CHAPTER V
CITIES AND INDUSTRIES

TABLE X

FOUR PRINCIPAL CHAINS OF CITIES IN WISCONSIN

<table>
<thead>
<tr>
<th>On Lake Michigan (9 cities)</th>
<th>In Fox River Valley (8 cities)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenosha</td>
<td>Fond du Lac</td>
</tr>
<tr>
<td>21,371</td>
<td>18,797</td>
</tr>
<tr>
<td>Racine</td>
<td>Oshkosh</td>
</tr>
<tr>
<td>38,002</td>
<td>33,062</td>
</tr>
<tr>
<td>So. Milwaukee</td>
<td>Neenah</td>
</tr>
<tr>
<td>6,092</td>
<td>5,734</td>
</tr>
<tr>
<td>Cudahy</td>
<td>Menasha</td>
</tr>
<tr>
<td>3,691</td>
<td>6,081</td>
</tr>
<tr>
<td>Milwaukee</td>
<td>Appleton</td>
</tr>
<tr>
<td>373,857</td>
<td>16,773</td>
</tr>
<tr>
<td>Port Washington</td>
<td>Kaukauna</td>
</tr>
<tr>
<td>3,792</td>
<td>4,717</td>
</tr>
<tr>
<td>Sheboygan</td>
<td>Depere</td>
</tr>
<tr>
<td>26,398</td>
<td>4,477</td>
</tr>
<tr>
<td>Manitowoc</td>
<td>Green Bay</td>
</tr>
<tr>
<td>13,027</td>
<td>25,236</td>
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<tr>
<td>Two Rivers</td>
<td></td>
</tr>
<tr>
<td>4,850</td>
<td></td>
</tr>
<tr>
<td><strong>Total (1910)</strong></td>
<td><strong>Total (1910)</strong></td>
</tr>
<tr>
<td>491,080</td>
<td>114,877</td>
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<table>
<thead>
<tr>
<th>In Rock River Basin (8 cities)</th>
<th>In Wisconsin River Valley (7 cities)</th>
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<tbody>
<tr>
<td>Beloit</td>
<td>Portage</td>
</tr>
<tr>
<td>15,125</td>
<td>5,440</td>
</tr>
<tr>
<td>Janesville</td>
<td>Grand Rapids</td>
</tr>
<tr>
<td>13,894</td>
<td>6,521</td>
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<tr>
<td>Edgerton</td>
<td>Stevens Point</td>
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<tr>
<td>2,513</td>
<td>8,692</td>
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<tr>
<td>Stoughton</td>
<td>Wausau</td>
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<tr>
<td>4,761</td>
<td>16,560</td>
</tr>
<tr>
<td>Madison</td>
<td>Merrill</td>
</tr>
<tr>
<td>25,531</td>
<td>8,689</td>
</tr>
<tr>
<td>Ft. Atkinson</td>
<td>Tomahawk</td>
</tr>
<tr>
<td>3,877</td>
<td>2,907</td>
</tr>
<tr>
<td>Jefferson</td>
<td>Rhinelander</td>
</tr>
<tr>
<td>2,582</td>
<td>5,637</td>
</tr>
<tr>
<td>Watertown</td>
<td></td>
</tr>
<tr>
<td>8,829</td>
<td></td>
</tr>
<tr>
<td><strong>Total (1910)</strong></td>
<td><strong>Total (1910)</strong></td>
</tr>
<tr>
<td>.77,112</td>
<td>.54,450</td>
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</table>

POPULATION OF COUNTIES (1910)

| Fond du Lac                   | Outagamie                          |
| 51,610                        | .49,102                             |
| Winnebago                     | Brown                               |
| .62,116                       | .54,098                             |
FOND DU LAC

Modern cities are essentially business centers, using the word "business" in its broadest sense as including manufacturing, trading, reshipping, and all similar activities. There are cities which, like Pittsburgh and Paterson, are mainly engaged in manufacturing, while others, our great seaports for example, are also engaged in vast commercial enterprises. No matter what the chief activities of a city are, one factor is always a dominant one in its growth, and that factor is transportation. It may be by water, or rail, or both; but neither manufacturing nor trade can thrive in any place which does not have good transportation facilities. Hence the villages that have grown into cities are those which either chanced to be, or else were deliberately located at, sites where lines of transportation naturally would be established. The mouths of rivers, the junctions of navigable streams, the ends of lakes, and certain other positions on rivers, lakes, and seas, are favorable places for commercial centers. There are, of course, many other factors in the making of a city besides that of transportation. On Lake Winnebago there are three places which a person would select as favorable points for cities—at the head of the lake, at the foot, and at the point where the main river, the Fox, enters it. And true to expectation, cities are located at these three places on the lake and not elsewhere. Yet we shall see that each city has had its own dominant reasons for growth. By its position Fond du Lac belongs to the commercial type of cities, rather more than to the manufacturing type. This is true in spite of the fact that it is, in proportion to its size, extensively engaged in manufacturing. In the same way, Chicago, though the second greatest manufacturing city in the United States, belongs to the commercial type, on account of the wonderful web of transportation lines that center there, and center there for natural and evident reasons. All of the railroads from the Northwest and Central West, seeking a point upon which to converge for the exchange of traffic, find the southern end of Lake Michigan the natural place of meeting. Had it not been for the little harbor at the mouth of the Chicago River, the extreme southern end of the lake would be the most favorable point for the city. A very small part of the traffic which enters and leaves Chicago, however, makes any use of the lake.

The same conditions hold true in a smaller way of Fond du Lac at the southern end of Lake Winnebago. In the lumbering
days Fond du Lac derived a large advantage from the water transportation afforded by the lake. While its recent growth has but little connection with lake transportation, yet the lake is the main natural factor, though an indirect one, in the city's development. This comes about through the influence which the lake exerts upon the railway routes. The steep bluff of limestone along the eastern shore of the lake renders that side less suited to the growth of towns and hence less attractive to railroads, and so the north-and-south railways follow the west side of the lake. Lake Winnebago is a barrier to east-and-west lines, and any such lines must bend north or south around the lake. This causes Fond du Lac to be something of a converging point for railway lines, and that is why it belongs to the Chicago type of cities—the commercial type—in spite of its manufacturing interests. At certain times of the day the North Western station at Fond du Lac has all the bustle and activity which is expected only in cities of large size. We have entered somewhat at length into this matter because Fond du Lac is a type city in its location and in its development; it is a representative of a class, and not an exceptional case. It will be found that a city or village of some consequence has grown up at the end of nearly every lake of any size in settled regions where railroads exist. Note the Finger Lakes of New York, for example.

THE GROWTH OF THE CITY

While a trading post existed at the forks of the Fond du Lac River before 1787, the first white settler within the present city limits came in 1836. By 1840 there were 139 white settlers in what is now Fond du Lac County, and at least ten times as many Indians. Down to 1844, when Dr. Mason gave the land for the county court house at Fond du Lac, Taycheedah was the larger place. Still earlier, even Calumet was a more important village than either Fond du Lac or Oshkosh, largely because the early government road ran along the east side of the lake. The first mill in Fond du Lac, a saw-mill, was built in 1845 and two years later the settlement was organized into a village. The population had already passed 500. In 1848 Wisconsin became a state, and Fond du Lac County was organized. Four years later the city was incorporated; it grew rapidly and in 1852 contained over 2000 people. During the late '40's and the '50's there was an influx of settlers, especially from the eastern states and from Germany. It was during these years that the
great lumbering operations began in this part of Wisconsin. In the early '50's came the first railroads, crude affairs with wooden rails upon which strap iron was spiked. The earliest railroad extended from Fond du Lac to Oakfield (about 1852). A little later it was extended to Chester and about 1859 it reached Milwaukee. In 1854 began what is at present the city's greatest manufacturing industry, the Rueping tannery, now the largest one in the state outside of Milwaukee and almost the sole survivor of scores of tanneries which, like saw-mills and flour-mills, existed in nearly every village. (Plates X and XI.)

During the earlier years of the development of a region, two conditions almost wholly control the lines of manufacturing which are entered upon: one is—What sort of manufactures do the people most use? The other: What raw materials for use in manufacturing have we at hand? In Wisconsin the main answer to the second question has ever been "timber from our forests." From the beginning of manufacturing in the state down to the present, the woodworking industries have led all others.

In Fond du Lac the lumber business which began in the '50's reached its zenith in the early '70's and rapidly declined after the great panic of 1873. In the location of the lumber mills and shingle mills, the city's position on the lake—or, more strictly speaking, on a stream flowing into the lake—was a matter of large importance. Most of the logs cut in the region north of the Upper Fox River, especially along the Wolf and Little Wolf, were brought down the rivers in drives, and, near Oshkosh made into rafts, and towed to Fond du Lac by way of Lake Winnebago and the Fond du Lac River. At the height of activity there are said to have been 18 lumber and shingle mills in the city, cutting 67,000,000 feet of lumber and 88,000,000 shingles in a year. There were also four sash and door factories. The one survivor of these mills, the Moore & Galloway Lumber Company, began in 1864 and is yet one of Fond du Lac's large industries, doing a half-million-dollar business yearly; all of the logs are now brought in by rail.

For 15 years following 1875 the saw-mills gradually disappeared and the city marked time, in fact lost population, as nearly every lumbering center has done when its mills, no longer able to get logs and saw them at a profit, had to close down. Since 1895, however, the city has been steadily growing. Its manufacturing still shows the dominating influence of lumber, for of Fond du Lac's nine large manufacturing plants, six are wood-using factories, engaged in making lumber, doors, sash, and other finished
THE PRESENT RUEPING TANNERY AT FOND DU LAC
See cut of original tannery, Plate XI
products, caskets, refrigerators, and furniture. The seventh and largest plant was originally built for tanning leather for the immediate neighborhood, and used hemlock bark for the tanning. The tannery no longer depends upon tan bark, and the furniture factories depend only partially upon wood from Wisconsin, yet the fact that 7 out of 9 large factories either now have or have had in the past an intimate connection with the forest resources of the state indicates how strong an influence those forests exerted in shaping lines of manufacturing. As time passes, and the Middle West grows in population, a greater diversification of industries will follow. In this change Fond du Lac is already sharing, as is shown by the establishment of a typewriter factory, steel working plants and others which do not use wood as their chief raw material.

