The Paper Mill Industry in the Lower Fox River Valley, Wisconsin, 1872-1890

Dorothy Heesakker
Loyola University Chicago

Follow this and additional works at: https://ecommons.luc.edu/luc_theses

Part of the History Commons

Recommended Citation

This Thesis is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Master's Theses by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.
Copyright © 1965 Dorothy Heesakker
THE PAPER MILL INDUSTRY
IN THE LOWER FOX RIVER VALLEY, WISCONSIN
1872-1890

by
Dorothy Mae Heesakker

A Thesis Submitted to the Faculty of the Graduate School
of Loyola University in Partial Fulfillment of
the Requirements for the Degree of
Master of Arts

June
1965
DRAINAGE AREA OF FOX AND WOLF RIVERS

# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Route of explorers, fur traders, missionaires, early settlers--Dream of river gateway to the West--Flour milling era--Advent of the Paper Age--Growth of population--Valley of farmers and industrialists.</td>
<td></td>
</tr>
<tr>
<td>II. RIVER OF POWER</td>
<td>6</td>
</tr>
<tr>
<td>Nicolet, first to see the lower Fox River--Jesuits Allouez and Dablon go up the river--Joliet and Marquette use Fox River en route to the Mississippi--Troop movements on river in War of 1812--Government sets up military forts--Indians cede territory--Course of the lower Fox--Eastern capital aids in building dams, canal, locks to make river navigable--Fox and Wisconsin Improvement Company--Green Bay and Mississippi Canal Company--Government takes over improvement--Private company retains property and water power rights.</td>
<td></td>
</tr>
<tr>
<td>III. FROM FLOUR TO PAPER</td>
<td>29</td>
</tr>
<tr>
<td>Wheat farmers from New England and New York come to valley--Kimberlys open first flour mill in Neenah--High prices result in more mills in post-Civil War period--Invention of roller mill process--Railroads, wheat, flour milling move westward--Paper making in colonial days--Scarcity of rags--Machinery replaces hand process--</td>
<td></td>
</tr>
</tbody>
</table>
First Milwaukee mill, 1848--First valley mill at Appleton, 1853--Search for substitute for rags--Price of paper goes up during Civil War--Second valley mill in Neenah, 1866--Reports of new wood pulp process.

IV. THE EARLY YEARS ........................................... 50

Ground wood pulp method--Post-war era of invention--More mills built to fill demand for cheaper newsprint made from wood pulp--Valley's first pulp mill, 1871--Kimberly, Clark and Company establishes valley's third paper mill in Neenah, 1872--Buys local competitor, 1874--Van Nortwick, Davis, Patten mills--Frambach brings ground wood process to valley--Kimberly, Clark of Neenah opens mill in Appleton--Manufacturers organize to curtail paper production to raise prices--Paper mill executives win control of Green Bay and Mississippi Canal Company, owner of water powers on river.

V. RIVER OF PAPER ............................................. 68

Kimberly, Clark builds second mill in Appleton, buys old pulp mill--Van Nortwicks install Edison dynamo in mill, operate world's first water power driven central electric station--More flour mills become paper mills--Growth of Kaukauna; Van Nortwicks, Thilmany open mills--Whiting, Gilbert, Strange in Menasha--Fires ravage industry--New sulphite process--Plans for two mill towns down river--New mill at De Pere, last of the water power sites on the river.

VI. CONCLUSION ................................................. 83

NOTES .......................................................... 86

BIBLIOGRAPHY .................................................. 110
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rapids of the Lower Fox before Improvement</td>
<td>14</td>
</tr>
<tr>
<td>3. Distribution of Water Power, 1874</td>
<td>61</td>
</tr>
</tbody>
</table>
LIST OF MAPS

<table>
<thead>
<tr>
<th>Map</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage Area of the Fox and Wolf Rivers</td>
<td>Frontispiece</td>
</tr>
<tr>
<td>Profile of the Lower Fox</td>
<td>13</td>
</tr>
<tr>
<td>Paper Cities on the Lower Fox</td>
<td>74</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Rivers and valleys were the principal routes used by the early colonists as they worked their way from the eastern coast up into New England and westward across the Appalachians toward the Mississippi River. Along the Hudson, the Delaware, the Susquehanna, the Potomac, the Mohawk, and the Ohio rivers grew towns and cities as the frontier moved on.

Among such mighty and historic gateways the Fox River and its alluvial valley seem insignificant. But it was the Fox River which brought the explorer, the fur trader, the missionary, the farmer, the capitalist, and the businessman from the East to northeastern Wisconsin. All played roles in the development of "this beautiful valley, upon which the perpetual smiles of the Almighty seem to rest." 1

While the Indians shot game, traded furs, planted corn, and quarreled among themselves, nations fought to control the river which ran through the redmen's kingdom. The victorious white men settled along the banks of the river. They cut forest wood to build houses and made clearings on which to plant crops.

1
At the water's edge they set up saw and grist mills in which to plane the lumber and grind the grain. To transport their products they had only the river and Indian trails. To make the river their highway of commerce they had to tame eight treacherous rapids over which the river fell in its thirty-seven-mile dash from Lake Winnebago to Green Bay where it joined the waters of Lake Michigan.

Eastern capitalists and land speculators came to invest in the waterway improvement, hoping to make it a connection between the East and the New West. They built dams and locks to make the Fox navigable. The water route carried the valley's agricultural products to markets in the East, South and West. The rich clay soil, underlaid with limestone, was ideal for a variety of crops, especially wheat.

Flour milling vied with lumbering for first place in Wisconsin's industrial progress. But the dams on the Fox River were a hindrance to the lumbermen; the structures interfered with log-driving and the river never came alive with busy, boisterous lumber camps.² The area turned to flour milling because it had fields of spring wheat, and it had water power to turn the millstones. From 1850 until 1880 the valley was the breadbasket for the pineries and the competitor of Milwaukee in the race for milling supremacy in the state. Railroads came to help carry the products but Milwaukee was the railroad center.
Her rails led to the wheat growing areas of interior Wisconsin and reached the new fields in Iowa and Minnesota. The big lakeside city in the more populated southern part of the state remained the merchant milling center of Wisconsin for a time; then even Milwaukee could not compete with the West and Minneapolis became the "flour capital."

The water power which had driven the millstones in the valley remained unimpaired when the flour business moved. The settlers found another use for the flour mills. In the valley, just as in all Wisconsin which lacked native coal, steam power was relatively expensive and factories and mills located on the banks of the river where water wheels furnished cheap power. The power was used in a variety of small industries. During the Civil War Appleton bragged that she manufactured her own "clothes, flannels, leather, flour, lumber, lath, wagons, stoves, plows, axes, knives, rakes, ox bows and yokes, chairs, tables, bureaus, bedsteads, pumps, barrels, printing and wrapping paper."

With the peace came America's transition from an agricultural to an industrial economy. The next two decades were a relatively prosperous era. Land was cheap, taxes were low, and man's ambition to progress seemed limitless. Man believed in himself and in the future. To almost any business it was the Golden Age, the Gilded Age. To the lower Fox River Valley, ready with its water power and mill sites, it was the Paper Age.
The art of paper making had spread from east to west since antiquity and in the United States it followed the frontier westward. The population center attracted the printer; the printer supplied a market for the papermaker's product; the population center supplied the papermaker's raw material. Five things were essential to the paper industry: process water, cheap power, raw material supply, nearness to markets, and a supply of skilled labor. All these the valley possessed. It had a river full of power; it had communities to furnish the rags and straw used to make paper; it had access by rail and water to the population centers east and south; and its lone paper mill, built in 1853 by a Massachusetts papermaker, had been the training school for its skilled labor.

There was capital to invest in the new industry, capital gained from flour milling. And there were energetic, ambitious men who dared to risk that capital. They adapted to the changes brought by technological advances of the Paper Age. Change was the mother of progress and the infant paper industry in the valley grew because of it.

Although it was an age of protective tariffs, Governor Lucius Fairchild of Wisconsin asked for "voluntary protection by the people themselves." He begged that they "patronize home manufactures." To build those manufactures the state needed more people and the Wisconsin Legislature established a board
of immigration which sent agents to Chicago and New York City to advertise the agricultural and industrial advantages of the state. Even to foreign countries it sent brochures boasting of its facilities.8

People came to the valley. Farmers found a local market for their produce and industry thrived on its added labor supply.

The river, plus the railroad, gave the valley unusual facilities for cheap transportation. The Fox, said an Oshkosh newspaper, was one of the national waterways "which are the great highways built by God Almighty to keep the people from being robbed by railroads."9 But railroad transportation was faster and in time displaced the river as a commercial carrier.

