Industry Builds the Busy City

Through All the Years the Things Beloit Makes Have Made Beloit

- A missionary among the Ojib-ways of Chequamegon Bay wanted wind-power to pump water for his mission station and the red people who were his charges. And subsequently, when his children were of proper age, he wanted them educated in the new college at Beloit.

Thaddeus Fairbanks began the manufacture of scales in 1830 at St. Johnsbury, Vt., and a boy of 17 apprenticed himself to learn the business in 1850. When he was a man grown, in 1865, and had become a successful machinery salesman, this former apprentice wanted to manufacture the products he sold.

A man named Charter and his ambitious son were absorbed with the challenging thought that an internal combustion engine, burning gasoline or oil, could be made to do the work which steam was doing 50 years ago.

And all men everywhere — on the farm and in the mill and factory — who still were doing things the hard-hand way wondered why machinery could not be put to many of the tasks that brought them back-break.

Outgrowth of these desires and ambitions, a compound of the challenge of great problems and the genius and the skills of many men, is Fairbanks, Morse & Co., whose principal factory comprises Beloit's largest industry.

Apparently unrelated events widely separated by time and distance proved not to be unrelated at all, but were fitted by circumstances and initiative into the pattern by which an industry developed. Because they fitted so well into this pattern, the industry they created is one of the nation's greatest.

It is an industry with total assets of $75,900,000, of which a large amount is represented in land, buildings, and equipment in Beloit alone; an industry which in Beloit employs 3,000 people, and which, in its other factories, in its 32 branch houses and its executive and sales staffs, gives work to 2,000 more.

It is an industry which in the 22 years from 1914 to 1935 inclusive (for which the data is quickly available) paid in wages to the employees of its Beloit works nearly 76 million dollars. The round figure is $75,900,000. In the company's accounting records the $75,900,000 is marked as payroll; but in the community it is more than that. It is represented in homes paid for, balances in the bank, education for children, taxes in support of the community, churches, food, clothing, automobiles — all the thousand and one items which together make for happiness and independence, business activity, and a stable community.

Central in the chain of events by which the scale made by Fairbanks in Vermont, the windmill designed by Wheeler at his Indian mission, the engine perfected by Charter and his son, and many another important product of engineering and manufacturing skill came to be a part of Fairbanks, Morse & Company, is the figure of the elder Charles Hosmer Morse.

It was he who fitted the far-apart and apparently unrelated events into the closely-knit pattern out of which Fairbanks, Morse & Co. was fabricated. He was founder of the company and for many years its president. Under his aggressive and competent direction small beginnings became great industrial achievement.

Charles H. Morse was 17 when he went to work for Erastus and Thaddeus Fairbanks, who had been making scales at St. Johnsbury since 1830. His apprentice wage was $50 a year, no great sum of money even for 1850, but he learned about scales, and about business, to such good purpose that in 1857 when the Fairbanks agent in Chicago needed a capable young man to help him, young Morse was sent along from Vermont. In this manner new opportunity came to the young man so recently a $50 a year apprentice.

First it was scales that young Morse sold, but there were many things people wanted in the new age of power and soon other machinery lines were added. The whole industrial field was opening before the young enthusiast. In 1863 he established a branch agency in Cincinnati under the firm name of Fairbanks, Morse & Co. Here for the first time was the firm name — now so well known around the world — used. It was used again in 1871. On a Sun-
day in that year conflagration swept Chicago and the business house of Fairbanks & Greenleaf, by whom Morse had been employed and in which he had later become a partner, was swept away. The following Tuesday Mr. Morse started business anew as Fairbanks, Morse & Co. It has been such from that day to this.

Now Mr. Morse was established in the machinery sales field. His business grew with the industrial and agricultural expansion of the great middlewest in the decades that followed the Civil War. And with growth of his business there was born the ambition not only to sell machinery but to manufacture it. From that ambition dates the presence of Fairbanks, Morse & Co., in Beloit.

One of the products sold by Mr. Morse was the Eclipse Wind Engine. It was the best windmill of its day, and its day was the beginning of the heyday of wind-power on the farm. The mill was best because the Rev. Leonard H. Wheeler, for 25 years a missionary at Odanah and on the Apostle Islands, had devised a speed-regulating and pull-out device that made wind-power practical and gave the windmill new utility. His device was patented in 1867 after he had brought his children to Beloit to be educated at Beloit College. In that year its manufacture was begun in a small way here by L. H. Wheeler and Son. The son was William H. Wheeler, still a resident of Beloit.

In 1873 the Eclipse Windmill Co., was formed. Its incorporators were W. H. Wheeler, L. H. Wheeler, Jr., Sereno T. Merrill and C. B. Salmon. Merrill was president; W. H. Wheeler, superintendent; and Salmon, secretary-treasurer. The business grew. Demand for the mill for farm use was great, and it began also to be used in large numbers as power for railroad water tank supply. It won prestige by a gold medal at the Philadelphia Centennial Exposition of 1876 and first prize at the Paris Exposition of 1878.

In 1880 a new company was organized to manufacture the windmill. It was the Eclipse Wind Engine Company. Incorporators were C. E. Hardy, C. E. Wheeler, E. P. Wheeler and W. H. Wheeler, and here for the first time Charles Hosmer Morse became actively a Beloit industrialist. He acquired 50 shares of stock in the new company and the firm of Fairbanks, Morse & Co. became general sales agent for all the product of the factory. Buyers of windmills needed pumps also, and so in 1881 a pump was designed and put in production at the Beloit factory. In 1885 a fraction clutch was added to the line and in that year—because business was increasing rapidly—the company moved from its plant at St. Paul and State Street to “the hill” where five years earlier the Beloit Wagon Works had built a stone factory building. By 1887 there were 118 men employed. Business was good.

