell

woman had to support three young children on her own. Cleaning houses and sewing did not pay enough, so Johnson used her small inheritance to buy a house, eight acres of land, two cows, a few pigs, and several dozen hens. She raised chickens year-round, paying careful attention to their needs. She built a hen house that was so warm her hens laid eggs all winter. She later wrote, "I fed them cabbage, beets, turnips, squash, onions, for I knew to produce eggs in winter I would have to make conditions as near like those of the warmer months as possible.... I never let them out on cold days."

Soon she made enough money selling eggs for 18 cents per dozen to pay her living expenses and feed her animals. In the late 1800s Johnson made her first **incubator**.

Using incubators, Johnson hatched 5,000 chickens in one season. Later in her poultry career, she hatched half that amount in a single day! Eventually, she made \$300 monthly during the busy part of the year. Newspapers wrote about her skills. She received so many letters asking for advice that she wrote a book. Johnson published *How to Hatch, Brood, Feed and Prevent Chicks from Dying in the Shell* in 1906.

In 1907, Johnson received U.S. Patent No. 894,835 for an incubator alarm. The device alerted farmers to changing temperatures within the incubator. Later, she refined her invention so the thermostat raised and lowered the wick of a heat lamp.

—by Katherine House



Rebecca Johnson's poultry business (and inventiveness!) supported her family PHOTO: SHSI (DES MOINES)

incubator: a container that is kept warm for hatching eggs.

“Iowa Inventors and Inventions from A to Z” Excerpt from *The Goldfinch*, 1998 (pg.5)



Johnston's Sewing Machine Attachments

Allen Johnston sold sewing machines to earn his way through dental apprenticeship in the 1860s. He experimented with ruffler and embroidery attachments in his spare time, creating devices that would make his sewing machines better than those sold by competitors. Seamstresses used his attachments to decorate clothing and curtains with ruffles and fancy stitching popular after the Civil War. His gadgets saved hours of tedious handstitching and earned Johnston recognition as an inventor. But it was his childhood that had prepared him for his career.

Johnston grew up on a farm in Wapello County near Blakesburg. His family didn't have money for toys, so Johnston built them himself. He fashioned sleds, ice skates, wagons, and bows and arrows from materials he found around home. When Johnston needed a baseball he wound yarn in a tight ball then used squirrel skin he tanned himself for the cover. If he didn't have the tools he needed, he made them, too.

Allen Johnston's childhood prepared him for a career as an inventor.

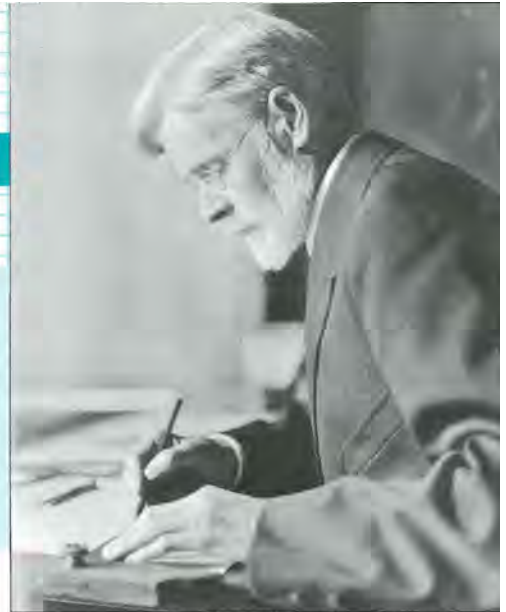
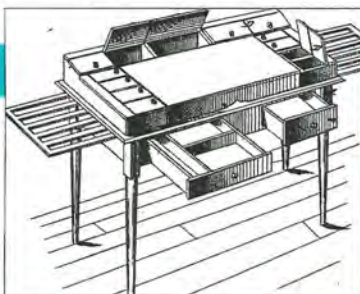


PHOTO COURTESY: WAPELLO COUNTY HISTORICAL MUSEUM

Johnston built a machine for cracking hazelnuts (hulling them by hand was slow, hard work), turned his mother's spinning wheel into a drill to bore holes in metal and wood, then adapted the spinning wheel again for use as a lathe.

“Many a night have I sat up and sewed a ball cover together so that I could take it to school the next day,” Johnston wrote. It's not surprising that this child became an inventor who received 129 patents from 1870 to 1925.



Bliss submitted this drawing with her patent application.

Kitchen Table



Josephine Bliss of Primghar must have been a very organized woman—or at least she wanted to be! In 1878, she was granted a patent for a kitchen table that

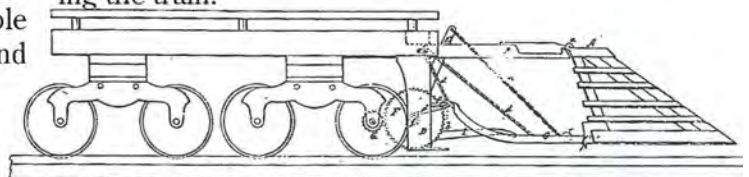
had a series of boxes with hinged lids, a reversible molding board for shaping pastries, sliding end grates, and front storage drawers.

8 The Goldfinch

Locomotive Cow Catcher



Obstacles on railroad tracks created collision hazards for trains speeding across the countryside. James Mitchell of Osceola patented this early development in locomotive cow catchers. The device, mounted on the front of the engine, helped remove livestock or debris from the tracks without derailing the train.



“Rise of Industrial America, 1876-1900” from Library of Congress

Rise of Industrial America, 1876-1900

In the decades following the Civil War, the United States emerged as an industrial giant. Old industries expanded and many new ones, including petroleum refining, steel manufacturing, and electrical power, emerged. Railroads expanded significantly, bringing even remote parts of the country into a national market economy.



Industrial growth transformed American society. It produced a new class of wealthy industrialists and a prosperous middle class. It also produced a vastly expanded blue collar working class. The labor force that made industrialization possible was made up of millions of newly arrived immigrants and even larger numbers of migrants from rural areas. American society became more diverse than ever before.

Not everyone shared in the economic prosperity of this period. Many workers were typically unemployed at least part of the year, and their wages were relatively low when they did work. This situation led many workers to support and join labor unions. Meanwhile, farmers also faced hard times as technology and increasing production led to more competition and falling prices for farm products. Hard times on farms led many young people to move to the city in search of better job opportunities.

Americans who were born in the 1840s and 1850s would experience enormous changes in their lifetimes. Some of these changes resulted from a sweeping technological revolution. Their major source of light, for example, would change from candles, to kerosene lamps, and then to electric light bulbs. They would see their transportation evolve from walking and horse power to steam-powered locomotives, to electric trolley cars, to gasoline-powered automobiles. Born into a society in which the vast majority of people were involved in agriculture, they experienced an industrial revolution that radically changed the ways millions of people worked and where they lived. They would experience the migration of millions of people from rural America to the nation's rapidly growing cities.