The city’s principal advantage in location is its position in a region of which it is the natural center. What Chicago is to the Middle West, Fond du Lac is to the rich farming region around it, a collecting and distributing point. Southward radiate four railway lines; northward reach two main railway lines and an interurban, while branch lines extend both east and west from the city. Its business emblem might properly be
a wheel with Fond du Lac as the hub, and eight railway lines as spokes. (See Figure 8). The United States census of 1910 gives Fond du Lac 97 manufacturing establishments, most of which are small. In 1914, there were 40 manufacturing concerns employing from 25 to 500 persons each, including eight which employed upwards of 75 persons, and four of the eight employed 300 or more persons. A canvass made by the Business Men's Association indicated over 4000 employees in manufacturing plants. All of the plants are owned and controlled by local men, most of them long-time residents of the city; this is a condition highly favorable to the stability and permanence of the industries. The city takes some pride in the fact that it has never had a boom. Its present growth is normal and it seems assured of continuance.

One fact quite apart from the industrial life of the city seems deserving of note—it is the number and character of the city's excellently housed institutions. The architectural quality of several of these structures is unusual for a city of 20,000 people. St. Paul's Cathedral (Church of England) and the Grafton School buildings in connection with it, the Public Library, St. Mary's Church, and two of the recently built protestant churches are structures whose architectural dignity would attract notice in a city of any size. The buildings of the convent and hospital of St. Agnes, occupying practically two city squares, the Masonic Temple, and several other buildings, give the city a certain atmosphere which is expected only in communities of greater maturity.

**NORTH FOND DU LAC**

Just beyond the city limits is one of the largest industries connected with Fond du Lac. Here the Soo Line has established one of its large groups of repair shops, and a little city of nearly 2500 people has grown up in a few years. The Chicago & North Western Railroad also has shops here, though much less extensive than those of the Soo Line.
A.—THE FIRST RUEPING TANNERY (1854), FOND DU LAC

Compare with Plate X.

B., C.—TWO PORTIONS OF THE MOORE-GALLOWAY LUMBER MILLS AND YARDS, FOND DU LAC
OSHKOSH

ITS Situation

It has been pointed out that because of Fond du Lac’s situation at the head of Lake Winnebago, it belongs to the class of cities of which Chicago, at the head of Lake Michigan, may be taken as the type. Oshkosh has been above all else a lumber manufacturing city, and that places it in the manufacturing, rather than in the commercial class. Nearly all of the lumber centers from Maine to Minnesota have grown up at sites which are essentially similar; some of the mills made use of waterpower, but usually that was a minor consideration, because the waste wood furnished fuel for making steam. White pine is a light wood and readily floated on the rivers; this is the least expensive method of transporting logs from the woods to the mills. Lumbering in eastern Wisconsin reached its height before railroads were numerous, and hence when river transportation was more important than now in all lumbering operations.

The ideal place for a saw-mill center was at some point on a river down to which the logs might be driven, and from which point the lumber would find ready transport to the city markets. If this point had transportation facilities by both rail and water, that was an added advantage and increased the importance of the place. A third consideration was the boomage capacity of the river. When logging is done on a large scale and several companies are driving logs on the same river, the logs get mixed, and at some point above the mills they must be held in quiet water, like a pond or lake, and sorted. Such a place constitutes a boom, and the enormous number of logs driven down the Wolf demanded a boom of exceptional size. Now let us see how many of these essential features the city of Oshkosh possessed.

1. It was built at the mouth of the Upper Fox River whose main tributary, the Wolf, penetrated one of the largest and most magnificent white pine forests in Wisconsin*. It was therefore favorably placed for securing the logs.

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* The U. S. census of 1880 (Vol. 9, p. 555) says, “The timber originally on the Wolf and Oconto rivers was especially fine. This has been largely cut (1880). On the Wolf river the timber was very heavy. Instances are known of 10 to 12 million feet of pine lumber having been cut from one section in the Lower Wolf region. The principal points of lumber manufacturing were on Lake Winnebago, at Oshkosh and Menasha, which take the product of the Wolf and Fox River pineries, and at Green Bay and Oconto, which drive logs from the Oconto River.” H. C. Putnam estimated 600,000,000 feet of standing timber in the Wolf River basin in 1880. The forests had been well cut 25 miles back from Fox and Wolf rivers and Lake Winnebago by that time.
2. The city lies in the main valley of eastern Wisconsin through which important lines of railroad were sure to be built. There was also transportation by water south, west, and north.

3. It had unequalled boomage capacity. At one time Bay Boom, off Lake Winneconne, was the greatest log boom in all the northern lumber country, when eight tugs were required to sort and assemble the logs belonging to the various companies. Clearly, the city at the mouth of the Upper Fox could scarcely escape becoming a lumber center of the first magnitude, for it possessed each of the three essential qualities—access to the pineries by river, ample boomage capacity, and convenient access to markets by both rail and water. Not less than forty places in Northern Wisconsin have been important saw-mill centers—Marinette, Oconto, Green Bay, Wausau, Stevens Point, Grand Rapids, Merrill, Black River Falls, Eau Claire, Chippewa Falls, La Crosse, Ashland, and others—you the situation of Oshkosh has made it one of the foremost cities of the group. La Crosse, with its highly favorable position on the Mississippi, is the only one of the old lumber centers which was and still remains a close rival of Oshkosh in size and industries.

Other Cities of the Same Type

In its situation and its history, Oshkosh belongs to the type of cities of which Bangor and Augusta in Maine, Albany in New York, Grand Rapids and Saginaw in Michigan, and Minneapolis in Minnesota, are representatives. All of them have been white-pine centers for reasons similar to those which made Oshkosh. All grew into importance at points on rivers where the assembling of logs was easy, and from which the lumber could be advantageously shipped away both by rail and by water.

Early History of the City

The first white settlers came in 1836, but Indian villages and fur traders’ posts had existed in the vicinity long before. The canoes of Nicolet, Perrot, Marquette, La Salle, Radisson, Du Luth, Hennepin, Allouez, and a half score other noted Frenchmen had passed and repassed the point; in the vicinity councils had been held, treaties made, and battles fought for nearly two centuries before a permanent white settler made his home on the site where Oshkosh now stands.
Oshkosh in 1863

Compare with Plate XII.

Courtesy Castle-Pierce Printing Co.
CITIES AND INDUSTRIES

By a vote of the few people in the immediate region, the name of Oshkosh, a Menominee Chief, was selected in 1840, and in 1842 Winnebago County with a population of 135 was organized. Ten years later the village had grown to nearly 2500 population and was incorporated as a city (1853). The rival village of Algoma was absorbed three years afterwards. In 1859 the first railway train (on the present Chicago & North Western) reached Oshkosh and awakened great enthusiasm and high hopes. Between this date and 1875 no less than five fires swept away large parts of the city, but each disaster was followed by a prompt rebuilding. While this bespoke a remarkable faith and determination on the part of the people, the repeated rising of a new city from the ashes of the old, was a tribute unconsciously paid to the site upon which the city stood. There simply had to be a city here in those days when the Wolf River pineries were pouring their wealth down to the shores of Lake Winnebago. The same cause which made the first city, made the second and the third and so on to the sixth. It probably would have made a seventh and an eighth, for the pine logs continued to come down the river until the '90's. By 1860, the population had passed 6000, and five years later had risen to 10,000.

In 1871 a branch of the present Chicago, Milwaukee & St. Paul Railroad entered the city and in 1882 the Wisconsin Central, now the Soo Line, came. Following the great fires of 1874 and 1875 the city lost population. The census of 1880 showed over 1000 less than that of 1875, but a gain was again shown in 1885 and the city has had a steady but not rapid growth since. The establishment of the State Normal School in Oshkosh has made the city an educational center for a large surrounding region.

THE DEVELOPMENT OF THE MANUFACTURING INDUSTRIES

From first to last Oshkosh has been a wood-working center. Its position with reference to the forests of eastern and northern Wisconsin has made this the one logical industry, and in it the capital and energy of the city have found their chief employment. The first saw-mill was built in 1847 and the first grist mill a year later (in Algoma). In 1849 the industries had expanded to include a steam saw-mill, a shingle mill, and a small sash and door factory. Lumbering in the up-river pineries had begun as early as 1839-40. A notable expansion came during the '50's and still more during the '60's. In 1856 the founder of the present Paine Lumber Company, now the largest industry in

Fox River—5
the Fox River Valley, began operations. The early saw mills were small, and the muley saw was in use. This gave way to the more efficient circular saw, as it in turn gave way to the band saw. By 1867 there were seven logging companies driving logs down the river to Oshkosh; between 1500 and 2000 men were employed in these operations and the lumber output of the city was rising toward 100,000,000 board feet a year—practically all white pine. This was the period of many small mills. In 1857 the Daily Courier says there were 18 saw mills running nearly 100 saws, and the Oshkosh city directory of 1868 says there were then 22 saw mills, 14 shingle mills, 6 planing mills and sash and door factories, a stave and barrel factory, a match-splint factory, a match factory, and two broom handle factories.

It was also a period of very active boat-building along the water front. In 1866, 25 barges and two steamers were built and taken to the Mississippi River. In the 20 years between 1850 and 1870 forty steamboats were built on the Fox and Wolf rivers and Lake Winnebago, the major part of them at Oshkosh. The rapid growth of the city's industries led the optimistic compiler of the city directory to predict in 1868: "Within another decade by the western shore of beautiful Lake Winnebago, will stand the second city in the State of Wisconsin with 75,000 population." Flour mills, so important in Neenah and Appleton, were never important in Oshkosh. The water power of the Lower Fox favored these mills and left Oshkosh to its lumber interests.