In 1889 the Williams Engine Works was organized to build a high-speed steam engine designed by Edwin F. Williams, who became associated with the new company. Charles H. Morse took over the sales agency of the new engine. In 1890 more land and larger buildings were needed. Citizens of Beloit raised $10,000 to encourage development of the industry, and Mrs. Ella D. Adams gave 10 acres of land adjacent to the associated Eclipse Wind Engine Co. factory. Thus the new industry was anchored to the community.

In 1890 Mr. Morse acquired W. H. Wheeler’s controlling interest in the Eclipse Wind Engine Co. and the following year a line of steam hoisting...
engines and steam pumps was added to the product. Mr. Morse was branching out and was making more and more of the machinery his company was selling in such great quantities. In 1893 W. H. and C. E. Wheeler retired from the companies in which they had held an interest, and by consolidation, reorganization, and purchase, C. H. Morse acquired controlling ownership of the several separate factories, which he concentrated under one management as Fairbanks, Morse & Co. George W. Sparks was appointed manager of the combined companies.

Now began the company's greatest growth and development. In 1893 James A. Charter, who with his father had produced the first successful internal combustion engine using gasoline for fuel to be built in the United States, was brought to Beloit, and in December of that year the first oil engine was shipped from the Beloit factory—the forerunner of the vast farm and industrial engine business which has covered the world in the years since; and which, by the year 1914, had produced at the Beloit factory 167,865 gasoline and oil engines of all sizes and for all purposes.

A few years before consolidation of the companies, two men marked for important contributions to the industry were employed by Mr. Wheeler. They stayed on in responsible capacities under Mr. Morse. The two were Frank G. Hobart and Mr. Sparks.

Mr. Hobart, still a resident of Beloit and still associated with the company, became chief engineer in 1893 and remained such for nearly 40 years until his retirement to accept a consultant post in 1932. Between 1893 and 1932 there was not a single development in any product of the company in which he did not have a major part. He worked with Charter on the first gasoline engine and he had a hand in the development of Diesels as a major product. And in between he put his engineering talent at work on a thousand other problems. He is still consulting engineer for the company and is at his desk almost every day. Probably no industrial engineer in the United States has a longer period of association with a single industry or has had more influence in the development of so many products of importance.

While Mr. Hobart was occupied with the engineering and development activities of the company Mr. Sparks was its business man and the strong hand of the elder Charles H. Morse. He was manager during exciting days of rapid expansion; he laid the foundations and he laid them well. After long direction of executive duties in Beloit he became manager of the Canadian factory of the company. He died several years ago.

Great attention was paid engineering development and new products useful in industry and agriculture, on land and water, were projected upon drawing boards, put through severe experimental tests, and when thoroughly proved, were brought into production. In 1895 the first small vertical gasoline engines came off the floor, and a new day of power use on the farm was introduced. In 1900 came the small two-cycle marine engine and in 1901 the four-cycle marine was developed. The day of the windmill and the steam engine was passing, but Fairbanks, Morse & Co. was ahead of the field with the technical skills that produced the better power units which succeeded wind and steam. Pumps of every size, from the smallest home unit to the great units handling millions of gallons of water in a day, were produced and put into use coupled with F-M power units. Electrical motors and generators, magneto, feed grinders, home light plants, automatic deep
and shallow well house pumps, and many other products were brought out. In 1914 the company began development of a Diesel engine and from that first development dates its commanding position in the Diesel field. No other manufacturer has the variety of Diesels that are produced by Fairbanks, Morse & Co., the scale-makers of NINETEEN THIRTY-SIX


In 1922 the sum of $2,000,000 was expended on construction of a huge iron and steel foundry; when it was built it was the largest foundry of its kind in the world.

A baseball team represented Fairbanks, Morse & Co. in an industrial league which furnished the fans a brand of ball almost the equal of the major leagues. There was a factory baseball team, a semi-professional everywhere in the middle-west, a football team, and a basketball team that made Beloit a winter sports center. In 1925 the conveyor system of assembly was adopted in the fabrication of several F-M products and later extended to others. In 1926 a much improved course, the Morse Hills Club, was established for employes and their families. Even earlier a comprehensive system of accident prevention by erection of safeguards on thousands of machines had been put into effect, and a health and accident medical and hospital service was established.

In 1930 the major manufacturing programs hitherto carried on at the three Rivers and Indianapolis plants of Fairbanks, Morse & Co., were consolidated in Beloit. At the Beloit Works at the present time manufacturing operations on the following major products are carried on:

Diesel engines, both stationary and marine, in two and four-cycle types of from 10 to 1400 horsepower; complete lines of electrical generators and motors of many sizes and types; hydraulic machinery which includes centrifugal, rotary and reciprocating pumps, both steam and power driven, in every size from the smallest to the largest; mag­netos, made in large numbers for F-M products and for other internal combustion engine manufacturers; gasoline engines for farm use in sizes from 1½ horsepower to 20 horsepower; and semi-Diesel engines using natural gas for fuel which are much used in oil field applications.

Factories at St. Johnsbury, Vt., and Moline, III., produce the famous Fairbanks scales. Railroad motor cars, hand cars, push cars, standpipes, and other railroad equipment is produced at the Three Rivers Works, and at Indianapolis refrigerators, radios, washing machines, and other home appliances are produced. Air conditioning equipment, stokers, and many other appliances also are F-M products.