Eastern capitalists and speculators had developed the waterway and in so doing they also had created tremendous water power on the "best and noblest river in the world" along which grew a chain of cities. The valley became the "Lowell of the West."
CHAPTER II

RIVER OF POWER

The first white man to see Wisconsin gazed upon it in 1634 at the mouth of the lower Fox River. He was Jean Nicolet, agent and interpreter sent by Samuel de Champlain to arrange a peace between the Winnebago Indians living in the Green Bay area and the Hurons. Nicolet made a noisy, spectacular entrance into Wisconsin. "He wore a grand robe of China damask, all strewn with flowers and birds of many colors... and he carried thunder in both hands—for thus they called the two pistols that he held." His mission of peace a success, Nicolet returned east to the Hurons without exploring beyond the mouth of the river. At least twenty years passed before another European visited the mouth of the Fox. Medard Chouart de Groseilliers saw the Green Bay area during his 1654-1656 exploration and fur trading voyage.

In 1670 Claude Jean Allouez, a Jesuit missionary, went up the river. It was April 16 when Allouez left his little mission on the far tip of the bay to go to the interior. "We slept at the head of the bay, at the mouth of the River des
Puans, which we have named for Saint Francis," he wrote his superior. The next day he saw the first of the rapids of the Fox at the present site of De Pere and on the eighteenth he encountered the steepest of the river's falls at modern Kaukauna, our sailors dragging the canoe among rapids, while I walked on the river bank, where I found apple trees and vine stocks in great numbers.

On the 19th, our sailors ascended the rapids for two leagues by the use of poles, and I went by land as far as the other portage, which they call Ooukocitiming, that is to say, "the bank." Now surely he was nearing Appleton. From there he went on through Lake Winnebago, left it at Oshkosh where he entered the upper Fox River and then went up the Wolf River. By the end of April he was back in Green Bay and from there returned to Sault Ste. Marie.6

In the fall of the same year he made another trip, this time with Father Claude Dablon, superior of the northwest missions. Dablon marveled at the autumnal dress of the wilderness but found the rapids far more treacherous than Allouez had implied.

If the country of this Nation somewhat resembles an earthly Paradise in beauty, the way leading to it may also be said to bear some likeness to the one depicted by our Lord as leading to Heaven. For scarcely has one proceeded a day's journey up the river from the head of the Bay des Puans, when he finds three or four leagues of rapids to contend with; and they are more difficult than is usual in other rivers, since the pebbles on which the men must walk barefoot, dragging the canoes, are so sharp and cutting that they have the utmost difficulty in withstanding the swift current which flows there.7
His trip ended, Dablon returned to Canada where the next year he was made superior of all the missions of New France. One of his first orders went to Allouez: Set up a permanent mission at the site of the first rapids in the lower Fox at De Pere, which Dablon said was "in the midst of more than ten different nations, who can furnish us over 15,000 souls to be instructed in the truths of Christianity." This Allouez did in the fall and winter of 1671-1672.

Although the Jesuits set up their missions and the explorers engaged in the fur trade, the French had not found the "Great River" the Indians talked about and which they assumed might lead to the South Sea. Under Louis de Buade, Count de Frontenac, the governor of New France, an expedition was ordered. Heading it was Louis Joliet, Canadian-born explorer and discoverer of the deep-water route from Mackinac to Lake Ontario. His chaplain was Pere Jacques Marquette. With five men and two bark canoes they pushed off from the St. Ignace mission at Mackinac on May 17, 1673. After paddling through Green Bay they reached the Fox River which "is very beautiful at its mouth, and flows gently."

But, after ascending the river a short distance, it becomes very difficult of passage, on account of both the currents and the sharp rocks, which cut the canoes and the feet of those who are obliged to drag them, especially when the waters are low. Nevertheless, we successfully passed those rapids....
Joliet and Marquette went on through Lake Winnebago, into the upper Fox River, then to Portage and down the Wisconsin River to the long-sought Mississippi River.11

For ninety years after Marquette and Joliet found the "Great River" of the Indians, the Green Bay to Mississippi route played a part in the strategy of war and trade. The French, and the British after they won the territory at the end of the French and Indian War in 1763, and the Americans followed the water route of the tribesmen. John Jacob Astor, who had set up a fur trade post at Green Bay, chartered the American Fur Company in April, 1808, and soon purchased the British interests in the Mackinac and Bay areas.12 The company's cargo went through the Bay, up the Fox, down the Wisconsin to the Mississippi and from there to points south and west. At Kaukauna on the lower Fox, Augustin Grignon maintained teams of horses and charged Astor's company twenty cents per 100 pounds to carry furs and goods for three-fourths of a mile around the rapids. At the end of the upper Fox where goods had to be transported a bit more than one mile to the Wisconsin the charge was forty cents per 100 pounds and ten dollars for each boat.13

In the war with Great Britain during 1812-1814, the United States became fully aware of the importance of maintaining communications with the frontier territory. Colonel William McKay brought his British troops to Green Bay in 1814.
and there gathered 150 whites and 400 Indians for his attack on Prairie du Chien, where the Wisconsin River empties into the Mississippi. "The expedition moved up the Fox River, whites in six boats or barges, and the Indians in canoes, and carrying their craft over the portage, they descended the Wisconsin," Augustin Grignon said.14

The British tried to keep the Indians on their side even after the Treaty of Ghent; they also hoped for the continued sympathy of the Wisconsin and French traders with an aim to regaining the territory for England.15 But the United States moved to eliminate British influence by paying more attention to the cross-territory river route. Six months after the war ended Lewis Cass, the territorial governor, wrote to Secretary of War Alexander J. Dallas about the Fox-Wisconsin trade channel.

This has been the great thoroughfare along which goods have been taken. Immense quantities have been smuggled to the Mississippi and it is calculated that not more than one third part of those sold in the Indian country, every [year] pay duties. The establishment of a post at Green Bay and at Prairie du Chien will close this line of communication.16

The suggestion was heeded and the next year the government set up Fort Howard at Green Bay and Fort Crawford at Prairie du Chien; in 1828 Fort Winnebago was established at the portage. The waterway was used to move units between the three posts.17 But the infantry men were not too pleased with their means of communication. Ten officers stationed at Fort Winnebago,
complaining about the inability to receive supplies because of low water at some seasons, asked the government in 1832 to consider giving "a few thousand dollars" for a road from Green Bay to Prairie du Chien. They added that the road was also needed "for the transmission of military supplies, and, also, for the purpose of keeping up a lively intercourse between the military posts on this northwestern border."18 Thus American military strength in the area diminished the influence of the British with the Indians and the white settlers and soon led to treaties between the United States and the Indian tribes.

In 1831 the Menominees ceded 2,500,000 acres of land so that the United States "may enjoy the right of making such roads, and of establishing such military posts" as the President thought "proper." However, in return, the government was to build for the Indians a grist and saw mill on the Fox River and "employ a good miller...whose business it shall be to grind the grain,... and saw the lumber...as also to instruct such young men of the Menominee Nation, as desire to, and conveniently can be in-structed in the trade of a miller."19 Apparently it was not convenient for the Indians to learn the trade. In 1836 the tribe yielded all its land to the United States and the Menominees moved to a section reserved for them north of the river.20

The departure of the Indians opened the lower Fox River Valley to settlers who were willing to learn and to work. They
transformed the area into an agricultural valley but the main means of transporting their products or bringing in goods was the wild river. They must tame it somehow if they were to make it a highway to the Atlantic and to the Mississippi.