By 1870, 150,000,000 feet of logs were being handled in Oshkosh, some of which went to the mills at Fond du Lac and some to Neenah and Menasha. It is said that half of the working men of Oshkosh worked with logs and lumber. The Wisconsin Lumberman of December, 1873, gives the names of 58 manufacturers and dealers in lumber in Oshkosh. The same authority (Feb. 1875) gives the names of 80 lumber camps on the Upper Wolf and its branches. Barr, in his chapter on Oshkosh in Lawson's History of Winnebago County, says there were "nearly 30 saw mills in the city at one time." He says, "The most important industries of this thriving community, the leader in the manufacture of lumber, are located on the marshes of its village days, which have become solid earth through fifty years' accumulation of slabs and sawdust." It is said that between 1850 and 1875, sailing schooners were engaged in carrying lumber and other commodities not only on Lake Winnebago, but even on the rivers. Occasionally rafts of logs and lumber were towed.
At the height of the lumber industry in the Wolf and Fox Valleys (around 1870), 150,000,000 feet of logs were handled annually in Oshkosh. There were 25 or more saw mills, and 40 lumber manufacturers and dealers had offices in the city.
to the Mississippi by way of the Fox and Wisconsin rivers. The first mills cut only rough lumber, and nothing but the choice timber was used. The waste was enormous, but scarcely avoidable under the conditions that then existed.

Gradually the timber near the rivers was cut away; logging operations pushed farther and farther up the Wolf and its tributaries. After the Civil War the Wolf above Shawano was improved by clearing the channel and building dams to store the water to be released when needed to float the logs down the river. Over 40 such dams were built. The increasing scarcity of pine forced many mills out of business; only a few were able to continue in Oshkosh, and those underwent a steady evolution from mere lumber and shingle mills to mills in which the work was carried to more and more refined stages. The logs were sawn in the saw mill, planed in the planing mill, and worked into sash, blinds, doors, moulding, and all of the forms required for interior and exterior finishing. White pine was the chief wood used, and it is still used, though it now enters into but a minor part of the products of the mills. Wisconsin had and still has a wealth of hardwood forests, including oak, birch, maple, ash, and elm. Gradually the surviving mills turned to hard wood, and now the making of hardwood flooring, doors, furniture, and an endless variety of ornamental "mill-work" constitutes the leading type of wood-working in the city.

Present Industries

There are (1914) about 120 manufacturing establishments—large and small—in Oshkosh; 80 of these employ less than 25 persons each; 24 mills employ between 25 and 100 persons each, and 12 mills employ numbers ranging from 100 to 2000. The largest mill is that of the Paine Lumber Company, whose most valuable products are of hardwood, though a great deal of pine is still used. This company is one of the largest manufacturers of veneered doors in America. Their logs now come by rail from their own timber lands (150,000 acres) in the northern part of Wisconsin. Their plant includes over 30 buildings and their yards and docks extend a mile along the water-front of the Fox River.* (Plate XV).

* Their dry kilns have a capacity of a million board-feet of lumber. The saw mill has a capacity of 100 million board-feet of lumber a year. This is nearly equal to the output of the entire city in the days when Oshkosh had 26 mills. The veneer mill can turn out 45 million feet a year, and the facilities for making doors of all grades permit of an output of a
There are many other mills, foundries, and factories engaged in the manufacture of a variety of products, but they are all overshadowed by the magnitude of the wood-using industries. The almost complete devotion of the city's large industries to the use of wood as the principal raw material may be seen from the fact that only one of the 12 factories which employ 100 or more persons does not belong to the wood-working class. This one makes grass matting, rugs, etc., using a grass which grows along the marshy banks of the Upper Fox River. Of the 11 other large mills, 6 make sash, doors, etc., 2 make furniture, 1, carriages, 1, trunks, and 1, matches; the last named is the second largest manufacturing industry in the city, employing about 700 people and having a capacity of 5 or 6 carloads of matches daily.

TRANSPORTATION

The situation of Oshkosh on the Fox-Winnebago waterway has been of material benefit to the city in the past and is still of benefit, though considerably less so than it was formerly. The only commodity which is now brought in in large quantities by way of the Lower Fox and Lake Winnebago is coal. A line of coal barges runs between Oshkosh and Green Bay; the barges, towed by tugs, carry 200 or 300 tons of coal at a freight rate about one-third less than the railroad charges.

Two main lines of railway—the Chicago & North Western and the Soo Line—also a branch of the Chicago, Milwaukee and St. Paul, and three interurbans running north, south, and west, serve the city.

Oshkosh is the largest city in the Fox River Valley, having in 1910 a population of 33,000. During the past 20 years it has grown steadily at the rate of about 500 a year, or 5000 a decade. Both the State Factory Inspector and the U. S. Census of 1910 give approximately 7000 as the number of persons engaged in manufacturing; the value of manufactured products in that year was $15,000,000, giving the city fourth rank among the cities of Wisconsin (Milwaukee, Racine, Kenosha, Oshkosh).

million and a half doors annually. In addition, the sash and moulding mills have a capacity of a million sash, and 25 million feet of moulding a year.

The principal pine products of the mill require the best of material and this leaves a quantity of less valuable wood to be used in some way. This is largely used for making wooden packing-boxes. The company maintains branch offices and display rooms in ten cities from New York and Atlanta to Dallas and Portland.
PLANT OF THE PAINE LUMBER COMPANY, OSHKOSH
One of the largest manufacturing establishment in the Fox River Valley.
NEENAH AND MENASHA

From a business and industrial standpoint, Neenah and Menasha are one city. Only an arbitrary line separates them. The larger part of Menasha lies on the north side of the Fox River, and the smaller part on Doty Island. (Plate XVI). Neenah occupies the balance of the island and the south side of

![Diagram](image_url)

**FIG. 9. DIAGRAM SHOWING THE RELATIVE CAPACITY OF THE PULP AND PAPER MILLS IN THE VARIOUS PLACES**

The mill at Depere, for example, has a capacity of 32,000 pounds a day. Weight, not value, is the basis of comparison. See table XIII, p. 81. (From Post's Directory 1913).

the river. The principal railroad station (C. & N. W.) is on the island, and is called Neenah and Menasha. Unsuccessful efforts to unite the two cities have been made; the rivalry, once strong, is disappearing on account of the inevitable interweaving of business interests. In 1910 Menasha was the larger city, having a population of 6,081 against 5,734 in Neenah; in 1900 and 1890 Neenah was slightly the larger.
NEENAH-MENASHA AS A TYPE CITY

Geographically the two cities should be considered together. It is not so easy to assign them to a single type as it is Oshkosh or Fond du Lac. In one important particular they belong to the type of which Detroit is an example—that is, a city situated at the outlet of a navigable lake, and at a point where land and water routes naturally cross. The island at the outlet of Lake Winnebago makes a convenient place for railways to cross the river, a natural "cross roads of traffic." Three railroads—the Chicago & North Western, the Chicago, Milwaukee & St. Paul, and the Soo Line, and also two interurbs—focus upon the island and reach out north, south, east, and west. The Fox River is maintained as a government waterway between Lake Winnebago and Green Bay. This is now of minor importance but it was a factor in the making of the cities in earlier days. The situation of Detroit, practically at the outlet of Lake Huron, is not unlike the situation of Neenah-Menasha. At Detroit, important land routes and water routes cross for reasons similar to those which exist at Neenah-Menasha.

Though less well known than Detroit, Sault Ste. Marie, ("Soo") at the outlet of Lake Superior, is a nearly perfect type of the group of cities to which Neenah-Menasha belongs. The Soo, besides being an important cross roads of land and water traffic, has great waterpower. Canals with locks take boats around the rapids as they do at Neenah-Menasha.

The importance of the great city of Constantinople, for centuries the political and commercial center of the Eastern Roman Empire, was due to like causes on a larger scale, namely to the converging of land and water routes upon a point where the crossing of the water was easiest. It is evident that the site of Neenah-Menasha is a perfectly natural one for a city, that the city is typical of a certain class of cities, and that it is illustrative of a law of city location and of city growth.

THE WATER POWER AND INDUSTRIES

In the making of Neenah-Menasha, the waterpower of the Winnebago rapids has been the main natural factor. As early as 1835-6, and before any regular white settlement had been made there, the U. S. government attempted a mission station for the Indians on the south side of the river. A grist mill and a saw mill using the water power were built, but the project came to
SCENE ALONG THE FOX RIVER IN THE PAPER MILL DISTRICT OF NEENAH

Neenah has six paper mills with a combined daily capacity of 240,000 pounds.
naught the following year through the purchase of the Indian lands by the government and the removal of the Indians.

Flour-Milling. The first private mill was built in Neenah in 1848, the year of the building of the first house on the Menasha side of the river. Two years later the Menasha dam was built as a part of the Fox-Wisconsin improvement work. At this time the surrounding region was a dense hardwood forest. Between 1865 and 1885, when Wisconsin was growing wheat in enormous quantities, and before paper-making had reached large proportions, flour-milling was the great industry in Neenah. In his History of Winnebago County, Harney names ten flour and grist mills which were built between 1852 and 1868. In 1879 there were seven flour mills in Neenah and four in Menasha. The Neenah mills are said to have ground 1400 barrels of flour a day or 400,000 barrels a year, and the cooper shops of the city to have made 1500 flour barrels a day. It was here that the roller process of flour-milling was perfected and the roller machines patented. Neenah was the chief market and milling center for a considerable territory—especially that lying to the west and southwest, and was referred to as the Rochester of the West. Minneapolis had not yet attained fame as a milling center.

When wheat failed, flour-milling declined and the substitution of some other line of manufacturing had to come. The presence of the waterpower, with Lake Winnebago as a storage reservoir, is a guarantee of the permanence of manufacturing at Neenah-Menasha, although steam power is used increasingly.

Pulp and Paper. It has already been indicated that the manufacturing industries of all northern Wisconsin, and of the Fox River Valley in particular, have been to a remarkable degree wood-using industries. At one time there were eight saw mills operating in Neenah. The demonstration in the '60's that paper can be made from wood was followed in 1871 by the establishment of a wood pulp mill in Appleton.