Thirty-two branch houses sell and service Fairbanks, Morse products in every part of the United States and several serve the same purpose in foreign countries. Canadian business is handled through the Canadian Fairbanks-Morse Ltd., with main offices at Montreal and branches at St. John, Toronto, Winnipeg and Vancouver.

Depression years put a strain upon Fairbanks, Morse & Co., as they did
upon every other business and industry. Gross business which in a single year had amounted to more than 30 million dollars dropped to a fraction of that figure, and management was confronted with critical problems. In the three years of 1931, 1932, and 1933, the company suffered losses aggregating $8,862,000. But management showed its mettle by reducing these losses each of the three years. The 1931 loss of $5,168,000 was reduced to $2,547,000 in 1932, and to $1,147,000 in 1933.

By 1934 the management policy was able to “turn the corner” and a nominal profit was indicated.

Notwithstanding the losses, the company’s sound financial position and policies enabled it to weather the storm. Stockholders were loyal in support of the management’s conservative policies, under which no dividends had been paid on preferred stock since January of 1931 and on common stock since June of the same year, and when a recapitalization was proposed on Nov. 31, 1933, there was not a dissenting stockholder. Under the recapitalization plan, each share of 7 percent preferred was surrendered for one share of new 6 per cent convertible preferred and one share of common and $2 cash. Dividend arrearages amounting to $25 for each share of the original preferred were wiped out, working capital so important for maintenance of the company’s position in American industry, was conserved, and stockholders were assured early resumption of dividend payments.

One policy to which the management adhered throughout the long depression was continuation of development and engineering. Despite losses, whose duration could not be measured in those difficult days, the company continued to make large investments in technical development, and as a result its position as a leader was not jeopardized; it was ready with the new product when new business was forthcoming. One of the large items of development was production of the new opposed piston type of Diesel, which is not alone a marine type engine, but has many other important applications where high-speed, light weight motive power of high efficiency for exacting use is required.

Another policy which management adopted was to maintain personnel as far as possible and especially to provide continued employment for hundreds of the veteran employees of the company. Management executives gave this problem much attention, and when interviewed for material contained in this brief story of the company, they expressed often their gratitude for the loyalty and the abilities of employees.

The first president of Fairbanks, Morse & Co. was its founder, the apprentice lad of 1850, Charles Homer Morse, whose two sons, C. H. Morse, Jr., and Robert H. Morse, became in their turn apprentices in all and learned manufacturing by making things in the Beloit factory. The elder Mr. Morse retired from the presidency in 1915 and died in 1921 at the age of 88. He was succeeded as president by C. H. Morse, Jr., who served until 1927 when he was elected chairman of the board and W. S. Hovey, formerly manager of the Beloit Works and vice-president in charge of manufacturing, was named president. Mr. Hovey served until the end of 1931 when Col. Robert H. Morse was elected president and general manager, Col. Morse is the present chief executive of the industry. Other officers are: Percy C. Brooks, executive vice-president; S. T. Kiddoo, vice-president and treasurer; A. E. Ashcraft, vice-president in charge of manufacturing; A. D. Dodge, vice-president in charge of sales; L. A. Keeler, comptroller; F. C. Dierks, secretary; E. T. Sandeen, assistant secretary. Executive offices are maintained in Chicago.

In charge of manufacturing operations with headquarters at Beloit is Alan E. Ashcraft, vice-president of the company, and general manager of the Beloit Works. He also is in charge of manufacturing at Three Rivers. Mr. Ashcraft is assisted by A. C. Howard, assistant general manager, at Beloit.

Other executives of the Beloit Works include Ray Saveland, factory
superintendent; George W. Zabel, heady superintendent; L. B. Jackson, manager of the engineering department; B. H. Meyer, in charge of auditing and accounting; G. R. Anderson, chief electrical engineer, and M. B. MacNeille, chief hydraulic engineer. With these management executives work 3,000 men and women whose combined skills and loyalties produce the machines by which Beloit has been made known the world around as an industrial center of first importance.

Briefly, this is the story of Fairbanks, Morse & Co., and how it came to be what it is. The story of what it will be in the future is being written on the drawing board, in the foundry, the machine shops and the erecting floor, and in the sales conferences, where the things that Beloit people make, make the Beloit that is to be.

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- For every man, woman and child in the United States in the year of 1935 two hundred pounds of paper were used. This, the statisticians say, is twice the per capita consumption of paper of any other nation. It is a lot of paper.

The greatest part of it was used by newspapers. Next largest use is by magazines and periodicals. Books, bags, boxes, cartons and other containers, wrapping paper, the paper on the wall and the paper on your cigarette all require thousands of tons of paper in the course of a year. This Centennial Book which you are reading is printed upon 50,000 pounds — 25 tons — of paper. Even the scratch-pad on which you draw figety hinges while you use the telephone uses up a lot of paper in a year's time. You'd be surprised how much.

This tremendous consumption of paper has created an industry whose importance bears upon the daily life of everyone in the nation. The woodcutter in the far north is a part of this industry. The navigator on the bridge of the freight ship which hauls the pulp-wood to the mill is part of it. So is the man who makes the machine that makes the paper, the switchman in the railroad yards, the printer at the makeup stone, the newsboy crying "extra" on the street corner.

But more than for any other reason, the industry is important to the economic welfare of Beloit because so great a portion of the 200 pounds of paper which every American uses in a single year is produced upon machines which Beloit men build in a Beloit factory. They are the product of a Beloit company which is dominant and the leader in its field, and which since 1858 has produced more than 600 such machines for use around the world.