The lower Fox forms the outlet of Lake Winnebago, a body of water thirty-five miles long and from nine to fourteen miles wide with depths ranging from twelve to twenty-five feet. The lake acts as a great reservoir and prevents any sudden changes in the volume of the outlet from freshets. Lake Winnebago divides the Fox River into two completely different sections. The river rises near the big bend in the Wisconsin River and flows northeasterward with only a very gentle slope for 106 miles when it enters Lake Winnebago at Oshkosh; this section is the upper Fox. When it leaves the lake through two channels at Neenah and Menasha it becomes the lower Fox which rushes northeast, then due east, and again northeasterward into Green Bay. The lower Fox pours for thirty-seven miles over rapids which cause it to drop 170 feet through a small section of three counties in northeastern Wisconsin. In that short span it tumbles from the northwestern tip of Lake Winnebago through Neenah and Menasha in Winnebago County; Appleton, Kimberly, Little Chute, Combined Locks, and Kaukauna in Outagamie County, and De Pere in Brown County. About 150 feet, or 88 per cent, of its total drop is within the borders of Outagamie County. The eight rapids to be tamed covered twenty-eight miles of the route.
<table>
<thead>
<tr>
<th>Name</th>
<th>Descent</th>
<th>Distance Apart</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Feet</td>
<td>Miles</td>
</tr>
<tr>
<td>De Pere</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Little Kaukauna</td>
<td>8</td>
<td>6.0</td>
</tr>
<tr>
<td>Rapide Croche</td>
<td>8</td>
<td>6.0</td>
</tr>
<tr>
<td>Grand Kaukauna</td>
<td>50</td>
<td>4.5</td>
</tr>
<tr>
<td>Little Chute</td>
<td>38</td>
<td>2.5</td>
</tr>
<tr>
<td>Cedar Rapids (Kimberly)</td>
<td>10</td>
<td>0.75</td>
</tr>
<tr>
<td>Grand Chute (Appleton)</td>
<td>38</td>
<td>4.0</td>
</tr>
<tr>
<td>Winnebago Rapids (Neenah-Menasha)</td>
<td>10</td>
<td>4.25</td>
</tr>
<tr>
<td>De Pere to Lake Winnebago</td>
<td>170</td>
<td>28.00</td>
</tr>
</tbody>
</table>

In 1839, while Wisconsin held territorial status, the Senate ordered the Topographical Engineers to survey the entire river and estimate the cost of making it navigable. Captain Thomas Jefferson Cram made the study and reported the following January that the cost to improve the route from Green Bay to Portage would be $448,470.18. He said "construction of a continuous water communication" would benefit all sections of the country, in peace or war. Should the east and gulf ports be blocked, there still would be "an interior water channel by which
the staples of the south and southwest could be readily and safely transported...to the eastern ports; and, in return, the manufactured products of the east could find their way through the said channel to the south, southwest, and to the whole vast extent of country west of the Mississippi Valley, even to the Pacific Ocean."23

The government in 1846, on the basis of Cram's report, made a grant of land to the future state to be used to improve the Fox River and build a canal between it and the Wisconsin. The grant consisted of one half of the land for three miles on each side of the canal, the Fox River, and the lakes through which it passed.24 Two years later Wisconsin was admitted to the Union25 and the state legislature accepted the grant. At $1.25 an acre, the estimated 384,000 acres were worth $480,000, enough to pay for the project without the state incurring any debt. The Board of Public Works was created to take charge of the improvement.26

However, the land did not sell as rapidly as the project's promoters had anticipated. In 1851 the Board of Public Works reported 45,891.44 acres had been sold in 1849 and only 42,481.90 acres in 1850. The board's treasury showed a balance of $8,388.82, but its liabilities were $75,875.28.27 Then Morgan L. Martin of Green Bay, long a speculator in Wisconsin land and friend of the waterway project, agreed to complete the work by
June 1, 1853. But this method also failed and in July, 1853, a new company—the Fox and Wisconsin Improvement Company—was formed. The state conferred all its rights in the improvement and all unsold lands to the company but it demanded that the work be completed in three years and that by that time a boat with a draft of two feet and breadth of thirty feet would be able to pass from Green Bay to the Wisconsin River during ordinary stages of low water. The state retained the right to purchase the improvement any time after twenty years at actual cost over the value of the lands. Martin became head of the new company which was promoted by many valley residents, including Theodore Conkey, Urial Peak and Joseph G. Lawton. But there was not enough money in the young state to finance the project and Martin sought funds from New York capitalists. He managed to get Isaac Seymour, the banker who was to become president of the Bank of America, and Seymour's associate, William J. Averill, to underwrite the company's bonds. Through this maneuver a group of Easterners, all experienced in transportation, politics and speculation, became investors. They were Erastus Corning and Edward C. Delavan of Albany; Horatio Seymour and John Seymour of Utica, and the New York City law firm of Benjamin F. Butler, William Allen Butler, and Hiram Barney. Eastern money did not prevent more troubles for the company. After the federal government increased the land grant
in 1854, the state altered the charter of the Fox and Wisconsin Improvement Company. The amended charter granted the unsold land to the company but ordered that the company must convey same within thirty days to three trustees. It also had to put the entire improvement into trusteeship. In addition, the new law said the works must be enlarged so that the canal would accommodate vessels of four-foot draft between Lake Winnebago and Green Bay and boats drawing three and one-half feet on the upper Fox. If the job was not completed in three years the trustees were to sell first the land, then if necessary the corporate rights, privileges, franchises and property to complete the work, pay off state indebtedness and redeem all obligations of the company.

The law was a blow to the Fox and Wisconsin Improvement Company which three months earlier, in June, 1856, had thrilled the valley with the arrival of the steamer Aquila, which had come from Pittsburgh, down the Ohio River, up the Mississippi and along the Wisconsin and upper Fox, through Lake Winnebago and the lower Fox to Green Bay. Enlarging the works and paying off debts was more than the company could manage. The valley was not growing as rapidly as the company promoters hoped. The commercial center of the state still was Milwaukee with its buyers, bankers, railroads, and storage facilities which were lacking in the valley. There were some attempts to get federal funds by using the waterway to transport troops and supplies during the Civil
war. Lieutenant Colonel Thomas Jefferson Cram, who had surveyed the waterway in 1839, wrote to Senator Henry Wilson on January 19, 1863, that "in reference to a naval station or depot for the upper lakes, Lake Winnebago possesses unrivaled advantages. There we could make large gunboats, arm, and have room to try them, and have them in readiness to send forth in any number...."35 Nothing came of the suggestion. As a result of the efforts, however, "the management of the company delayed a foreclosure sale until the speculative clique mustered the funds to buy up the assets of the bankrupt company."36

The sum needed had to cover the state indebtedness and the cost of completion of the work. The sale was set for the first week in February, 1866. Breese J. Stevens, who had been a Washington lobbyist for the Fox and Wisconsin Improvement Company and now was lawyer for the trustees, made arrangements "between the claim holders and certain cash contributors whereby a sum was provided which covered the required amount and these parties, represented by Hiram Barney of New York, became the purchasers at the sale, of the land, works of improvement, water powers and other property of the company."37 Stevens later told Senator William Windom, chairman of the Senate Committee on Transportation, that "all of the lands were sold, and the full proceeds were applied to the payment and full satisfaction of the construction-indebtedness outstanding."38
Sale day was a crushing defeat for Morgan L. Martin. He said the New Yorkers "deranged all our plans, and...we were obliged to submit, in February, 1866, to a foreclosure of the bonds and sale of the whole concern to the New Yorkers. The big imported fish swallowed the little natives."³⁹

It may have been the end of the world to Martin but there still was hope for the project, according to the Appleton Crescent which commented after the sale:

The bonds and stocks of the company, in which the Eastern capitalists invested in cash over a million dollars, is by this sale entirely sunk, beyond recovery; and yet they so pride themselves on the ultimate success of this great national work that it does not deter many of them from the determination to devote time and money to the full realization of the enterprise.⁴⁰

The next week the Crescent printed a letter from Alexander Spaulding, one of the trustees of the sold company, who said "two millions of dollars is ample" to build the ship canal from Lake Michigan to the Mississippi. He added:

Iowa and Minnesota, without the completion of this improvement, will be obliged to abandon the production of bread-stuffs, because the land carriage takes away all the profit. The people complain bitterly of railway extortion; but they forget that railways cannot compete with water communication in carrying freights....Iowa and Minnesota can furnish 27,000 bushels of bread-stuffs per year for an eastern or foreign market....The saving in freight in a single year, in the transportation of the surplus bread-stuffs of Iowa and Minnesota to Buffalo by the ship canal instead of railroads across the state would be $3,240,000.⁴¹

The buyers of the Fox and Wisconsin Improvement Company
were Samuel Marsh, Erastus Corning, Horatio Seymour, John Magee, Edward C. Delavan, William B. Ogden, John Catlin, Daniel Wells Jr., and Andrew G. Bininger. These nine became directors of the new company—the Green Bay and Mississippi Canal Company—formed on August 15, 1866, with a capital stock of one million dollars to be divided into 10,000 shares of $100 each. Marsh, a former president of the New York and Erie Railroad, became president of the new company. Attorney Stevens became vice president and one of the most active directors of it.