Neenah's first paper mill was built in 1865–6 (The Old Red Neenah Mill). In 1872 the firm of Kimberly, Clark & Company was organized and became the nucleus of the vast industry which has been built up by that company, now the largest paper manufacturers in the West, with eight mills in the Fox River Valley and several elsewhere. In the same year that company built the Old Globe Paper Mill, which is still in operation. When built it made 3,000 pounds a day and employed 40 hands. In 1874 Kimberly, Clark & Company purchased the Old Red Neenah
Mill from Smith & Van Ostrand. This mill was torn down in 1890; the present Neenah mill was built on the same site. The present Kimberly-Clark mills in the valley produce nearly one-half million pounds of paper and 200,000 pounds of pulp a day.

There are now six paper mills in Neenah with a combined capacity of 240,000 pounds of paper daily. All but one use water power, supplemented by steam. An endless variety of papers are made, nearly all of the higher grades, including book, writing, ledger, bond, crepe, and tissue.

Menasha has five paper mills with a combined daily capacity of 250,000 pounds of paper and one sulphite fibre mill with a daily capacity of 50,000 pounds. All but one of these use water power supplemented by steam.

_Factories in Neenah._ The State Factory Inspector in 1910 reported 35 mills and factories in Neenah; 28 of these employed less than 25 persons each, four employed between 25 and 100 persons each, and three employed between 100 and 200 persons each. The three Kimberly-Clark paper mills together employ over 200 persons and constitute the largest plant in the city. Paper-making is the predominating industry. There are four other factories of considerable size engaged respectively in the manufacture of woolen goods, shoes, stoves, and hardwood products,—especially veneered doors. The Bergstrom Stove Works began as an iron foundry more than 50 years ago.

Neenah is a city of considerable wealth and there are more fine homes with beautiful grounds than are usually seen in a city of its size.

**Menasha**

Manufacturing in Menasha is larger in the aggregate than in Neenah. Of the 28 mills and factories, 17 are small and employ less than 25 people each; six employ between 25 and 100 people, four employ between 100 and 200 each, and one employs about 1,300. It is a notable fact that nearly every manufacturing industry of importance in Menasha is connected directly or indirectly with either the paper or the wood-working industries. The only large metal-working establishment specializes in work for the paper mills.

A rapidly growing industry of Menasha represents a third step in the evolution of the wood-using industries of the Valley. Wood is the raw material for the paper mills, and paper is the raw material for plants such as the Menasha Printing Company; its specialty is the printing of great quantities of soap wrappers, gum
A.—GOVERNMENT DAM ACROSS THE FOX RIVER AT MENASHA
Head, about 9 feet; 2100 horsepower developed at ordinary flow.

B.—MAP SHOWING RIVER, GOVERNMENT DAM, SHIP CANAL AND LOCKS AT MENASHA
wrappers, and bread wrappers. A half million bread wrappers and a million soap wrappers a day; 2 to 4 carloads of gum wrappers in a month, 12 carloads of daily-date calendar pads for one year, and single orders involving a billion wrappers, are indicative of the output of this one plant. The recent purchase of a paper mill by this company illustrates a principle of expansion of an industry, namely the advantage gained by controlling its own supply of raw material. In the same way, paper companies frequently own pulp or fibre mills and these in turn frequently own their own timber lands. The Menasha Wooden Ware Company goes a step farther in another direction and owns 140 specially built cars for shipping its products, and has warehouses in Chicago, St. Louis, New York, and Milwaukee for storing and distributing its wares.

The Wooden Ware Industry. The largest manufacturing concern in the Valley, with the exception of one in Oshkosh, is the Menasha Wooden Ware Company, whose buildings, yards, side tracks, etc., cover 65 acres bordering the Fox River. It uses over fifty buildings besides the drying houses. The industry began practically with the founding of Menasha and has grown to be the largest wooden ware plant in the world. The founder of the company (Mr. E. D. Smith) commenced with a single lathe, made his own tubs, pails, etc., and peddled them with a one-horse wagon. Now the plant uses yearly six thousand cars of material, including 300 to 400 cars of wire and hoop iron; 75 per cent of the wood used is basswood cut from the company's 125,000-acre tract of timber lands in northern Wisconsin. All of the logs are now received by rail. No waterpower is used; the great quantity of wood waste resulting from the manufacturing processes supplies fuel. The following partial list of items indicates the magnitude of the operations. Its shipments aggregate a train-load a week.

The plant uses 25,000,000 feet of timber annually; each year it makes

- enough candy pails to hold 120,000,000 lbs. of candy;
- enough fish pails to hold 12,000,000 lbs. of fish;
- enough pickle kits to hold 1,800,000 gallons of pickles;
- enough tierces to hold 50,000,000 lbs. of lard;
- enough lard half-barrels to hold 30,000,000 lbs. of lard, and
- enough lard pails and tubs to hold 60,000,000 lbs. of lard.
APPLETON

EARLY HISTORY

Although the Lower Fox River was one of the most used rivers of the old Northwest, it was 214 years after Nicolet landed at its mouth before the first white settler's house was built at the site of the present city of Appleton (1848). To those who during two centuries used the river for travel, the Grand Chute was only an annoyance and a source of danger; the river was merely a highway along which boats passed, nothing more. The rapids were a cause of delay, and under the conditions which prevailed in that period, they had no economic value, and offered no inducement to men to settle permanently by them; and so the water power, afterward the main cause of the city's growth, was not a factor in the original adoption of the site. Other settlements had already been made farther down the river, when in 1848, the first rude house was thrown together on the bluff overlooking the Grand Chute, as the 4-foot perpendicular fall was long called, and as the township is still called. It was the selection of this spot in 1848 as the site of the Lawrence Institute, now Lawrence College, that drew attention to Appleton in the early days, and aided in attracting to it the high grade of New England and New York people who settled there. While the water power has made an industrial Appleton, the college has been keeping it an intellectual Appleton. The purpose of this report requires a discussion of the industrial development of the city, and hence of the part which the available water power has played in that development. The no less valuable part which the college has played in the city's cultural life must be left all but untouched.

It was the gift of $10,000 by Amos Lawrence of Boston for an institute of learning to be built on the Fox River, in Wisconsin, and the selection of the present site for that institution, that gave Appleton its start. When ground was broken for the first building, the place was an utter wilderness; 10,000 feet of lumber used in the construction of the first building is said to have been brought from Deer Creek, 30 miles away.

In 1849 the first mail was received, but there was neither flour mill nor saw mill. Neenah was the nearest place where either existed. In 1850 a wooden wing-dam was built into the river and a little saw mill was constructed. Three years later the first grist mill followed. The settlement grew rapidly; in 1853, five
BIRDS EYE VIEW OF APPLETON IN 1881

The original drawing appeared as a large sized wood cut in the Appleton Post of Dec. 29, 1881.
years after the building of the first home, the community was organized into a village and had in the neighborhood of 1,000 population, 275 dwellings, 10 stores, 5 hotels, 3 saw mills, a sash factory, a lath mill, a cabinet shop, and a paper mill. Thus early did the New England mechanics turn to account those talents which had already made New England the manufacturer for the rest of the United States.

By 1856 the river had been sufficiently improved to permit steamboats to pass with difficulty from Green Bay to Lake Winnebago, and the *Aquila*, already referred to (p. 31) had made the trip from Pittsburgh to Green Bay by way of the Ohio, Mississippi, Wisconsin, and Fox rivers. For a few years following this date, and before a railway had traversed the length of the valley (which was accomplished in 1862), the river was actively used for navigation and was of great value to the struggling communities near it. The railroad soon became a competitor and it is doubtful if, so far as navigation is concerned, the waterway has repaid the money spent upon it.

**Water Power**

On the other hand, the improvements which have made the water power available, have paid for themselves, and will do so, many times over. There are three dams at Appleton. Before improvement the total fall was considered to be 38 feet. The government profile gives a present fall of 36.7 feet in a distance of 1.2 miles and the total estimated power which may be developed at ordinary flow is 8,400 horse power.* The upper dam is built of stone and gives an average head of 14 feet and a total power of about 4,350 H. P., of which the Green Bay and Mississippi Canal Company controls 2,000 H. P.

The middle dam is built of timber and is neither a part of the government work nor the property of the Green Bay and Mississippi Canal Company. West's Hydraulic Canal, one of the most valuable of the earlier improvements, receives water from the middle dam. The head at various mills ranges from 7 to 14 feet and at ordinary flow, about 2,050 H. P. is developed.

The lower dam is U. S. government property, and is located three quarters of a mile below the middle dam. The average head is 8½ feet and the ordinary flow of the river gives somewhat over

2,000 H. P., which is controlled by the Green Bay and Mississippi Canal Company. Four locks enable boats to pass the various dams.

Appleton is a type of the water power city. To this it owes most of its industrial growth and prosperity. The water power leased to the manufacturers by the Green Bay and Mississippi Canal Company—somewhat less than one-half of the water power used at Appleton—is charged for at an average rate of five or six dollars a horse power a year. This does not represent the full cost of the power to the users, yet the saving is undoubtedly large, as it costs in the neighborhood of $40.00 a horse power a year to produce steam from coal in Appleton. The price paid by the users of the canal company's water power is said to be materially less than that charged in most parts of the country.

The manufacturers who use the power have found it necessary to install steam as an auxiliary power; for the Fox River, while much more uniform in its flow than most rivers, is nevertheless subject to considerable fluctuations, and at low stages of the river the water does not supply the needs of the mills. As a rule the period of low water does not exceed 60 to 90 days in a year. Although the U. S. government allows the waterpower users to take only the surplus water available after the needs of navigation have been met, so few boats pass through the locks that the needs of navigation are not large and most of the water may be used by the mills.

Engineers have placed the annual saving from the use of water power at $20.00 per horse power in Wisconsin as a whole. On this basis, Appleton manufacturers are benefited $170,000 a year by the water power which they use, and this is equal to 5% on $3,400,000. Whatever the actual saving is, the fact remains that it is the advantage due to cheap power that has attracted to Appleton a score of manufacturing establishments, many of which probably would not have been there except for the water power.