This is the modern plant of the Beloit Iron Works, which had its beginnings in Beloit in 1858. Here are built the giant paper-making machines used in paper mills in all parts of the United States and in many foreign countries.

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This is not many machines as numbers count in these days of mass production. A manufacturer can make that many automobiles in a day. But paper-making machines are not automobiles. They do not skitter here and there upon the highways and become obsolete in two years or three or four. One machine is not like every other; indeed, no machine is exactly like any other. Each is made for its particular purpose. One spins through its intricate pattern of great rolls, paper so thin it wraps your cigarette; another produces the most delicate facial tissue; still another fabricates the inch-thick insulation or roofing that keeps weather and storm from penetrating and is impervious to fire.

They are huge machines 400 feet or more long. They are built on a gargantuan scale. Some have gleaming dryer rolls 12 feet in diameter and 17 feet long which weigh 120,000 pounds — yet between such rolls and many others that make up a portion of each machine the thinnest sheet of paper passes swiftly and easily and is not torn. This is precision on a grand scale. It is also precise design and skillful and conscientious mechanics. And it is teamwork, exact and thorough-going teamwork at every stage from the drawing board to the erecter who installs the finished machine halfway 'round the world from Beloit.

A train of 65 cars is required to ship one of these machines; and if it is to be shipped abroad three carloads of lumber are needed to box the parts and three tons of nails to fasten the crates. Paper-making machines are not built in a day or a month; but when they are built they stay built. Many a Beloit Iron Works machine built 40 or more years ago is making paper today, and will make it for many another day.

Beloit men build these machines, for one reason, because 76 or 77 years ago Sereno T. Merrill was making paper in the old Rock River Paper Co. mill on a machine built in New England and when he needed repairs he had to wait a long time to get them. So he asked his brother, Orson E. Merrill, who ran the O. E. Merrill Co., a machine shop, to make some mill patterns and turn out some spare parts for him. It was much quicker than sending to New England for them; and it got O. E. Merrill interested in paper-making machinery. That was the start of the industry in Beloit.

O. E. Merrill Co., was organized in 1858. Shortly afterwards it became the Merrill & Houston Iron Works, with George Houston as a partner. Its principal product in that day was the famous water wheel perfected by Houston to harness water power. Some of these wheels, by the way, still function, or did until very recently. Associated with O. E. Merrill and George Houston in the company were S. T. and J. B. Merrill and C. F. G. Collins.

From making an occasional spare part for his brother's paper machine, O. E. Merrill and his associates broad...
ened their interest to making repair parts for other mills, and finally to the building of a paper machine themselves. It worked. Others were built and they worked, and in reasonable time the company became known as the leading manufacturer of straw-board machines in the middle west. In that day the company built the paper mill complete, including its water power equipment, the paper-making machine and the building which contained it. Then came the panic of 1873. Industries and businesses collapsed; the Merrill & Houston company was hard hit but held on. Soon, however, O. E. Merrill sold his interest. The difficulties continued, for those were not easy times for industry or for anyone. In 1882 the Merrill & Houston company went into the hands of a receiver. Business was bad but operations continued for two years. Then the plant was idle for almost a year. 

Now comes the second reason why in a thousand cities the newspaper sold at the street corner is printed on paper made on a machine built in Beloit. Four young men who had been employees of the Merrill & Houston company wanted jobs, even if they had to make their own jobs. They took their chance. They took what money they had and could borrow, organized a $10,000 stock company owned entirely by themselves, rented the factory building in July of 1885, called themselves the Beloit Iron Works, hired five mechanics to help them, and went to work. The four who founded the new company and made it what it has since become were Fred Messer, Alonzo Aldrich, W. H. Grinnell and Noble J. Ross. One of them, Mr. Ross, survives. For purposes of organization and for almost no other purpose Mr. Messer became president of the company, Mr. Grinnell vice-president, Mr. Aldrich secretary, and Mr. Ross factory superintendent. Except on paper the titles were almost meaningless, for no one had a polished desk; each kept on doing what he had done before, and more. They worked all hours at whatever must be done. Mr. Messer had been superintendent of the Merrill & Houston shop; Mr. Aldrich had been the draftsman, Mr. Grinnell operated the big grinding lathes and Mr. Ross had been the boss erector. They still did their own jobs—and they got an order. Then another. They were repair and replacement orders at first, but they kept the wheels turning. Then they sold a machine and set at work to build it. It was a good machine. By October, 1886, there was work for 48 men in the plant. In 1887 the company bought the building. There was work, but no dividends and little salary, because now the building must be paid for. About this time L. B. Merrill and R. J. Burdge became part owners. Mr. Merrill sold his interest after a few years and the Burdge interest was sold by his heirs many years later. In 1889 Mr. Messer died. He was succeeded as president by Mr. Aldrich. The founders who were left carried on, and to such good purpose and with such success that the Beloit Iron Works is marked to this day by the characteristics of alert engineering, sound workmanship and forward-looking leadership which accounted for its earliest successes.

That is how the Beloit Iron Works came to be. It has continued to be what it is because there were men in the organization imbued with the policies established by the founders and skillful in the further development of the paper-making machinery art. Mr. Aldrich remained as president until his death on Dec. 20, 1931. Mr. Grinnell had died some years previously and Mr. Ross retired from active industrial life in 1920. Upon Mr. Aldrich's death Elbert H. Neese became president of the company. He had come to the company in 1916 after a broad experience in the paper-making industry in both east and abroad and because of his extensive experience he was made vice-president.