Some doubt has been expressed about the sincerity of the new company "to devote time and money," as the Crescent claimed, to complete the waterway. But it is difficult to doubt the deep interest of Horatio Seymour in building an Erie Canal in Wisconsin. His father, Henry, had made a fortune on the building of the Erie Canal. Horatio Seymour pushed canal legislation through the New York Legislature. In 1856 he lectured on the great future of the transcontinental waterway and, marking the short portage to be made from the Fox River to the Wisconsin, said: "But a single mile separates the head waters of the Missouri from those of the Columbia River. From the mouth of that stream on the Pacific to the bay of New York, with the exception of this one mile, there is an unbroken silver chain of water." He saw the trans-Wisconsin waterway as an extension of the canal system he had promoted in his own state and as a
cross-country highway which would bring immigrants into the Old Northwest. He had visited the valley several times and had been president of the Fox and Wisconsin Improvement Company; later, his younger brother, John, succeeded him as head of the organization. \(^{46}\) No doubt Horatio Seymour and his cohorts influenced the *Albany Atlas* in predicting great things for the improvement company. Calling attention to the movement of many Easterners to Wisconsin and the several New Yorkers directing the company, that journal said in April, 1857: "Doubtless the enterprise is one which is to afford a munificent reward to the sagacious gentlemen who were able to foresee its importance, and risk their capital upon its successful consummation." It also cited the "exhaustless" water power on the Fox which it said would "become more and more valuable as the state fills with population." \(^{47}\)

Water power, "exhaustless" or otherwise, had nothing to do with the Easterners' backing the waterway. When Isaac Seymour and William Averill considered backing Morgan L. Martin's project in 1853 they sent C. D. Westbrook, an engineer, to the valley to determine the safety of their money. Westbrook reported favorably on the improvement program but said the water powers were of little value. \(^{48}\)

Now Horatio Seymour was a director of the new company. A majority of his fellow members of the board were active railroad promoters. They considered the waterway a good supplement
to the over-taxed capacities of the railroads and a check on exorbitant railway tariffs. It would be a more efficient check on railroads if it were regulated by the federal government, they believed, and hence there began agitation for federal control of the water highway across Wisconsin.49

Proponents of government purchase of the route referred to the survey made in late 1866 by Major Charles R. Suter of the United States Engineers who filed his report to Major General Gouverneur K. Warren. Suter toured the works with officials of the Green Bay and Mississippi Canal Company including its chief engineer, N. M. Edwards, and its president, Horatio Seymour. Suter found the lower Fox a hive of industry. "The fine water power afforded by this stream has been utilized to a considerable extent," he wrote, "and flourishing manufacturing towns have sprung up around the points where it is most available. They contain saw and flouring mills mostly." Because the banks of the river were forty- or fifty-foot-high bluffs, Suter reported, the river could "be raised to any extent desirable without overflowing any of the adjacent country. The only property which would suffer would be the mills along the banks, but any losses in this respect would be compensated by the increase of water powers." Nine dams and eighteen locks were in operation to give slack water navigation to the stream, he said, and the cost for improvement to allow passage of vessels of four-foot
draught would be $118,400 on the lower Fox and for six-foot draught the cost would be $493,370.50.

To plead for government intervention the governors of Wisconsin, Minnesota, Iowa, and Missouri called a convention in Prairie du Chien and on November 10, 1868, they begged their senators and representatives in Washington "to ask for and urge the government to undertake and perfect" the improvement of the waterway which they called a work "of national importance." They wanted especially to clear the Wisconsin River, filled with sand bars, so that boats could pass at low stages of water. The resolution said the Green Bay and Mississippi Canal Company would "make the navigation of the Fox River as good as the government will make the Wisconsin." But they added that the work was not one for the state of Wisconsin alone. "If completed it would benefit other states, equally, or more than the state of Wisconsin," they said. The resolution was signed by the convention secretary, Breese J. Stevens of the Green Bay and Mississippi Canal Company.51

Also pleading for the continued improvement was the Wisconsin governor, Lucius Fairchild, who sent this message to the state legislature in 1870:

There is no point in the United States where the expenditure of $5,000,000 will contribute so much to the general good. The effect will be to reduce the cost of transportation not only upon the freights carried by water, but also upon those carried by
every other means. It is estimated that, with the rates fixed at one cent per ton per mile, about the tariff on the Erie Canal, the yearly saving, which will enure equally to the producer and consumer, will amount to at least twice the total cost of the improvement. The shipments east are estimated to be fully 2,500,000 tons annually, and those west at 1,250,000 tons. Should one-fifth of this freight go by way of the Wisconsin River, tolls at the above mentioned rates, would, after allowing for repairs and to the carrier a fair profit, amount to nearly or quite a million of dollars annually. Thus the general government could be reimbursed within six years after the completion of the improvement, should reimbursement be demanded. Then the rate of tolls proper could be reduced nearly 100 per cent.52

In Washington the cry was echoed and reechoed by Philetus Sawyer, the congressman from Oshkosh whose home district was on Lake Winnebago at the spot where the upper Fox River glides into the lake. Sawyer's House Commerce Committee maneuvered for money to improve the waterway. Although he managed to get a $100,000 appropriation in 1870, there was some opposition in Congress to attempts to improve the Wisconsin River. Representative John Franklin Farnsworth of Illinois charged that the House was appropriating the money "to be thrown into the sands of the Wisconsin River....It would require ten times $100,000 to clear out that river. It fills up again as fast as it is cleared."53

The next day, on the other side of the Capitol, Senator Timothy Howe of Green Bay said that the government could do nothing to improve the sandy Wisconsin River while a private corporation owned "that very connection which belongs to the
complete line." The Green Bay and Mississippi Canal Company had title to toll the commerce on the Fox, Howe said, and the government must decide whether to buy this franchise from the company.54 And Senator James Harlan of Iowa pleaded for the bill for a government survey to determine how much it would pay for the improvement because, he said, the people west of the Mississippi wanted a connection via water to the East "for the purpose of cheapening transportation."55 The Senate bill requesting the survey was passed the same day.56 Sawyer reported the bill to the House where it passed,57 and on July 7, 1870, the President signed it.58

The bill authorized the Secretary of War to ascertain how much was to be paid the company for transfer of all its property and rights on the river, "including its locks, dams, canals and franchises, or so much of the same as shall, in the judgment of said secretary be needed."59 An arbitration commission studied the problem and recommended payment of $325,000. It valued the company properties at $1,048,070 but deducted $723,070 which it had realized from sales of land. However, Secretary of War William W. Belknap decided on March 8, 1872, to take only the works of improvement and left to the company the property rights, valued at $40,000, and the water powers created on the river, valued at $140,000. The award was thereby reduced to $145,000.60
Belknap's decision to leave the water powers and property rights to private enterprise perhaps was influenced by the Army Engineers whose report he attached to his acceptance letter sent to the Congress. Major D. C. Houston had examined the award and on February 26, 1872, wrote to Brigadier General A. A. Humphreys, chief of the Army Engineers, that since the "subject of navigation is primary...it does not seem desirable for the government to make the purchase [of the water powers], for it would become involved in negotiations with private parties desiring to rent water power, the collection of rent, and perhaps litigation. These matters should be left with the company, if possible." 61

The water power was distributed thus: at Appleton, 5,000 horse power; Kimberly, 1,000; Little Chute, 2,500; Kaukauna, 2,500; Rapid Croche, 1,500; Little Kaukauna, 750; at other points, 750. The actual amount leased at the time by the company did not exceed 2,000 horse power, Houston said. These powers—which excluded those at Neenah and Menasha where they were already privately owned—and the lots rented for about $2,200 a year. 62

Some of the newspapers in the valley were pleased at the government action. Said the Green Bay Gazette on April 16: "The government will retake possession of the works and proceed to put them in some practical account. About the time the government has completed the works and made them of value to the people some scalawag corporation will be on hand to get
hold of them." The Oshkosh Northwestern said on April 25: "The bill...virtually takes up that work as a government enterprise. And thus, after years of labor Uncle Sam has finally been made to take hold of the work."  

Congress had specified that no money could be spent on the river until the Green Bay and Mississippi Canal Company agreed to the arbitrators' terms. The company hesitated during the summer and hoped a reopening of the case would enlarge the award but in the autumn it decided to abide by the decision. The Washington Chronicle reported that the government paid the company and the latter deeded the improvement to the United States on September 25, 1872. So far as the Chronicle was concerned, the strokes of the pens brought the ship canal into being.

The East will respond to the West in giving all honor and glory to the Hon. Philetus Sawyer and his associates for their untiring exertions in securing this great boon of a ship canal across the state of Wisconsin...giving to the commerce of the West a new and cheaper water channel to the East and the Atlantic seaboard.

The benefits to be secured by this ship canal are immense, compared with the small cost,...to complete it for large vessels, and we trust that Congress will liberally and promptly provide the means for its early completion in the interests of cheap freights and cheap food for the people.