**Early Manufacturing**

As is the case in most places, early manufacturing in Appleton was dependent upon raw materials produced in the vicinity, and to quite an extent the products were sold nearby. Poor transportation facilities make this condition necessary in any new country. The one raw product which early Wisconsin had in almost unlimited quantity was wood—pine, hemlock, and the hard
A.—LOWER PAPER MILL DISTRICT OF APPLETON

Cars of pulp wood in the foreground; Fox River and the John Street Bridge in the middle ground; Wisconsin Tissue Paper Co.'s mill on opposite side of the River.

B.—LIMESTONE QUARRIED IN THE FOX RIVER CHANNEL AT KAUKAUNA

The River flows on a rock bed nearly all the way from Menasha to Green Bay.
woods—and it naturally followed that wood was used in manufacturing far beyond any other raw material. The Richmond paper mill was running in 1834. In 1858 there were five saw mills in the city and in 1861, 60,000 barrels of flour were shipped from Appleton. A woolen mill was in operation in 1862. By the '70's the manufacturing had attained considerable magnitude, using waterpower almost entirely. The following summary, published in the Annual Review number of the Appleton Post, shows approximately what the manufactures consisted of in 1880, 35 years ago. The values given were estimates, and are probably somewhat generous.

TABLE XI

APPLETON MANUFACTURES IN 1880 (ESTIMATES)

<table>
<thead>
<tr>
<th>Product</th>
<th>Dollars</th>
<th>Product</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming implements</td>
<td>70,000</td>
<td>Furniture</td>
<td>75,000</td>
</tr>
<tr>
<td>Flour (6 mills)</td>
<td>890,000</td>
<td>Hubs and spokes</td>
<td>86,000</td>
</tr>
<tr>
<td>Iron</td>
<td>355,000</td>
<td>Lumber</td>
<td>80,000</td>
</tr>
<tr>
<td>Leather (2 tanneries)</td>
<td>85,000</td>
<td>Lime, brick, etc.</td>
<td>30,000</td>
</tr>
<tr>
<td>Machinery</td>
<td>38,000</td>
<td>Paper (4 mills)</td>
<td>850,000</td>
</tr>
<tr>
<td>Staves and heading</td>
<td>110,000</td>
<td>Sash, doors, and blinds</td>
<td>75,000</td>
</tr>
<tr>
<td>Woolen goods</td>
<td>200,000</td>
<td>Wood pulp</td>
<td>140,000</td>
</tr>
</tbody>
</table>

It will be noted from the above table that the manufacture of flour exceeded that of paper in 1880. At this time, the Fox River counties, and for that matter, all of the farming counties in Wisconsin, were raising wheat as the main crop. In the years around 1880, more land in Outagamie County was sown to wheat than to all other crops combined; 700,000 bushels a year were produced, or 70 times as much as is now grown in the county. Appleton was not only a flour-milling center, but it was also a wheat market, and old residents remember when the streets of the city were lined with farmers' teams hauling wheat. It is stated that at the height of the flour-milling activity, more than a million dollars worth of flour was ground annually. By the '90's wheat growing was declining very rapidly, mainly on account of the ravages of pests, and the exhaustion of the soil through the growing of the same crop year after year. Most of the flour mills gave place to pulp and paper mills. Kimberly, Clark & Company, now the largest paper manufacturers in the Valley, were the owners of the large Genesee Flouring Mills.

The shifting from flour-milling to paper-making in Appleton
presents an example of an economic principle of wide application, the readjustment of manufacturing in response to changing raw materials. It goes on in every city and in every section as changes come which deprive manufacturers of their accustomed raw material and compel them to employ their capital, power, and experience in new lines. The presence of the great water power at Appleton is a guarantee that if one kind of manufacturing is driven out of the Valley, another kind will replace it. Thus the basis of the city's industries is a permanent one under almost any conceivable circumstances. In the 14 lines of manufacturing shown in table XI it is interesting to note that wood formed the raw material for eight. Besides, the two tanneries used bark from hemlock and oak trees, and the iron smelter, the third largest industry and the largest plant in point of value of output, used charcoal for fuel. The charcoal was made by charring wood in dozens of kilns scattered all through the surrounding region. Thus, even the iron industry depended upon wood, and when the wood was gone, the iron furnace went too.

Present Manufacturing in Appleton

According to the census enumeration of 1910, Appleton had 97 manufacturing establishments. The State Factory Inspector listed 73 establishments during the same year. Many of these are small. Fifty of the 73 manufacturing plants named by the Factory Inspector had less than 25 employees each; 18 had between 25 and 100 employees; 3 had between 100 and 300, and 2 had between 300 and 400. The numbers have increased somewhat, though not greatly, since that time.

The Fox River Valley has become the center of the paper-making industry of the West, and Appleton has both the largest number of pulp and paper mills and the largest output of any of the Fox River cities. There are in the city eleven paper and pulp mills, nine of which manufacture pulp or paper, and two of which use paper in further manufacturing, such as coating or enameling. The former make almost every variety of paper including tissue, crepe, wrapping, manila, book, news, writing, envelope, ledger, bond, linen, and scores of special kinds for special uses; two of the pulp mills make ground wood pulp and two make chemically treated pulp, called sulphite fibre. These mills are capable of making 220,000 pounds of pulp and 270,000 pounds of paper every 24 hours. All of the mills which manufacture pulp or paper are located along the river and use water power, (supplemented by
THE KIMBERLY-CLARK PULP AND PAPER MILLS AT KIMBERLY, 3 MILES BELOW APPLETON
Capacity, 120,000 pounds of pulp, and 200,000 pounds of paper a day—enough paper to make 125,000 ordinary books.
steam when necessary). The mechanical process of grinding the wood for making the pulp requires a great amount of power, and it is in this process that the cheap power furnished by water is most in demand.

The following table gives the chief facts of interest about the different pulp and paper mills.* In the column headed "Kind of power used," "W and S" signifies water and steam.

**TABLE XII**

**PULP AND PAPER MILLS IN APPLETION**

<table>
<thead>
<tr>
<th>Name of Mill.</th>
<th>Daily Capacity</th>
<th>Kind of power used</th>
<th>Principal Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appleton Coated Paper Co.</td>
<td>40,000 lbs.</td>
<td></td>
<td>Enamelled papers, covers.</td>
</tr>
<tr>
<td>Boyd Paper Co.</td>
<td>20,000 lbs.</td>
<td></td>
<td>Specialize in cover and laid papers.</td>
</tr>
<tr>
<td>Ravine Mills</td>
<td>10,000 lbs.</td>
<td></td>
<td>Writing papers.</td>
</tr>
<tr>
<td>Lincoln Mill</td>
<td>20,000 lbs.</td>
<td>W. &amp; S.</td>
<td>Linen, bond, writing papers.</td>
</tr>
<tr>
<td>Fox River Mill</td>
<td>30,000 lbs.</td>
<td>W. &amp; S.</td>
<td></td>
</tr>
<tr>
<td>Interlake Pulp &amp; Paper Co.</td>
<td>100,000 lbs.</td>
<td>W. &amp; S.</td>
<td>Sulphite, fibre, also 12,000 lbs. ground wood.</td>
</tr>
<tr>
<td>Kimberly-Clark Co.</td>
<td></td>
<td>W. &amp; S.</td>
<td>Manila, fibre, etc.</td>
</tr>
<tr>
<td>Atlas Mill</td>
<td>58,000 lbs.</td>
<td></td>
<td>Book, envelope, writing, manila.</td>
</tr>
<tr>
<td>Telulah Mill</td>
<td>45,000 lbs.</td>
<td>W. &amp; S.</td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>35,000 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulp</td>
<td>10,000 lbs.</td>
<td>W. &amp; S.</td>
<td>Ground wood pulp.</td>
</tr>
<tr>
<td>Riverside Fibre &amp; Paper Co.</td>
<td></td>
<td>W. &amp; S.</td>
<td>Bond, linen, envelope, etc.</td>
</tr>
<tr>
<td>Paper</td>
<td>30,000 lbs.</td>
<td>Steam.</td>
<td>Sulphite fibre.</td>
</tr>
<tr>
<td>Pulp</td>
<td>80,000 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin Tissue Paper Co.</td>
<td>16,000 lbs.</td>
<td>W. &amp; S.</td>
<td>Tissue and light weight papers.</td>
</tr>
</tbody>
</table>

* Data from Post's Directory of Paper and Pulp Industries, 1913.
In any city devoted to a special line of manufacturing, such as paper, mills making supplies and machinery for the use of paper mills, and still other mills designed to use paper in further manufacture are always called into existence. A majority of the factories and mills in Appleton which do not themselves make pulp or paper make special machinery or supplies for the use of paper mills, both in the Valley and elsewhere. The Appleton Wire Works makes fourdrinier wires, cylinder moulds, etc., for the paper mills. The Valley Iron Works' chief line is the manufacture of beating engines for the paper mills, and the Appleton Woolen Mills make paper makers' felts and jackets.

Then there are other mills which have been attracted to the city because they use a large amount of paper in further manufacturing and so find it an advantage to be located in a paper-making center. For example, the Tuttle Press Company manufactures many specialties, including plain and decorated crepe paper, paper napkins, and towels, folding boxes and cartons, box-covering papers, printed wrappers for soap, shoes, gum, and bottles, printed tissue paper, milk bottle caps, etc. The Appleton Coated Paper Company does not manufacture the paper which it uses, but coats, enamels and otherwise treats it for special uses. There are a few other factories and mills not connected with paper-making and not all using water power; among these are a chair factory, a toy factory, three knitting mills, and two or more machine shops.

**Other Features of Appleton**

The city is the natural banking and mercantile center of a rich farming and dairying region in addition to being the central city in the chain of paper-making towns along the Lower Fox. Through the city run two divisions of the Chicago and North Western Railroad, a main line to Green Bay, Ashland and the Northwest; and a branch line, connecting Appleton with Manitowoc and other cities along the Lake Michigan shore. A branch of the Chicago, Milwaukee and St. Paul also enters the city, and an interurban connects it with towns as far down the river as Green Bay, and southward with Neenah, Menasha, Oshkosh, and Fond du Lac.