G. A. Macklem, who joined the company in 1907, was also an outstanding man in the field when he came to Beloit, and in January, 1927, was made vice-president in charge of sales. In 1930 E. E. Berry, who had been Mr. Aldrich's right hand in the development of engineering methods, processes and design, became vice-president in charge of engineering, and W. E. Smith, many years in charge of purchases, became secretary of the company in 1932. These and Mrs. E. H. Neese constitute the company's board of directors.

Long-time employment characterizes the personnel of more than 500 men and women who work at the Beloit Iron Works. Among these are the following in executive and supervisory capacities: William S. Wood; C. T. Ramsden, C. E. Macklem, C. R. Whipple, P. H. Tregwell, J. E. Goodville, Theodore Roberts and F. G. Ramsden, sales engineers; Lloyd Hornbostle, assistant chief engineer, and W. W. Standley, in charge of the drawing room; Clarence Ledell, in charge of the cost department; H. F. Tower, assistant treasurer; Horace Magee, orders; M. W. Kundore, production manager; John Molique, L. Buckwalter and Clarence McNabb, machine shop and erecting floor foremen; D. C. Roberts, consulting engineer and chief inspector; Fred Dietz, foundry foreman; Samuel Benson, woodshop foreman, and Theodore Hagg, toolroom foreman. Others in shop supervisory capacities are Russell Hartman, Roy Mielke, John O'Brien, Glenn Hauser, William Starling, W. P. Schoenoff, Roy Putnam, Dan Halilsey, Fred Doring, L. Dalvit, A. Grosskreuz, H. Peterson, J. P. Phil-
Six consecutive months without a
vided.

only.19 days per 1,000 hours of work

Iron Works team won the citywide trophy

ience in first aid measures and

aid teams of employees are trained in

械 safeguard are pro-

ever been helping to build paper ma-
achines for more than 40 years, and one,
E. Shue, dean of them all, has been

Three others among the veterans of the
organization are B. L. Larson and
George L. Cadman of the engineering
division and Henry Wahlen, foundry.

During the deepest of the depression
extreme measures were adopted to
maintain personnel. Work was stag-
gered, maintenance and replacement
programs were put into effect, and
construction work was undertaken to
provide the maximum amount of work
possible.

A safety program started in 1929 has
had outstanding results in the factory.
Management executives have put ade-
quate resources behind the campaign
for reduction of accidents and conser-
vation of health and a shop safety com-
mittee has done a remarkable job. A
first aid room is maintained with a
registered nurse on duty and the ser-
cices of a physician are available. First
aid teams of employees are trained in
Red Cross methods of emergency aid.

Three years in succession the Iron
Works team won the citywide trophy
for excellence in first aid measures and
in 1934 the factory won a safety award
for six consecutive months without a
single lost-time accident. In 1935
only .19 days per 1,000 hours of work
were lost because of accident. Com-
plete mechanical safeguards are pro-
vided.

An employees’ Mutual Aid Society
has a 98 percent membership of the
entire personnel. Herman Schroeder
is its president. Approximately 400
are members of the shop Credit Union,
of which Charles Reynolds is president.

Henry Horn is chairman of an em-
ployees’ committee which meets with
management executives in the discus-
sion of shop problems. The company
maintains Messer Lodge at Yost park
for the use of employees. A shop bowl-
ing league operates throughout the
winter season.

Physical properties have been en-
larged and improved. A new, modern
pattern shop and pattern storage build-
ing was erected in 1931. In 1933 the
power house was rebuilt and com-
pletely modernized, and in the summer
of 1936 work began on a large addi-
tion to the erecting floor.

Beloit Iron Works machines are
operating in mills in all parts of the
United States and in many foreign
countries, including Canada, Mexico,
Hawaii, Australia, China, Japan,
England, Russia and Germany. They
represent the maximum in utility and in
output, and the speeds at which the
Beloit machines produce paper have
established new standards in the in-
dustry. From one of these machines
comes newsprint (paper used by news-
papers) in a sheet more than 19 feet
wide at the rate of 340 miles for every
24-hour operating day. In light sheets
the production is as high as 432 miles
of paper per day, and in other types as
many as 350 tons of product a day are
made on one machine. The company
is one of the largest manufacturers of
paper-making machinery in the world.

Ninety-five percent of the Beloit
Iron Works machines are sold outside
of the state of Wisconsin; a substantial
percentage abroad. Because of this,
great sums of money are brought into
this community to be expended in
wages, for raw materials, and in the
myriad other manners in which in-
dustry maintains its operation, pro-
vides employment, and keeps its place
in the lead in its field.

So the more paper Americans use
and the more uses to which they put it,
the better Beloit will like it. For
Beloit men will build the machines that
make the paper—and that will be fine
for them, for the community and for
the state.

* * *

- When industrial activity in Belo-
loit was at a low ebb in 1886 forward
looking business men and manufactur-
ers determined to bring to the city
new industries that gave promise of
growth and expansion. One such in-
dustry was the Berlin Machine Works
established in 1883 by the later Porter
B. Yates at Berlin, Wis., now the
Yates-American Machine Company of
Beloit. The subsequent growth of the
company gives tangible evidence of
their foresight and vision.

At its inception the Berlin Machine
Works manufactured only a sanding
machine. When the plant moved to
Beloit in 1887 the company employed
13 men and had one salesman on the
road. Today more than 200 machines
are included in the complete line of
woodworking machinery built by the
Yates-American Machine Company
and more than 500 people are em-
ployed.
Mr. Yates was not a "plunger". He never authorized the placing of a machine on the market until he had proved by actual use that it was superior to any similar machine built by his competitors. Many companies in this field were established before he began the manufacture of woodworking machines; but when he marketed a machine he was certain that it had no equal. This is not intended to convey the thought that Mr. Yates was lacking in initiative. As a matter of fact many of the machines that were developed in his plant were new to the woodworking industry, and in many instances they revolutionized existing practices.