But the Green Bay Gazette was doubtful of the future:

There is a great possibility of a great commerce flowing by our doors but it is some ways off yet at the best. Steam and the railways have rather superseded the canal business for light freight but the railways if employed on nothing else could not move
a quarter or an eighth of the grain crop of the West. And the same proportion will always exist. Farms will be opened, and new crops produced faster than trans­portation will be ready to move them.67

True, railroads had been in the valley for more than a decade, ever since the Chicago and North Western completed its line from Oshkosh to Green Bay in 1862. Rails connected the little valley towns hugging the river banks with Milwaukee and Chicago, the hub of east-west traffic, and rails skirted the long, slow water routes. Even so, the route of the missionaries and explorers might be the route of modern commerce. The fur trade was gone, and the Indian and the explorer, too, but along their water highway stood fields of wheat and the new settlers along the lower Fox turned to flour milling.
CHAPTER III

FROM FLOUR TO PAPER

Before the Indians made their treaty with the United States in 1836 the government was aware of the agricultural and commercial possibilities of the lands along the lower Fox River. Samuel Stambaugh, the Indian agent at Green Bay, described the area to the Secretary of War in 1831: "As an agricultural and commercial place it may be with safety said, that it will occupy the most central and important part of the new territory, and must naturally be the first to attract the attention of emigrants intending to engage in those pursuits." Stambaugh remarked about the "very valuable" water power and the "finest mill sites" but said that in all the Menominee country there was only one grist mill, so badly constructed it could do little business. That lone mill was at Kaukauna, eighteen miles up river from the settlement at Green Bay.

In consequence of being thus destitute of the means of having their grain manufactured into flour, the great bulk of the wheat raised by the inhabitants, is used for feeding cattle, and the flour required for the sustenance of the population is principally brought from the mills in Ohio, bordering on Lake Erie. The quantity of this article consumed here annually, does not fall short of 1,500 barrels, exclusive of the supply
imported for the use of the garrison, and for the Indian department. 2

The mill sites, Stambaugh concluded, would present "splendid attractions to men of capital and enterprise whenever the country is offered for sale." 3

Five years after Stambaugh's evaluation, the Treaty of Cedars sent the Indian away and land around Lake Winnebago, the lower Fox, and Green Bay was offered for sale. At that time Brown County, which included the entire area, had a population of 2,706. 4 To ease the path of the newcomers to the valley the state incorporated the Winnebago Lake and Fox River Road Company to build a plank road from the lake to the foot of the rapids at Kaukauna. 5 The majority of the new settlers came from New England and New York where farming already had reached big business proportions. When wheat growing yielded to stock and dairy farming in the Northeast, the little farmer who was short of land and also money for buildings, fences, and stock sold his small holdings and headed west via the Erie Canal and Great Lakes to Wisconsin where he could again establish a little wheat farm. 6

"And still they come," said the Appleton Crescent in 1854. "The rush of New Englanders and New Yorkers to our village appears to widen and deepen." 7 Late the next year the paper said: "The population of Appleton is principally made up of New Yorkers and New Englanders with some dozen families of German, and as many of Irish birth. We have only two or three French
families and not a Spaniard or Negro. 

The pioneers, aiming for independence on their frontier, sowed their wheat and when the first harvest came they set up grist mills which needed little capital or labor but did need a power site. They found abundant power near the rapids and soon little clusters of villages grew along the river. The new settlers did not yearn for their homes in the East; they established new Lowells and Rochesters in the valley. The local newspaper assured them of success:

The completion of the Grand Chute dam...will afford water power to drive all of the mills and factories of a dozen Lowells and Rochesters. Add to this that our river never rises or falls but two or three feet during the year and one cannot dispute that we have the best and noblest river in the world for all kinds of mills and machinery.

On the heels of the farmers came the Eastern capitalists to invest in the improvement of that "noblest river" which they hoped would connect the East with the New West. The river, when made navigable, would assure the farmers of transportation for any surplus production. The surplus was meager in the beginning; the valley needed most of it and if any was left it went to the men in the pineries and lumber camps and fisheries immediately north of the valley. The older and more populated southern Wisconsin grew more wheat and milled more flour than did the infant northeastern section by 1850. Wisconsin produced 4,286,131 bushels of wheat in the year ending June 1, 1850. Of
that total, Winnebago County grew 57,072 bushels and Brown County only 6,212. The population of Winnebago then was 10,167 and of Brown 6,215, while Wisconsin's total was 305,391.12

The village of Neenah in Winnebago County, however, eventually ground its way to rank second to Milwaukee in flour production. Its first mill was built in 1850 by two brothers, John R. Kimberly of Troy, New York, and Harvey L. Kimberly of New Haven, Connecticut, who had come to Neenah in 1848. Edward Smith opened the second mill, and in 1854 the village boasted three flour mills.13 The unusually good 1855 wheat crop, which brought $1.40 to $1.45 a bushel, caused more manufacturing in the village. The Fox River Flour Mill opened in 1856 and two more in 1857. The latter two were soon combined into the Falcon Mills operated by J. L. Clement and John Stevens.15 Across the channel of the Fox, the village of Menasha had four mills going by 1859.16 That spring, wheat sold in the valley for $1.25 a bushel and flour for $6 to $7 a barrel.17

Now the valley did have a surplus to send to market. The plank road had been completed in 1852 and 100 teams of horses made daily round trips to haul the wheat and flour the fifteen miles from Neenah and Menasha to Kaukauna from where it was taken to Green Bay by steamer. Products also could be shipped down Lake Winnebago to Oshkosh or Fond du Lac and thence by rail to Milwaukee.18
The federal census of 1860 listed 374 flour and grist mills in the state, most of them in the southern, more populated areas. Rock and Green counties on the Illinois line had a total of forty-two mills. On the Iowa border, Grant County had twenty. Immediately west and north of Milwaukee, which had nineteen mills, were Waukesha County with eighteen, Dodge with fifteen, and Fond du Lac with twenty-two. There were thirteen mills in Winnebago County, three in Outagamie and two in Brown.

Some of the valley mills were small ones to which the farmer took his wheat to be ground and then returned home with flour. Neenah and Menasha, however, were in the merchant milling business. Each of Neenah's eight mills produced between 20,000 and 40,000 barrels of flour in 1861, and each of Menasha's three made 25,000 barrels for an annual production of 290,000 barrels. Their products went to wholesalers in Wisconsin as well as in the East.

A boon to their industry was the coming of the railroad. The Chicago and North Western reached Neenah from Oshkosh in January, 1861, and in March it was extended to Appleton. "The snort of the iron horse has been heard in our midst," said an Appleton newspaper. "We are connected by iron bands with East, West and South." The next year the railroad went all the way to Green Bay, connecting the entire valley with Milwaukee and Chicago.
Progress of the valley mills was slight during the Civil War. Railroad building slowed and the price of wheat dropped. Farmers withheld their wheat when the price reached seventy to seventy-two cents a bushel in the spring of 1862. In June the best grades brought only seventy cents. By July the Neenah-Menasha Weekly Manufacturer begged farmers to sell, saying Neenah millers were paying from eighty to eighty-five cents a bushel.

During this year of the war when farmers hesitated to plant or sell wheat which paid so poorly, another flour mill opened in Neenah. Azel W. Patten, who had come to the valley from Massachusetts in 1856 and manufactured furniture for a few years, began the Keystone Mill. By 1863 Neenah deserved to be called the valley's "Flour City;" it alone had eleven mills.

When the war ended, Neenah increased her milling activity so much it seemed she might overtake Milwaukee as the flour center of the state. John R. Kimberly, who had opened the first Neenah mill in 1850, and his son, John A. Kimberly, and Havilah Babcock, erected the much larger Reliance Flour Mill in 1869. Another went up about the same time and Patten sold his Keystone plant and converted a sash, door and blind factory into a flour mill. Neenah and Menasha, in the spring of 1870, boasted fifteen flour mills and a capacity of 3,875 barrels of flour a day, requiring 16,500 bushels of wheat per day or 5,000,000 bushels a year. The county itself had twenty-one flour and grist mills, according
to the federal census, and employed 125 men. The invested
capital was $315,000 and production was valued at $1,567,655. 30
Four workers in one flouring mill listed for Outagamie County
turned out products valued at $6,400 but $8,000 capital had been
invested. 31 Brown County had two mills and eleven employees;
capital invested was $37,000 and the value of their product was
$101,692. 32

Neenah failed to displace Milwaukee as the flour center
of the state. The big city on the shore of Lake Michigan was
producing more than a million barrels of flour annually and she
was the chief spring wheat market. 33 Milwaukee had railroads,
water power, storage facilities, and the lake for an extra method
of transportation. Railroads gave her access to the wheat fields
of the interior of the state, as well as to those of Iowa and
Minnesota. High prices after the war had stimulated wheat growing
in the West as well as Wisconsin but railroad construction had
not kept pace. Little more than twenty-five miles of railway
were built per year in Wisconsin during 1859-1869 because of the
war and high cost of labor. 34 The railroad consolidations which
followed did little to ease the situation in the northeastern
valley of Wisconsin. Neenah could not reach the vast wheat fields
of Minnesota by direct rail. In time, Milwaukee, too, became too
far removed from the wheat fields and had to yield her position
to Minneapolis. 35
Wisconsin's wheat had been of high quality. The red clay soil of the lower Fox River Valley was underlaid with limestone and was excellent for wheat growing. A sample of spring wheat, grown in the town of Black Wolf, four miles from Oshkosh, won a prize at the World's Fair in Paris. Winter wheat had been an uncertain crop in Wisconsin's moderately cold climate and farmers turned to spring wheat. The great pressure used to grind the hard kernel of spring wheat caused the flour to discolor; winter wheat was softer, could be ground under less pressure from the millstones, and therefore was whiter. Millers experimented with machinery to grind spring wheat to a whiteness equal to winter wheat. The result was the roller process which did not generate as much heat as millstones and needed less power. The rollers, however, were smooth and could not be used in the first stages of grinding. The experiments of John Stevens of Neenah led to the proper degree of grooving for the rollers and revolutionized the entire milling process.