**Appleton as a Type City**

Appleton belongs pre-eminently to the class of industrial or manufacturing cities. A better example of a city whose industrial life is based upon a single resource—water power—and whose ac-
A.—VIEW IN 1882

From a drawing and wood cut made for the Appleton Post, and published Dec. 21, 1882. Government dam at left; navigation canal across the river.

B.—WRIGHTSTOWN, THE ONLY TOWN ON THE LOWER FOX RIVER NOT AT A WATER POWER SITE

Founded in 1834.
tivities center around a single industry—paper-making—could scarcely be found. Cities of this type, while frequent, are in the small minority. Among the older cities of the East such cases are found. For example, Gloversville and Johnstown, twin cities in eastern New York, are almost wholly devoted to the manufacture of leather gloves and mittens. Troy, N. Y., makes more than 80 per cent of the collars, cuffs, and dress skirts made in the United States. Similar cases are found in Brockton and Lynn, shoe-making centers near Boston; in Fall River, Mass. (cotton), Paterson, N. J. (silk), and South Omaha, Neb. (meat packing). The city of Niagara Falls is one whose manufacturing industries rely almost wholly upon water power, and scores of cities in New England owe their location and early growth to it. Many of the recently built cotton mills in North Carolina, South Carolina, and Georgia are the beginnings of cities of the waterpower type.

KAUKAUNA

EARLY HISTORY

Kaukauna is one of the oldest settlements on the Fox River. In 1790 or 1793 a trading post was established there by a French Canadian who is recorded as having bought a tract "40 acres in length and 40 acres in width for 2 barrels of rum." After 1818, the place became one of the best known on the river. In that year Augustin Grignon settled at the Lower Rapids, built a house, and cultivated land; he maintained a trading post for a long period and gradually attained a widespread reputation for his generous hospitality to travelers along the river. The country was still an almost unbroken wilderness. It is said that for some years prior to 1824 Grignon's house was the only one between Green Bay (Fort Howard) and Lake Winnebago. In 1827 the region about Grand Kakalin, as it was long called, contained 31 people.

The town of Kakalin was organized in 1839, in which year Mr. George W. Lawe, one of the most widely known men in the entire Valley and often referred to as the Father of Kaukauna, came there to live. Ten years later the place was spoken of (in the Green Bay Advocate) as "famed for its beauty, prominence and bountiful hospitality." After a bitter contest between the two villages, Ledyard and Kaukauna, on opposite sides of the river, they were incorporated into the single city of Kaukauna in 1885. The first dam across the river was built in 1850 and a four-story mill was erected in 1861.
WATER POWER AND INDUSTRIES

At Grand Kaukauna (the spelling legally adopted in 1861), the Fox has a descent of slightly over 50 feet in less than one mile, and affords the largest water power of any rapids along the river though only a little over half of this is used. The original paper mill was erected in 1873-74. There are now five mills, all of which make either ground-wood or fibre; one mill makes sulphate fibre, a more recent product than the sulphite fibre which is made in many mills in the Valley; three mills make paper. In all, the capacity of these mills is over 200,000 pounds of pulp or fibre and 150,000 pounds of paper in 24 hours, making Kaukauna one of the important pulp and paper centers of the Fox River group.

Power is developed on both sides of the river. It is distributed along the north side by a navigation canal over a mile in length, containing five locks, and on the south side by a private canal. Another dam has also been built, for power purposes, some distance below the government dam. There are excellent conditions for a much larger manufacturing development than has yet taken place.

In 1880 the shops of the Milwaukee, Lake Shore and Western Railroad were placed at Kaukauna and the city experienced a boom of some magnitude. For many years these shops employed a large force of men and gave life to the city, especially to the south side where the shops are located. The Lake Shore Road has since become a part of the Chicago and North Western system, the railroad shops have declined in importance and Kaukauna has suffered a set-back. The population in 1910 was 4,700, four hundred less than at the previous census. The additional water power which might be developed here holds out the prospect that the city may sometime take a large part in the manufacturing industries of the Valley.

KIMBERLY, LITTLE CHUTE, WRIGHTSTOWN, LITTLE RAPIDS

Kimberly

The Kimberly-Clark pulp and paper mill, one of the largest paper mills in the West, is situated about 3 miles below Appleton on the south side of the river. In recent years the company has been aiding in the development of a model village, peopled mainly
A.—DAM AND NAVIGATION CANAL AT KAUKAUNA

Kaukauna has the largest Water power (13,400 H.P.) on the river; 6,900 H.P. is not yet developed.

B.—LOCK IN NAVIGATION CANAL AT KAUKAUNA

About 600 boats pass through the lock annually.
by its own employees. The company owns the entire water power developed by the Cedars Dam. The paper mill has a capacity of 200,000 pounds a day, and the sulphite fibre mill a capacity of 120,000 pounds a day.

A medium sized book weighs from a pound to a pound and a half. Every week this one mill produces enough paper for nearly a million such books. It could supply to each family in a city of 8,000 people, a hundred books every day.

Across the river, at the place known as the Cedars, a great convocation of Indians was held (in 1836) for the purpose of selling to the United States government a tract of Indian lands extending from Fond du Lac west to Portage and north to Green Bay.

**LITTLE CHUTE**

The rapids here were called by the French *La Petite Chute* as distinguished from the Grand Chute, where Appleton now is. The place began as a Catholic mission, established by Father Theodore Van den Broek, a Hollander, in whose honor the township was afterwards named. He began his work among the Indians in 1837 and soon had a parish of two hundred people, all Indians, a majority of whom he taught to read, write, and till the soil. In 1843 the congregation is said to have numbered 600. A little later Father Van den Broek returned to Holland and induced a large number of his countrymen to come to Wisconsin. Little Chute has been, from the beginning of white settlement, mostly peopled by Hollanders and their descendants. In 1910 the population was 1,354.

At Little Chute the river descends 36.2 feet in two miles; the rapids are passed by a canal over a mile in length, with a lock near the upper end and a double lock at the lower end. About 4,000 H. P. is developed by the dam and is used by the Little Chute Pulp Company, whose mill has a daily capacity of 100,000 pounds of ground wood.

At the Combined Locks Dam, a mile below Little Chute, is one of the largest pulp and paper mills in the Valley, that of the Combined Locks Paper Company, with a reported capacity of 200,000 pounds of paper, 100,000 pounds of ground wood, and 80,000 pounds of sulphite fibre daily. Six thousand horse power is used.

**WRIGHTSTOWN**

Between Kaukauna and De Pere are Wrightstown and Little Rapids. The former was settled in 1833 and thus is older than
Appleton, Neenah, Menasha, or Oshkosh; yet it has reached a population of only 700. It has no water power and is the only city or village on the river without manufacturing industries. It gained importance in an early day (1836) as the point where travelers on the Fort Howard—Fort Winnebago Military Road ferried across the river. A bridge which now crosses the river is largely responsible for making the village a trading center for the neighboring region. (Plate XXII, B).

At Little Rapids is a dam and canal developing 2,000 horse power, which is used by a wood pulp mill of 64,000 pounds daily capacity.

DEPERE

The city takes its name from the old French Rapides des Peres, or Rapids of the Fathers, so-called because of the Jesuit Mission established there by Father Claude Allouez in the winter of 1671-72. The first rapids, as you ascend the river, are here, and they led to the selection of the place for the famous old mission. The rapids made a natural stopping point for canoes, both ascending and descending the Fox, and hence was a favorable place for the mission. It has been the scene of many interesting and some thrilling events. For 18 years Father Allouez labored there, but with many disappointments; the mission was finally destroyed by the Indians. During the fur trading days, Depere shared with Green Bay in the unique life and activities of the Valley, but with the decline of this trade, the place became all but deserted. In 1837 it was made the county seat of Brown County, though it had but a handful of people. A year later it had grown to a place of 28 dwellings, and in 1857 it was incorporated as a village. During the Civil War the village was a live manufacturing center, but declined after the War. In the early seventies West Depere was the most stirring place along the river and is said to have eclipsed Green Bay. It was consolidated with the east side in 1890.

In the early seventies, iron smelting was a large industry at the Deperes and also at other places on the river. The surrounding country was still partly covered with hardwood timber, and this must be removed before the land could be cultivated. The iron furnaces furnished a market for this wood which was made into charcoal and used as fuel for the blast furnaces. In fact the industry was primarily a wood-using industry, and was a boon to the farmers who thus found an additional profit in clearing their land.
DEPERE. LOOKING WESTWARD, NAVIGATION CANAL IN FOREGROUND; POWER CANAL AND PAPER MILL ACROSS THE RIVER

This dam is the last one in the series of twelve from Lake Winnebago and Green Bay.
Two of the furnaces in Depere using ore from Upper Michigan consumed from 40,000 to 50,000 cords of wood a year. It was an important industry while it lasted, but when the wood was gone the furnaces soon passed out of service. During these same years there were several saw mills on the water power. In the '80's flour milling was a large industry.

At present the largest mill in the city is the fine paper mill on the west side. It was built by the Kimberly-Clark Company expressly for making high-grade writing papers, but was sold to the American Writing Paper Company. It has a capacity of 32,000 pounds daily, using the water power developed by the government dam. The river is so deep that lake steamers drawing 16 feet of water bring coal to the Depere docks. Metal working is, next to paper making, the chief line of manufacturing. Boiler works, machine shops, boat works, and brick yards are industries of some magnitude. Excellent brick and tile clays are obtained on both sides of the river. Two trolley lines connect the city with Green Bay and one with up-river cities. The Chicago and North Western Railroad is on the west side of the river and the Chicago, Milwaukee and St. Paul reaches the eastern portion of the city.