His insistence that all the machines built at his factory be perfected and proved soon placed the company in the vanguard of the woodworking machinery field. Users quickly learned of the reliability of his equipment, and it was not long before the company was recognized as one of the leaders in its field. This same policy of quality workmanship and rigid inspection is still maintained and Yates-American machines are recognized the world over as leaders in the field of woodworking machinery. During the World War the name of the firm was changed to the P. B. Yates Machine Company.

Following the death of Mr. Yates in 1923 the Yates family has since been identified with the management of the business. These interests, upon the acquisition of the Yates holding, also purchased the American Woodworking Machinery Company, which operated plants at Rochester, N. Y.; Williamsport, Pa.; Montgomery, Pa.; and Aurora, Ill.; and merged the two companies into the present Yates-American Machine Company with manufacturing operations limited to Beloit, Rochester, and Hamilton, Ontario, Canada. All manufacturing operations are now concentrated in Beloit and Hamilton, although the company still maintains its Rochester property ready for operations to take the overflow from the Beloit plant.

The Beloit plant, which is approximately the same size as the Rochester property, covers between 10 and 11 acres of ground and has 440,000 square feet of floor space, all of which is in use at the present time. The company maintains its own foundry and pattern shop, as well as all departments of manufacture and assembly. It is one of the few companies of its kind with controlled production from the time the machine is designed in the engineering department until it is sold and operating in its customer's plants.

Yates-American machines are shipped to all parts of the world and are used in the manufacture of a wide variety of products which have a definite and direct bearing on the existence of every individual. Virtually every lumber mill, woodworking plant and furniture factory uses Yates-American equipment. It is safe to say that most furniture has at some stage of its production been fabricated on a Yates-American machine. Its machines cover almost the entire range of woodworking operations. Its largest machine is a heavy duty fast feed planer and matcher which weighs 37,000 pounds and is 18 feet long and 8 feet wide. The machine is designed to take rough stock and produce 600 feet of finished boards a minute, such as siding and flooring. All four sides of the material are finished at the same time. In addition to planers and matchers, the Yates-American Machine Company builds moulders, surfacers, Sanders, grinders, lathes, shapers, routers, mortisers, borers, band saws, resaws, circular saws, joiners and tenoners, as well as cutters, knives and electric motors. These machines are used in the manufacture of building materials, not only wood but composition as well, furniture, picture moulding, window frames, doors, broom handles, rolling pins, clothespins, automobile bodies, radio cabinets, home appliances and countless thousands of other articles.

Hundreds of its machines are placed in the schools each year where they are used for instruction purposes. The excellence of Yates-American machines has caused them to be accepted as the standard for school use just as they are in the industrial field.

The company, however, no longer restricts its activities to the building of industrial woodworking machinery, for in order to maintain a more even payroll the present management has developed new products which have already been accorded a favorable reception and have met with approval in the business world. The new products include automobile radiators, condensers and evaporators for air conditioning and refrigeration systems, and industrial radiators for gasoline and Diesel engines which are used on road building and excavating machinery, tractors, stationary engines, air compressors, power plant equipment and the like, and radiators for heat transfer units.

The company has also developed and introduced a new line of lighter woodworking machines for use in home workshops, schools and the lighter industrial plants such as pattern and cabinet shops, display departments and shipping departments. These machines are so outstanding in design and construction that they were accorded an unusually cordial reception as soon as they were introduced. Representative distribution has already been established in hardware stores and other outlets ordinarily engaged in merchandising a consumers product of this type.

The Yates-American Company, now 53 years old, is looking forward to further expansion and utilization of its extensive facilities. The present management is conservative in its operating policies, progressive in its attitude and hopeful that further additions can be made to its Beloit operations and that general local conditions will continue favorable, so that it can consider Beloit as the base of its major operations, management executives said.

* * *

- Within the short space of 15 years the Freeman Shoe Corporation,
which had its beginnings here in the summer of 1921, has experienced a growth which places it today in the top flight of local industries both as to number of persons employed and annual volume of production. Of even greater significance is the fact that the Freeman corporation ranks as America's largest exclusive manufacturer of men's dress shoes.

Twelve million 911,251 pairs of shoes—a number sufficient to provide one pair each for approximately one-third of the entire adult male population of the United States as of the 1930 census—had been manufactured by the Freeman company at the close of business in 1935.

Today, 1,000 persons are employed in the Freeman organization. Daily the plants in Mill street and in Harvey street are turning out 5,700 pairs of shoes. In 1935, when production reached an all time peak, 1,343,317 pairs of Freeman shoes were produced in Beloit.

Yearly production figures of the Freeman company, dating from 1921, give a vivid picture of the company's development and the ever-increasing demand for its products. The following figures give the total shoe production in pairs annually through 1935:

<table>
<thead>
<tr>
<th>Year</th>
<th>Pairs Produced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1921</td>
<td>61,727</td>
</tr>
<tr>
<td>1922</td>
<td>217,342</td>
</tr>
<tr>
<td>1923</td>
<td>401,416</td>
</tr>
<tr>
<td>1924</td>
<td>500,218</td>
</tr>
<tr>
<td>1925</td>
<td>621,870</td>
</tr>
<tr>
<td>1926</td>
<td>877,221</td>
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<tr>
<td>1927</td>
<td>972,573</td>
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<td>1928</td>
<td>938,418</td>
</tr>
<tr>
<td>1929</td>
<td>1,194,699</td>
</tr>
<tr>
<td>1930</td>
<td>1,147,424</td>
</tr>
<tr>
<td>1931</td>
<td>1,360,056</td>
</tr>
<tr>
<td>1932</td>
<td>1,077,997</td>
</tr>
<tr>
<td>1933</td>
<td>1,197,014</td>
</tr>
<tr>
<td>1934</td>
<td>1,223,965</td>
</tr>
<tr>
<td>1935</td>
<td>1,343,317</td>
</tr>
</tbody>
</table>

Visualizing almost 13 millions of pairs of shoes of all styles and sizes may present difficulties to the layman whose immediate concern in the footwear line is customarily confined to a single pair of shoes on a single pair of feet, but there is another story in this connection—another picture which the imagination more easily can conjure.