Stevens had come to America from Wales in 1850 and lived in Ohio until 1854. He arrived in Neenah that year and worked in several of the local mills, finally becoming boss miller for Patten's company. By 1864 he formed a partnership with J. L. Clement and operated the Falcon Mills. There he began experimenting in 1870 and within four years had installed the new grooved rolls in his mill. With the old millstone he
produced 200 barrels of flour a day. With the new process, using the same amount of water power, he made 500 barrels a day. He produced 90 per cent good flour, whereas, before he had managed only 25 per cent good quality. Good or high grade flour meant $2 more a barrel than the lower grades. Stevens' patent was granted in 1880, the same year in which he visited the big Washburn Mills in Minneapolis and there sold shop rights to his rollers. Stevens saw the vast fields of wheat in the West and knew they would stretch far into Canada. He came back to Neenah and the next year sold his interest in the Falcon Mills.

Stevens' invention contributed to making Minneapolis the flour center of the United States and thereby had some effect on reducing the industry in his own valley. Minneapolis' big mills, in the heart of the new wheat growing section, were linked by direct rail to Milwaukee and Chicago and by ship to St. Louis and New Orleans. Lacking such advantages, Neenah's flour milling business declined.
<table>
<thead>
<tr>
<th>County</th>
<th>Mills</th>
<th>Hands</th>
<th>Capital</th>
<th>Value</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1860</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>2</td>
<td>9</td>
<td>$13,000</td>
<td>$32,500</td>
<td>11,795</td>
</tr>
<tr>
<td></td>
<td>1870</td>
<td>11</td>
<td>37,000</td>
<td>101,692</td>
<td>25,168</td>
</tr>
<tr>
<td></td>
<td>1880</td>
<td>42</td>
<td>152,050</td>
<td>462,801</td>
<td>34,078</td>
</tr>
<tr>
<td>Outagamie</td>
<td>1860</td>
<td>3</td>
<td>33,000</td>
<td>324,793</td>
<td>9,587</td>
</tr>
<tr>
<td></td>
<td>1870</td>
<td>1</td>
<td>8,000</td>
<td>6,400</td>
<td>18,430</td>
</tr>
<tr>
<td></td>
<td>1880</td>
<td>64</td>
<td>233,000</td>
<td>857,890</td>
<td>28,716</td>
</tr>
<tr>
<td>Winnebago</td>
<td>1860</td>
<td>13</td>
<td>150,000</td>
<td>455,343</td>
<td>23,770</td>
</tr>
<tr>
<td></td>
<td>1870</td>
<td>21</td>
<td>315,000</td>
<td>1,567,655</td>
<td>37,279</td>
</tr>
<tr>
<td></td>
<td>1880</td>
<td>17</td>
<td>498,500</td>
<td>2,475,427</td>
<td>42,740</td>
</tr>
<tr>
<td>State of</td>
<td>1860</td>
<td>374</td>
<td>941</td>
<td>3,526,869</td>
<td>11,519,834</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1870</td>
<td>581</td>
<td>2,031</td>
<td>6,574,650</td>
<td>20,419,877</td>
</tr>
<tr>
<td></td>
<td>1880</td>
<td>705</td>
<td>2,421</td>
<td>9,199,735</td>
<td>27,639,430</td>
</tr>
<tr>
<td></td>
<td>1890</td>
<td>497</td>
<td>2,300</td>
<td>9,804,761</td>
<td>24,252,297</td>
</tr>
</tbody>
</table>
During the twenty years since 1860 more and more capital had been invested in flour milling in the state in general and in the lower Fox River Valley in particular. The value of the industry's products also increased. But the yield of wheat per square mile of improved land in the valley showed a downward trend. Winnebago yielded 3,330 bushels per square mile in 1859; 3,123 in 1869, and 2,442 in 1879. For Outagamie the figures were: 1,767 bushels, 3,005, and 2,474. For Brown they read: 1,317 bushels, 2,027, and 1,805. The yield was lower for all three counties in 1879 than it had been ten years earlier. It was the first real setback for wheat and flour milling. During the next decade, however, unusually low prices for wheat caused both industries to move out of the valley and out of the state. Prices on the Milwaukee market in 1871 ranged from a high of $1.31 in April to a low of 84 cents in October. In 1877, the range was $1.90 in April to $1.08\frac{1}{4}$ in October. The highest price at Milwaukee in the 1880s was $1.40\frac{3}{4}$ in January, 1882, and the all-time low was 71\frac{1}{2} cents in October, 1884.

Wheat moved west to the big, fresh fields and flour milling with its new, high capacity roller process went with it. So did the railroads to haul back the product to the Middle West and the East. Small areas of production could not compete with the big centers.

Lands for wheat growing and wheat for flour milling had
brought Easterners and Europeans to the lower Fox River Valley. Not all of them followed wheat and flour westward; many stayed in the communities they had built along the river. The growing villages had attracted not only farmers and millers, but also teachers, preachers, and printers, just as colonial frontier towns had done more than a hundred years earlier.

When William Bradford, the first printer in Philadelphia, looked for a papermaker, he found William Rittenhouse, who had emigrated from Holland to the Penn colony. Bradford induced Samuel Carpenter and Robert Turner, wealthy Philadelphia land owners, and Thomas Troese, a rich ironmonger, to finance the paper mill which Rittenhouse set up on the banks of a small stream called Paper-Mill Run in 1690. The paper was made from linen rags, the flax being grown in that section of Pennsylvania. The mill was little more than a shed-like building beside the stream which furnished enough power to turn the water wheel so that rags could be beaten to a pulp. Rittenhouse removed the pulp from the tub, or vat, formed it into a sheet on a mould, drained off as much water as possible, then put the damp sheets on a felt, pressed them, and dried them by exposure to the air. In 1729 Thomas Willcox started a mill near Philadelphia and it was this establishment which later became famous as the supplier to Benjamin Franklin and the one which furnished paper on which the Continental money was printed.
Franklin, who wanted more paper available in the colonies, worked to spread the industry and was quoted as saying he, himself, was instrumental in establishing eighteen mills. 47

Skilled workmen were scarce in the eighteenth century; and rags were more scarce. An advertisement in the Boston News Letter in 1769 announced: "The bell cart will go through the city before the end of the month, to collect rags for the paper mill at Milton, when all the people that will encourage the paper manufactory may dispose of them." During the Revolution, the Massachusetts Legislature ordered its committees of public safety to appoint one person in each town to receive rags for the paper mills. Paper was needed for diplomatic and military purposes.

It was said that the battlefield at Brandywine was littered with cartridges made from a large edition of Fox's Book of Martyrs.