GREEN BAY

ITS LONG HISTORY

No city of the Old Northwest has such a long and interesting history as Green Bay.* It is now approaching 300 years since Jean Nicolet with his mandarin gown and pistols astonished the Winnebagoes at the mouth of the Fox (1634), and enacted the first chapter in the romantic history of the Fox River Valley. In these years Miles Standish was Captain of Plymouth and Wouter van Twiller was governor of New Netherland; Philadelphia was yet undreamed of and Boston had scarcely begun its history. Thirty years after Nicolet's visit came Nicholas Perrot, and began the fur-trading enterprise which was for two centuries the magic influence to attract the hardy and the adventurous Coureur de Bois, the penniless Voyageur, and the fortune-seeking noble into the pathless wilds of New France. From the beginning of the French regime down almost to the middle of the last century, Green Bay was one of the chief centers of the fur trade

* This has been admirably written up in Historic Green Bay, 1634-1840, by Ella H. Neville, Sarah Green Martin, and Deborah Beaumont Martin. Green Bay, 1903.
of the Northwest. Thither each summer came the fleets of canoes and French batteaus from Montreal and Mackinac, bringing arms and cloth and ornaments, and thence each spring went the fleets laden with the furs of the beaver and otter, the bear, wolf, fox, and deer, the lynx, marten, and badger. A score of interior posts at Kaukauna, Buttes des Mortes, Oshkosh, Fond du Lac, Calumet, Portage, Prairie du Chien, and points farther west, were tributary to Green Bay. When all traffic was by water, Green Bay was a strategic point with only two or three peers in the western country. "For 200 years Wisconsin's all important interest was the fur trade. This traffic stimulated exploration, by making it profitable; transformed Indian society politically and economically; brought the Indian into complete dependence upon the trader, and paved the way for the peaceful agricultural settlement of the State."

**Historical Synopsis, Green Bay**

Arrival of Nicolet, the first white man to visit Wisconsin, 1634.
Arrival of Radisson and Groseilliers, famous traders and forest rangers, 1654.
Beginning of the fur trade by Nicholas Perrot, 1666.
Arrival of Father Allouez (1669) who later established the first Christian mission in the Valley (St. Francis Xavier) five miles above Green Bay, 1671-2.
Arrival of Joliet and Marquette, discoverers of the Upper Mississippi, 1673.
Nicholas Perrot made first Governor, or commandant, of the territory, 1685.
The first establishment of a garrisoned French post at the mouth of the Fox River, 1721.
Arrival of Augustin and Claude de Langlade, the latter said to have been one of the bravest and most resourceful of the men who made New France, 1745 (?) .
Final surrender of Wisconsin, with the rest of New France, to England (1760) and the placing of the first English garrison at Fort Edward Augustus, as the English called Green Bay, (1761).
Withdrawal of English garrison on account of danger from Indians, 1763.
Seven white families at Green Bay, 1780.
Nominal but not actual beginning of United States sovereignty, 1783.

A.—GRAIN ELEVATOR AT GREEN BAY

B.—UNLOADING EASTERN COAL AT GREEN BAY

More than 600,000 tons of coal are received by boat at Green Bay annually. This coal is brought from Lake Erie ports at 30 to 40 cents a ton.
Population of Fox River settlement about 50, in 1785. Actual cession of Wisconsin to the United States by Great Britain, and its incorporation into Indiana Territory, 1800. First assertion of the authority of the United States; Charles Reaume made a Justice of the Peace, 1803. Wisconsin becomes part of Illinois Territory, 1809. Stationing of the first American garrison, and the building of Fort Howard, 1816. Green Bay then had between 45 and 50 families. First regular school opened in Green Bay, 1817. Green Bay made part of Michigan Territory, and Brown County organized, 1818. First arrival of settlers from the Eastern States and the decline of the old French regime, about 1820. Arrival of the first steamboat, "Walk in the Water," 1821. Green Bay's first post office, Jan. 2, 1822. Building of the military roads from Green Bay to Fond du Lac and to Manitowoc, 1832-3. Father Van den Broeck writes that Green Bay has 9 or 10 houses, 1834. Large immigration of eastern settlers and excited land speculation, 1835-40. Territory of Ouisconsin created (named by Jas. D. Doty, from the Ouisconsin River), 1836. Borough of Green Bay formed by the union of the villages of Navarino and Astor, 1838. Wisconsin admitted to statehood, 1848. Green Bay incorporated into a city, 1854. Large immigration of Hollanders, Belgians, and Germans, 1854-57. First railroad train runs to Green Bay, 1862. The Civil War, 1861-64. "The war ended, and Green Bay nodded, slept. Wharves along the river shore rotted to the water's edge and on the sandy waste of Washington street, cows dozed on summer days. Gradually from 1866, Green Bay showed a marked awakening in business interests. Elmore and Kelly's elevator was built. Railroads pushed through to this desirable port. The Chicago and North Western was pushed northward to the copper and iron country. The Milwaukee and Northern cut a short line between Milwaukee and Green Bay, and the Green Bay and Lake Pepin road opened up a direct route to the Mississippi. Between 70 and 80 saw mills were erected in Brown County, and in 1870
it is recorded as being the largest shingle market in the world, the market product in that year being one-half billion. Backward lay its romantic past, the part played in the foundation of a new state, the days of the fur trade, of courreur de bois and voyageur, forward pushed Green Bay of the future, Greater Green Bay."

**GREEN BAY AS A TYPE CITY**

In every city from Fond du Lac to Depere, the manufacturing industries bear the strong impress of a single dominant influence—the influence of Wisconsin’s forests. In all of them, one raw material, wood, overshadows all others. Fond du Lac and Oshkosh still continue engaged in the wood-shaping industries, while the water power cities on the Lower Fox specialize in pulp and paper made from wood. In the case of Green Bay an opposing influence enters and diversifies the industries to an extent at once noticeable. It is an influence which inevitably arises from the city’s commercial life. Green Bay is, like all cities, an industrial center, but an industrial center modified by its commanding position at the head of Green Bay and at the watergate of the Fox River Valley. Because of this commanding position the city belongs to that type of city which is today the leader in the world’s affairs, cities which may be called watergate cities. They are more than seaports, for they sit where two waterways meet—where rivers meet the sea. The river may or may not be in itself important, but the valley that leads up from the sea into a rich, populous hinterland becomes in the very nature of the case a conduit of commerce. A city so situated is fed through two funnels: the one receives the converging lines of trade from the sea; the other brings to a focus railroads from the interior. Such a city is New York at the mouth of the Hudson, and Montreal on the St. Lawrence. Such is London and Rotterdam, Hamburg and Marseilles, Buenos Aires and Calcutta. Lake Michigan is not the ocean nor is the Fox River the Rhine or the St. Lawrence; and correspondingly, Green Bay is not Rotterdam or Montreal, but it belongs to their type—the type of the watergate city. The diversity of its industries, the column of Marine News in the daily paper, the big elevator that looms up at the head of the Bay, the coal docks that line the river, the wholesale houses that turn their fronts to the street and their rear doors to the water, and the office of the collector of customs, are all marks of the port city.

The U. S. Government maintains a channel approximately 20 feet in depth. Boats carrying 10,000 tons of coal may reach the coal docks at Green Bay.
GREEN BAY AS A LAKE AND RIVER PORT

The channel at the mouth of the Fox River is kept dredged for vessels drawing 19 or 20 feet of water, but this is not sufficient for the largest boats on the Lakes, and an effort for its further deepening is being made. The present depth permits the entrance of boats carrying 10,000 tons of coal. A few years ago such boats were the monsters of the Lakes. Many an ocean-going vessel is smaller. Between 500 and 600 vessels a year, mostly steamers, enter and clear the harbor. Their total tonnage reaches nearly 500,000 tons. This is not the tonnage of freight received, but the registered capacity of the vessels. The coal receipts alone in 1913 reached 650,000 tons—500,000 tons of soft, and 150,000 tons of hard coal. The fact that this coal is brought from Lake Erie ports, nearly a thousand miles, for 30 cents to 40 cents a ton, while the railroads charge double that amount for hauling it a hundred miles inland, gives some suggestion of the enormous saving made possible by the water shipment of heavy commodities like coal. The Great Lakes save Wisconsin in freight charges on coal alone millions of dollars a year. The densest population of Wisconsin is in the southeastern quarter and it follows that the lake traffic to points south of Sheboygan will be heavier than to points north of that city. With the development of the northern half of Wisconsin, Green Bay's volume of waterborne trade will continue to increase. There are large, but declining receipts of pulp wood (30,000 to 40,000 cords) from points in the Upper Peninsula of Michigan. This is mostly brought in rafts of 3,000 to 4,000 cords, towed by tugs. No Canadian pulp wood reached at this port in 1913; most of this now goes to Ashland and thence is taken by rail to the pulp mills. The receipts of foreign merchandise are now about $100,000 a year, yielding a duty of $6,000. In 1902 the duty collected amounted to $20,000. A regular line of steamers, The Mutual Transport Line, brings some merchandise from the lower lake
ports. The passenger and freight boats of the Goodrich Line no longer touch at Green Bay. Coasting steamers ply between the city and other points on the Bay. The tonnage of vessels entering and leaving the port has steadily increased. This increase is due to the growing receipts of coal. The Reiss Coal Company docks (Plate XXVII.) alone are now (1914) receiving 500,000 tons a year. Their unloading facilities enable them to unload a 7,000 or 8,000 ton boat in 24 hours.

Shipments by water fluctuate. In 1902 more than 23,000,000 feet of lumber were shipped by one company and in that year the Cargill Elevator handled 8,000,000 bushels of grain; not all of the grain went by water, however. In recent years, railroads have carried an increasing proportion of the city’s shipments.

Manufacturing Industries

Green Bay has practically 100 manufacturing establishments, over one-half of which employ less than 25 people. There are 23 plants which employ between 25 and 100 people each, nine that employ between 100 and 300 people, and two that employ over 300 each. There is greater diversity in the character of the industries than is found in any other of the Fox River Valley cities. The wood-using industries are less prominent, yet they lead. In the years around 1870, Green Bay was a great lumber and shingle market. There were over 60 lumber mills in the county,* and the city handled 100,000,000 feet of lumber and 500,000,000 shingles a year. There were five lumber mills in the city and at Mill Center, 9 miles away, there are reported to have been 19 mills. Two large lumber mills and three planing mills, a box factory, a furniture factory, and other wood-using plants now operate in the city. A combined sulphite fibre and paper mill produces about 60,000 pounds of fibre and an equal amount of paper. Two other paper mills produce respectively 50,000 and 40,000 pounds, chiefly colored tissue, crepe napkins, toilet, fruit wrappers, and paper towels. The Green Bay paper mills are among the few in the state that do not use water power.