This story, this picture if you will, deals with animals—animals from all parts of the globe, which supply the leathers used in Freeman shoes. The parade forms at the Freeman plant, and extends as far as the eye can see. The fastest are in front—22,000 genuine white buck from Brazil. Hopping along behind them are 22,072 Australian kangaroos, and, blustering as they pass by far from their native habitats of Africa, Brazil and India, are 26,460 black and brown kids (goats). Sacred cows from India (no longer sacred) follow closely—31,082 of them. Slipping their way along are 1,000 seals from Alaska and Labrador. The domestic section comprises 148,930 calves, and 54,536 heavy steers from Texas and Colorado. Each of the above animals gave his hide toward the making of Freeman shoes in 1935, each animal representing one skin. Every year sees a similar parade, and each year since the Freeman company began making shoes the parade has been growing longer.

Buck used in men's sport shoes and kangaroos, which furnish the strongest fibre leather for dress shoes, are not domesticated animals, but must be hunted in their native surroundings—the former in Central and South America, the latter in Australia.

It is interesting that in 1935 the manufacture of Freeman shoes required 370,736 square yards of cotton goods. This amount of cotton would make a cotton strip one-foot wide and 632 miles long which would reach approximately the distance from Beloit to St. Paul and return. Add to the above 48 tons of tacks and nails, and one gets some idea of the materials that went into the 1,343,317 pairs of Freeman shoes produced last year.

Freeman shoes are sold in every state in the Union, and in Canada, the West Indies, South America, Cuba, the Hawaiian Islands, the Canal Zone, Alaska, and the Philippines—even in far-off China. All foreign business is entirely unsolicited. The Freeman corporation maintains its own retail stores in Philadelphia (5), Pittsburgh, Milwaukee, St. Paul, Minneapolis, Alten-town, Pa., Cincinnati, Louisville, Chicago, Cleveland, St. Louis, and Columbus, Ohio. These retail stores, however, account for only about 7 per cent of the company's total business, its more than 5,000 dealers throughout the country contributing the great bulk of sales.

Nationally advertised in the Saturday Evening Post, Esquire, the Boot and Shoe Recorder, on highway billboards, Freeman shoes are made in three grades and in more than 200 styles. Retail prices are from $4 to $7.50. Imperial is the name of the highest grade shoe, Fashion Built is next, and the lowest priced shoe is the Champion, which is not marketed.
A's to triple E's.

company in July of that year moved into the plant at Freeman
sons were employed producing about space. During the first year 600
and originally by the Eclipse Wind­
superintendent, and general manager.
street was purchased, and the Free­
The building formerly occupied by the
practically the entire space in
During the first year 60 persons were employed producing about 600 pairs of shoes daily.

Original officers were R. E. Free­
In 1925, J. A. Beddow joined the
offices of the company are R. E.

Further business necessitated the leasing in 1934 of the four story building in Shirland avenue at Mill street from the Wisconsin Power & Light Co. This building is being used as a warehouse and for shipping.

Today the Freeman Shoe Corporation occupies 140,000 square feet of floor space, four times the amount necessary for its operations at its founding 15 years ago. The No. 1 plant in Mill street produces 3,600 pairs of shoes daily, and the Harvey street plant, 2,100 pairs.

The success of the Freeman Shoe Corporation is based upon its introduction of modern production methods into shoe manufacture. Using the most advanced machinery in happy combination with skillful hand labor, the precise lines of original models and lasts is attained in every pair of shoes.

Officers of the company are R. E. Freeman, president; H. C. Freeman, first vice-president; J. A. Beddow, second vice-president; and H. T. Carey, secretary-treasurer.

- Organized on April 4, 1905, by F. N. Gardner and associates to manufacture an improved type of grinding machine—the disc grinder—the Gardner Machine Company has played an important part in Beloit's industrial life for more than 30 years.

Mr. Gardner invented the first machine of the disc-grinding type while employed by Charles H. Besly & Co., as general manager and superintendent, and the machines were sold as "Gardner Grinders." The machine's development demonstrated the need of heavier machines with larger disc wheels and abrasives, and this demand prompted Mr. Gardner's resignation from his position, and the organization of a new company to build his ideal.

All of his original stockholders were personal friends and the mention of their names will indicate the confidence placed in him. The original stockholders were Alonzo A. Aldrich, P. H. Crahen, W. H. Grimmell, Lawrence Cunningham, R. J. Burdige, N. J. Ross, J. A. Janvin, C. J. Mitchell, Humphrey Foster, Dr. A. C. Helm, J. M. Gardner and Lou Rauenheimer. Of these men only J. Ross, Humphrey Foster and A. C. Helm are living today.

None of the original stockholders is interested in the present corporation, as at the time of reorganization their shares were purchased by L. Waldo Thompson, present president, on the basis of full purchase price paid, with six percent interest thereon during ownership.