The same fate befell 2,500 copies of an old sermon found in a house once occupied by Franklin in Philadelphia. 48

Papemakers were almost as difficult to find as rags and paper. Some had gone away with the British regiments; some were patriots who would rather join the army than make paper. The Continental Congress ordered that papemakers in Pennsylvania be prevented from joining soldiers en route to New Jersey; New York exempted papemakers from military service. Those who did enlist were discharged. When a prisoner in Massachusetts turned out to be a papemaker, he was released immediately. 49
The utensils of paper making also were hard to secure. Moulds wore out and a mechanic who knew how to make them was a rare individual. When Nathan Sellers quit making moulds in Pennsylvania and joined the army, papermakers petitioned Congress that he "be ordered to return home and make and prepare suitable moulds, washers and utensils for carrying on the paper manufactory." Ten days later Sellers was at home making moulds. 50

The new century brought machinery which revolutionized the industry and eased the paper shortage. In France in 1799, Nicolas Louis Robert, manager of a paper mill in Essones, patented his machine to make paper in a continuous sheet. Henry and Sealy Fourdrinier, London stationers, financed his invention in England and in 1806 produced an improved version of Robert's machine which forever afterward bore the Fourdrinier name. 51

Before this machine was brought to America, Thomas Gilpin in Wilmington, Delaware, in 1816 invented a revolving cylinder for making paper in a continuous sheet. Primitive though his machine was, it made a sheet 1,000 feet long and twenty-seven inches wide. 52 Whether paper was made by hand as Rittenhouse and Willcox did, or by the Fourdrinier or cylinder machine, the process was basically the same. The fibrous material—linen or cotton in those early days—was cut and bruised in water until it separated into fine, short filaments and became a pulp. The liquid mass was taken up in a thin, even layer upon a mould or
wire-cloth which allowed the water to drain off, but retained the fibrous matter. The process of reducing the original material to pulp and the subsequent drying and processing interwove the filaments and fitted them together so that they could not be separated without tearing, and thus formed paper.\textsuperscript{53}

The first Fourdrinier imported to America was set up in Saugerties, New York, in 1827. Another arrived from England and was put into a mill in Windham, Connecticut, and it was there that the first American-made Fourdrinier was built in 1829 by Smith and Winchester Manufacturing Company.\textsuperscript{54}

While Fourdriniers were being made in America and Gilpin's cylinder was being improved by others, straw was tested as a substitute for rags. William Magaw of Meadville, Pennsylvania, secured a patent on a straw process in 1828 but his paper had a yellowish color. New developments in processing of straw in the 1850s brought it wider acceptance as newsprint, especially when it was mixed with rags.\textsuperscript{55} The use of straw as a raw material, plus the new machinery to replace the slow hand process, lowered the cost of making paper. A mill which had seven vats, or tubs, of pulp operated at $13,000 a year under the old method. Using a Fourdrinier, such a plant could operate for about $3,600 a year.\textsuperscript{56} Now there could be a bigger profit in paper making and the industry spread, along with the frontier, across the mountains and into the Middle West.
Lack of paper in Wisconsin in 1847 forced the Milwaukee Sentinel and Gazette to reduce the size of its editions and the Janesville Gazette to suspend publication. "Unless we get a boat from the lower Lakes within a week, nearly the entire press of the Territory will be stopped by the same cause," said the Janesville paper. 57 Two weeks later the Sentinel and Gazette said the paper shortage was "worthy the attention of some of the paper manufacturers at the East. A good paper mill in this Territory, would prove, we doubt not, a very profitable investment." 58 The paper's wish was fulfilled early in 1848 when the Ludington and Garland Company opened a mill in Milwaukee. The Sentinel and Gazette used the mill's product in its March 7 and 8 editions and said it was "the first paper made in Wisconsin, but is hardly a fair specimen of what the manufacturers can do since their machinery is not yet in perfect trim." 59 Three weeks later it said the color and quality of the newsprint "compare very favorably with paper made at the East, and the cost is about the same." 60

Rags were as scarce in the territory as they had been in the colonies. The new mill paid two and one-half cents a pound for rags but "the great difficulty is to get a sufficient supply of this indispensable material," said its chief customer. Ludington and Garland spent $9,500 for the building and machinery of that first mill and employed ten workers to make fifteen reams
of paper a day. The supply was increased as other mills were started around Milwaukee and at Waterford, Beloit, and Whitewater in the following decade which saw the business also move north into the lower Fox River Valley.

Charles P. Richmond, a former Lee, Massachusetts, papermaker who worked in that first Milwaukee mill, moved to Appleton in 1853 where, along with Edwin Atkinson, he announced a partnership "for the purpose of manufacturing all kinds of paper." Their equipment consisted of two old rag engines and a steam boiler which they bought from a St. Charles, Illinois, firm. But unlike the Milwaukee plant, the first valley mill did not make newsprint in the beginning; it made a heavy wrapping paper. In October the owners begged for material: "Straw! Straw! Bring in your straw!" They were ready to receive 100 tons a week of flax, rye or oat straw and would pay a good price, their advertisement said. Although the mill operated day and night, five months later it was behind in filling orders.

Richmond's brother, Norman, who had remained at the Milwaukee mill, came up to help but more workers were needed. The Richmonds sent for craftsmen from Massachusetts and Connecticut. At the request of the Appleton Crescent, which bought its newsprint from Beloit in the far southern part of the state, the Richmonds tried and finally in 1857 produced printing paper although "the surface was somewhat rough." Both wrapping and
newsprint were made until fire destroyed the plant in 1859. The capital invested in the mill was $20,000 and its annual product valued at $24,000. It paid twelve men and four women a total of $3,780 in wages. Wisconsin at the time had fifty-six men and thirty-seven women working in five paper mills capitalized at $133,000. Their production value was $193,114.

While the Appleton mill was being rebuilt, Eastern paper mills continued to search for a substitute for rags and straw. A variety of materials, ranging from asparagus to wool, from banana leaves to corn husks, from frog spittle to manures, were tested. In Pennsylvania and Massachusetts mills had tried, without financial success, to use the bark of basswood and mulberry trees. In 1854, Hugh Burgess, who in England had made a pulp from wood by boiling the wood in caustic alkali, brought his method to the United States and the next year the first wood pulp was made into paper in the Warren Mill in Maylandville, Pennsylvania. A larger pulp and paper mill was set up later at Royer's Ford on the Schuylkill. A few manufacturers used the pulp for newsprint, but for many years there was a prejudice against wood as a good fiber. One of the users of such newsprint was the Boston Journal which used paper made from wood at Royer's Ford. The latter mill used five to six cords of wood to make two and one-half tons of paper daily. Users of Burgess' soda pulp method formed the American Wood Paper Company
and in 1866 completed their plant at Manayunk, Pennsylvania, where they made twelve to fifteen tons of pulp a day. 75

The war caused cotton prices in the North to skyrocket and so did paper prices. Writing paper in 1862 went up from fourteen to seventeen cents a pound for ledger paper, from fifteen to twenty-five cents for letter and note paper; news paper went up from eight cents a pound to seventeen cents. In 1864 news paper was worth twenty-eight cents, fine book forty-five cents, writing paper sixty cents. 76

With such prices the value of the Richmonds' plant at Appleton tripled. The burned mill reopened in 1861 and by 1864 it was doing a $75,000 annual business. 77 It boasted that printers would find the product "first rate, as we have improved the machinery...and now do good work." 78 No matter how good the paper was, one mill in the entire valley could not fill the demand. When word spread that there might be another paper mill up the river, the Appleton Crescent was elated. "No better investment can be made in northern Wisconsin," it said, "and there is ample room for a dozen such establishments." 79

The valley's second paper mill was erected in 1866 on the site of an old saw mill in Neenah, the city of flour mills, by a stock company capitalized at $40,000. The stockholders of the new Neenah Paper Mill Company were Edward Smith, who had built the Winnebago Flour Mill in 1853, and his brother, Hiram;
Nathan Cobb, John Jamieson, Moses Hooper, and Dr. Nathaniel S. Robinson. Robinson, who had come from Portland, Maine, to Neenah in 1848 to practice medicine, rented the mill from his co-stockholders and operated it the first year, making paper from rags. It opened in the fall and by the start of the next year it declared a quarterly dividend of 8 per cent. In 1868 the mill was purchased by Hiram Smith and D. C. Van Ostrand. Into this new enterprise Van Ostrand invested the money he had made while operating a line of teams on the plank road for the transfer of freight between Neenah and Kaukauna. Since neither of the new owners knew how to make paper, they hired Myron Haynes, a longtime papermaker in Whitewater. The newsprint sold for eleven and one-half cents a pound. The mill had a daily average capacity of 3,500 pounds of print paper and employed forty persons. By 1872 its working force had increased to forty-five, exclusive of wood choppers and rag buyers. Rag men were paid by the mill owners and received some enormous prices for their collections. The Neenah Gazette ran this item in 1871:

--Save the pieces. Messrs. Smith and Van Ostrand paid one man $8,000 for his rag bag, the other day. Another not quite so ragged, got $1,000. Our wardrobe is offered for sale.

The mill used 1,200 tons of rags a year, or four tons each day. Twenty women sorted them, choosing only the better grades; poorer grades were sold to straw process mills in the state.
Each year the firm used 100 tons of chemicals to clean and bleach rags and 1,700 cords of wood to create steam for boiling and drying.