The manufacture of cooperage has long been an industry of importance; 1,200 carloads of cooperage are said to have been shipped in 1889. The industry is still flourishing. Three flour mills are operating and one of them has a capacity of 500 barrels a day. The great increase in dairying in the region tributary to Green Bay has tended to reduce the grain shipments.

* In the History of Brown County, by Deborah B. Martin, it is said that in the fifties there were well toward 150 saw mills in the county.
COAL DOCKS AT GREEN BAY

Unloading a 10,000-ton cargo of eastern coal at the Reiss Coal Company's docks at Green Bay. Note the length of the boat.
It is noticeable that the iron and steel working industries—except those which serve the paper mills—are not prominent in any of the cities between Lake Winnebago and the city of Green Bay. At that city, however, these industries are among the foremost, due in part at least, to the cheap coal, cheap transportation, and the marine activities of the city. There are nine establishments which operate either as foundries or machine-building plants, or both, and the products of several of these are widely sold. In addition there are three railroad shops, that of the Chicago, Milwaukee and St. Paul employing upwards of 500 men. The widely diversified character of manufacturing is seen in the following partial list of factories, large and small:

Glove factories.........................................................2
Knitting mills........................................................3
Harness and saddlery...............................................2
Overall factories....................................................2
Candy factories......................................................2
Canning and pickle factories....................................3
Brick yards (nearby)...............................................3

There are also wholesale and jobbing houses, a large seed company, and seven coal companies with coal docks; 1,300 business concerns are listed in the city directory.
GENERAL SUMMARY OF CITIES AND INDUSTRIES

The existence of a chain of eight cities in 60 miles, from Fond du Lac to Green Bay, is evidence of the operation of some unusual geographical influence. The cities and their population are:

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fond du Lac</td>
<td>18,797</td>
</tr>
<tr>
<td>Appleton</td>
<td>16,773</td>
</tr>
<tr>
<td>Oshkosh</td>
<td>33,062</td>
</tr>
<tr>
<td>Kaukauna</td>
<td>4,717</td>
</tr>
<tr>
<td>Neenah</td>
<td>5,734</td>
</tr>
<tr>
<td>Depere</td>
<td>4,477</td>
</tr>
<tr>
<td>Menasha</td>
<td>6,081</td>
</tr>
<tr>
<td>Green Bay</td>
<td>25,236</td>
</tr>
<tr>
<td><strong>Total, 1910</strong></td>
<td><strong>114,877</strong></td>
</tr>
</tbody>
</table>

These are not large cities and in the East would not occasion any comment, yet there is only one more important chain of cities in Wisconsin (the one along Lake Michigan), and few equally important from an industrial standpoint in the states of the Middle West. All of these cities are actively engaged in lines of manufacturing in which wood is the principal raw material. This is a direct outgrowth of the great supply of timber which naturally gravitated into the Fox River Valley. In the quarter century following 1860, about 100 saw mills were operating in the Valley at one time; Oshkosh, Fond du Lac, and Mill Center, near Green Bay, were the main centers. The pineries of the Wolf and Oconto rivers supplied the logs, and the rivers and lakes were used for transporting them. Rough lumber and shingles were the principal products until the supply of white pine began to decline; then planing mills, sash, door, and blind factories, and other mills for the further finishing of the lumber became relatively more and more important. Gradually the smaller mills and those at less favorable sites were abandoned. Many of them burned. The mills situated at especially favorable locations, or those which were backed by larger capital and business ability continued longer, and a few continue to the present. Fond du Lac still has one large mill, Oshkosh has three, and Green Bay has two. One or two smaller mills continue in most of the other cities. The white pine is practically all gone, and the rivers are used scarcely at all for transporting logs or lumber. The mills of Fond du Lac County have cut as high as 100,000,000 feet of lumber annually; those of Brown County, somewhat more than that, and those of Winnebago County, nearly 200,000,000 feet.* In all of the centers except Oshkosh, most of the mills had been closed down by the end of the seventies. Owing

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* A medium sized frame dwelling requires about 15,000 feet of lumber; hence 200,000,000 feet would build between 12,000 and 14,000 houses, or enough to house a city of 50,000 to 75,000 people.
to its exceptionally favorable location, Oshkosh continued active operations on into the eighties, but with increasing emphasis upon

finished products and a diminishing output of rough lumber. After the white pine had been cut, enormous quantities of hemlock, basswood, and the hard woods still remained, and these have become the basis of the present wood-working industries of the Valley. Furniture factories are using large quantities of oak, birch,
and maple; carriage and other vehicle factories are using hickory, elm, ash, and oak; cooperage mills are using elm, basswood, oak, and a variety of other woods; single factories in Neenah and Oshkosh have a capacity of 800 and 1,500 doors a day, using both hard and soft woods; the wooden ware factory at Menasha makes annually several million pails and tubs, mainly from basswood.

FIG. 12. DIAGRAM SHOWING THE NUMBER OF PERSONS ENGAGED IN MANUFACTURING IN EACH OF THE CITIES HAVING A POPULATION OF OVER 10,000 IN 1910. (U. S. Census 1910).

Note by comparison with Fig. 13 that the wood-working industries of Oshkosh use a much larger force of men than do the paper industries of Appleton, but that Appleton uses much more mechanical power.
Then there are box factories using inferior grades of pine, excelsior mills, shingle mills, and a long list of other mills engaged in nearly every variety of wood-working.


Pulp and paper manufacturing requires a larger use of power than the other lines of industry. Note Appleton, for example.

Thirty or forty years ago there were many small tanneries using the hemlock and oak bark. Only one of these survives in the Valley, the one at Fond du Lac, and it has far outgrown its
early local character and now buys its hides and tanning extracts and sells its four million dollars' worth of leather in the markets of the world.

At one time the making of charcoal (from wood) was an industry of importance, and iron furnaces used this charcoal in smelting iron ore which was brought in from Mayville, Dodge County, or from the Upper Michigan mines. Appleton and Depere had smelters of large capacity.

From 1860 to 1885, wheat was the principal crop grown in Wisconsin and flour mills flourished in every city in the Fox-Winnebago Valley, notably in Neenah and Appleton. In about 1870 there were seven flour mills in Neenah, four in Menasha, and six in Appleton, all using water power. As wheat growing declined, most of these flour mills were either converted into paper mills, or were replaced by them, and these now form the one dominant industry along the Lower Fox.

This vast industry is the outgrowth of two geographical factors—(1) the pulp-wood of the northern forests, and (2) the water-power of the Fox River. The wood pulp which is used in cheaper grades of paper is made by grinding wood, mainly spruce. The grinding process requires a great deal of power, and since water-power is the cheapest kind, these mills naturally locate at places near the forests and at points where water power is available. The Fox River Valley met these two requirements, and has become the greatest pulp- and paper-making district in the West.

As the Wisconsin forests have been culled of their spruce, the making of ground-wood pulp has been shifting away from the Fox River to the Upper Wisconsin, and into Canada. Now the manufacture of sulphite pulp, made by treating chipped wood with chemicals, is replacing the manufacture of ground wood and is bringing about a corresponding change in the kind of paper which is made in the Valley. Some years ago print, or newspaper, was the kind most largely made. This has given way to the manufacture of better and better grades, such as book, ledger, and bond papers. At present, nearly every variety of paper known to the market is made in the Valley. The output is enormous. Appleton, for example, has 13 pulp and paper mills with a combined daily capacity of 220,000 pounds of pulp, and 230,000 pounds of paper. The location, number, and capacity of the mills are shown in the following table (see also Fig. 9):
### TABLE XIII

**Location, Number and Capacity of Pulp Mills and Paper Mills in the Fox River Valley, (1913)**

(Data from Post’s Directory)

<table>
<thead>
<tr>
<th>City</th>
<th>Number of mills.</th>
<th>Daily capacity in pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pulp</td>
<td>Paper</td>
</tr>
<tr>
<td>Neenah</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Menasha</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Appleton</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Kimberly</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Little Chute</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Combined Locks</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Kaukauna</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Little Rapids</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Depere</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Green Bay</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>27</td>
</tr>
</tbody>
</table>

Many of the other industries in these cities depend directly or indirectly upon the paper mills. Some of them manufacture machinery, screens, felts, etc., for the use of the paper mills, while others use the products of these paper mills for further manufacturing; such, for example, as the making of paper napkins and towels; gum, soap, and bread wrappers, and paper specialties of great variety. Some of the mills handle orders reaching a billion printed wrappers of a single kind. From Neenah to Green Bay the traveler is seldom out of the sight of a paper mill or its tall chimney. (See Plate XXI.) Nearly all use water power, but a few of the newest mills are using steam or electricity only. More than four-fifths of the water power used along the Fox River is used by the paper and pulp mills.

Green Bay is distinctively a lake port, and its widely varied industries show a smaller proportionate use of wood than those in any of the other cities, yet the wood-using industries are larger.
than any other single group. The iron-using industries are more important in Green Bay than in any other city in the Valley, due to cheap coal and the natural activities of a port. A list of the cities and their leading lines of manufacturing shows how largely the wood-using industries predominate:
Fond du Lac.......................... Leather, furniture
Oshkosh.............................. Lumber, doors, matches
Neenah............................... Paper, hardwood products
Menasha.............................. Woodenware, paper
Appleton............................. Paper, pulp
Kaukauna............................ Pulp, paper
Depere............................... Paper, iron products
Green Bay............................ Iron products, paper, lumber

A widely distributed phase of manufacturing exists in the creameries and cheese factories, which are sprinkled over the entire Valley and whose products reach a larger sum than is generally supposed.