The first 20-inch machine for the original corporation was built by the Beloit Iron Works. But having machine tools built by the job in an outside factory has its disadvantages, and Mr. Gardner convinced his company of the necessity of having its own shop where the thousand-and-one manufacturing conditions which always arise could have closer attention. Accordingly a portion of the P. H. Crahen tobacco warehouse was rented, the floor space occupied being 30 by 50 feet.

By the fourth year the company had grown to occupy the first floor of the Crahen factory across the alley, and in another year it had occupied the second floor also, filling the entire space in the two buildings.

In 1910 the company was reorganized and plans for a new factory were made. Officers of the reorganized corporation were: F. N. Gardner, president; P. E. Gardner, vice-president; W. H. Grinnell, treasurer, and L. Waldo Thompson, secretary-treasurer. The organization remained so until the death of F. N. Gardner in 1913.

The Wisconsin charter was surrendered at this time and the company became an Illinois corporation when the factory was moved to South Beloit upon completion of the new plant. All the buildings were constructed of reinforced concrete and the floor space was increased to 24,000 square feet. To the original new building has since been added a pattern shop, an abrasive building, and a power plant and coal storage annex—bringing the total floor space to 81,000 feet.

The site consists of nearly seven acres of ground and furnishes ample room for plant expansion. It has connections with both railroads.
Present officers of the company are L. Waldo Thompson, president; Walter B. Leishman, vice-president and treasurer; Ingle R. Shue, secretary, and Robert W. Roth, second vice-president in charge of manufacturing.

"Building surface grinders is not a 'sideline' with us as with our competitors," said Mr. Thompson, president of the company. "We manufacture nothing but grinders, polishing machines, and the accessories used with them. We originated and patented the first extra heavy abrasive disc put on the market in thickness of one-quarter and three-eighths inches, known as the G. I. A., which means Gardner's Improved Abrasive. The use of the heavy abrasives opened a large field for machines of our type, and whereas the first grinder weighed less than 3,000 pounds, in many cases today's units weigh from 10 to 30 tons.

"We still manufacture a great many G. I. A. discs, but the grinding operations now accomplished on our heavy grinders for production purposes demand a much thicker abrasive member, and for this we developed the 'Wire-Lokt' wheel, which is made in thicknesses of one to three inches. The name 'Wire-Lokt' was given the disc because a heavy wire screen is embedded in the abrasive wheel as a reinforcement. This construction gives the high factor of safety that is necessary, since the peripheral speed of a disc reaches a mile, or even a mile and a half a minute in operation.

"Many of our machines are for automatic or semi-automatic use and are designed especially for a single purpose. Prices of such units run from a few hundred dollars up to $30,000 and are shipped not only to all parts of the United States, but also to many foreign countries, including England, France, Australia, Japan, Holland, Russia and South America.

"The business of the Gardner Machine Company has increased steadily since July 1, 1935, and we have been able to add many employees. At present we are operating close to capacity and we expect a satisfactory continuance for many months."

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- When you're sweltering in summer and you step into a refreshingly cool food shop, restaurant, railroad car, theater, hotel lobby or drug store, it is quite possible the enjoyable temperature is due to the efficiency of a product of the General Refrigeration Corporation of Beloit.

Though the General Refrigeration Corporation is not as old as some industries in Beloit, it has taken its place among the leading manufacturing institutions and its products are in use, not only in Beloit, but in every state in the United States, in Canada, in Mexico, in Europe and in far away China and Palestine.

Air conditioning or comfort cooling is closely associated with refrigeration and the Beloit company's products supply cool clean air in hundreds of food shops, restaurants and retail stores. Air conditioning installations have also been made in manufacturing plants where proper temperatures are important to processes of manufacture.

The General Refrigeration Corporation had its beginnings in Beloit in Pleasant street in the building now occupied by the National Brown Swiss Cattle Breeders' Association. The name under which it first operated was the Lipman Air Appliance Company. Products were small liquid gear pumps and water pumps, and portable air compressors for pumping automobile tires at garages and filling stations.

From the manufacture of air pumps, the company branched into the construction of ammonia compressors, and from that it was only a step into the manufacture of ammonia refrigeration machines. In 1918, the Lipman Refrigerator Car and Manufacturing Company was organized to manufacture special cooling equipment for refrigerator cars to replace the common system of car icing. A foundry and a car shop were built at that time. The original buildings were located on the present large factory site south of Shirland avenue near the bridge. The end of the war relieved the demand for such equipment and operations were shifted to the production of ammonia refrigeration machines. A special shop was then built to manufacture cooling coils.

Later the name of the enterprise was changed to the Lipman Refrigeration Corporation, then to the National Refrigeration Corporation, and in 1930 to the General Refrigeration Corporation, and in 1930 to the General Refrigeration Corporation.

When the refrigerator car business was discontinued the foundry building was retained as such, but the car shop was converted into an assembly and testing shop. The machine shop was built in 1924 and the office building in 1926.

Ammonia machines were made exclusively until 1932 when the new Freon-12 refrigerant was introduced for railway air conditioning. The General Refrigeration Corporation developed a railroad passenger car air conditioning unit at that time—a unit which met with instant success. The next year, 1933, methyl-chloride refrigeration machines were introduced.

New methods and applications of mechanical refrigeration have developed rapidly in the last few years, so rapidly that 95 per cent of the equipment sold by the General Refrigeration Corporation in 1936 has been designed since 1932. Though ammonia is not used as extensively now as it was in earlier days of mechanical refrigeration, the Beloit company has developed a new type of ammonia machine which is being introduced this year and which incorporates the latest features.