More capital and more materials and more workers were needed in a paper mill than in a flour mill. The Appleton paper had hoped for "a dozen such establishments" but the Neenah publisher was prophetic when he said:

If recent rumors prove trustworthy, as we hope they may, paper making will soon take on new proportions and redoubled importance,—furnishing home employment to nearly as much labor as all other branches of manufacture combined, and giving Neenah a pre-eminence in this line, as in milling, over every other town in the West.

There were rumors of another mill opening soon. And there were reports from the East of further advances in the use of wood pulp. There was plenty of wood north of the valley. When knowledge of how to make paper from ground wood arrived, the valley was ready. It had ambitious men with capital to risk; it had power sites on the river; it had experienced papermakers; it had a growing population; and it had easy access to stands of poplar, spruce and hemlock which had been scorned by the lumbermen in the pineries.
CHAPTER IV
THE EARLY YEARS

The new ground wood process of making pulp was not really very new. Wasps had been using it for ages to make their nests. But Friedrich Gottlob Keller was the first person to try to copy from the wasp. He came upon an old nest in the woods in Germany, studied it, and found that it was composed of small fibers of wood knitted together like coarse wrapping paper. Keller tried to reproduce such fiber by rubbing wood on a stone but he was no machinist and, therefore, contacted Henry Voelter, a machinist and also a papermaker. Voelter got a patent in 1858 for a rotary grinder to cut the fiber off the side of the wood.¹ The Keller-Voelter system was exhibited in Europe in 1862 and 1867 but few Americans paid attention to the invention "which was going to revolutionize the paper making of the whole world." One who did notice was Albrecht Pagenstecker in New England. He asked his brother, Rudolph, then in business in Germany, to investigate. He also got his cousin, Alberto Pagenstecker, who had made money on building railroads in South America, to invest in the new process.²
In December, 1866, two Voelter machines arrived and were set up at Curtisville, near Stockbridge, Massachusetts. The first ground wood pulp was made on March 5, 1867, and three days later it was tested in the nearby Smith Paper Company. Wellington Smith was so pleased with the product that his mill agreed to take all the pulp produced at the plant for one year. The Curtisville mill made only one-half ton of pulp per day and sold it for eight cents a pound. The Pagensteckers tried to interest other manufacturers in the new process but were told that since profits in newsprint were ample under the old method there was no need to introduce "inferior stock." Newspaper publishers feared that paper made from wood would contain wood particles and would ruin their type. Some even specified in their contracts that no more than a certain percentage of wood pulp should be used in making the paper they bought. Undaunted, the Pagensteckers bought the Voelter patent and in 1869 built their own pulp and paper mill at Luzerne, New York. A few others started small wood pulp mills in New England.

The increasing demand for paper hastened the acceptance of the ground wood pulp process. The Civil War, which had created a desire for news, was followed by an era of invention. Stereotyping was in use at newspapers in New York City; William Bullock perfected a press which would print from a continuous roll of paper; the typewriter was patented by Christopher Latham
Sholes; advertising came into vogue and increased magazine circulation. Railroads crossed the continent and could speed delivery of newspapers, magazines and books.

More mills began to fill the demands of the mass circulation of printed matter and the price of wood pulp fell from eight cents to four and five cents. It remained at that price for a long time but gradually reached one cent a pound and less. The price of newsprint in 1869 was fourteen cents but as the supply and use increased it, too, fell during the next two decades until it reached two cents and less per pound.

The introduction of ground wood into paper making had other results. Wellington Smith said the great changes "have resulted in driving out of the business many small mills that formerly did a lucrative business and gave employment to a large number of men and women. This has worked great loss and misfortune in many localities and has built up others, and given to the public better service and quality of goods, at much lower prices."

One of the areas which was built up because of the new process was the lower Fox River Valley in Wisconsin. While the Pagensteckers were making paper from ground wood and inducing publishers to try the same, the valley still had only two paper mills. The old Richmond mill at Appleton made both print and wrapping paper out of rags and straw. The Neenah Paper Mill used only rags to make printing paper. Together they employed sixty-
eight persons, were capitalized at $125,000, and their products valued at $144,750. Including these two, Wisconsin had six paper mills, 207 workers, an invested capital of $445,000 and products valued at $363,200.

Wheat farmers aided the arrival of the ground wood process into the valley. In the winter of 1870 they brought more than their usual quantity of timber into Appleton to try to sell it and make up for their losses from the low price of wheat. Wood manufacturing concerns stocked up to the "extreme limit." One of the firms buying the farmers' poplar was the Western Wood Pulp Company which already had broken ground for a mill along the river. Bradner Smith & Company of Chicago invested $25,000 in the Western plant and opened it in 1871, four years after the first ground wood pulp was made in the United States. It shipped six tons of pulp daily to the company's paper mill at Rockton, Illinois. Soon the company employed thirty men and did a $75,000 annual business.

Up river there were rumors that W. E. Ford and J. R. Ford, owners of the Fox River Flour Mill which had been built in Neenah in 1856, were going out of flour milling and into paper making. The Neenah Gazette approved the idea. "The town can spare a flouring mill or two, for the present, just as well as not, and it has not got paper mills enough," it said. The articles of association of the Fox River Paper Mill Company of Neenah listed
the organizers as John R. Ford, George Whiting, John A. Kimberly, Havilah Babcock, Hiram Shoemaker, and Augustinus Loos, with a capital stock of $30,000. The plan fell through. Within a month the joint stock management was replaced by a partnership consisting of Kimberly, Babcock, Charles Benjamin Clark, Frank C. Shattuck, and Whiting. Whatever Whiting's connection with the new firm was, it was short lived. He left the organization very soon and returned to his job as salesman amid reports that he was frozen out because of his age. Whiting was then twenty-three years old. The other partners were older. Clark was twenty-eight, Kimberly and Shattuck were thirty-four, and Babcock was all of thirty-five! The four bought and tore down the old Ford flour mill and built the Globe Paper Mill.

The Kimberly and Babcock families had been in the mercantile and flouring business in Neenah for more than twenty years. Clark had come to the valley from Theresa, New York, with a nest egg saved from his Civil War pay and invested in the Leavens' hardware store. Clark had the paper bug and he and Myron Haynes, the papermaker at Smith and Van Ostrand's mill, talked of the ready profits in the business and the lack of mills in the valley. Haynes had little capital and Clark didn't have the $30,000 needed. Clark took his problem to Kimberly and Babcock who, in addition to being businessmen, also were incorporators and stockholders of the National Bank of Neenah.
Each agreed to match Clark's $7,500. But that was not enough. Then Kimberly and Babcock talked to Shattuck, the dry goods salesman from Chicago who often came to the valley with his wares. Shattuck added his $7,500. Thus did Kimberly, Clark and Company come into being.  

Shattuck continued on the road selling dry goods; Babcock went back to merchandising and milling. Kimberly and Clark went to the East, the heart of the paper making industry, and in Connecticut bought a one-cylinder paper machine with a capacity of two tons of all-rag content newsprint. All was set—money, mill, machinery; Kimberly would take care of sales and finances, Clark would manage the plant. But they had no papermaker. Back Clark went to the man who had fired his imagination in the first place. Haynes quit his job at Smith and Van Ostrand's Neenah Paper Mill and spent the rest of his life working for the new firm.

The Globe Paper Mill opened on October 22, 1872, and within a few days it was "turning out print paper by the quantity." The paper sold at fourteen cents a pound and found a market locally as well as in Chicago and Milwaukee.

Because it took from 30,000 to 40,000 gallons of clear water to make one ton of paper—and the Globe intended to make twice that amount—the company installed four water wheels in the Neenah channel and then put a pipe into the river with a
screen on one end to prevent entry of branches, dead fish, stones, stumps, and other debris. Thus they got enough water to wash and bleach 900 tons of rags used each year. The mill employed forty persons, including twelve women rag sorters.  

In spring of the next year the Van Nortwick family, heavy investors in enterprises along the Fox River in the state of Illinois, especially at Batavia, visited the lower Fox River Valley of Wisconsin. William Van Nortwick had come to the Middle West in the 1830s and invested in land and power sites, grist and saw mills around Batavia. His son, John, followed in 1846 from New York state where he had been a civil engineer on that state's canal works. John brought with him his savings of $3,000 in gold and invested in mills and railroads. Into his businesses he took his two young sons, William Mallory and John Smith. The Van Nortwicks took over a bankrupt paper company in 1870 and supplied the Chicago Tribune with paper made from a great deal of straw and very few rags. Joseph Medill of the Tribune once said the paper was so hard it rattled like a tin pan. To eliminate the brittleness caused by straw the Van Nortwicks joined the list of wood pulp users. At Appleton they bought an old paper factory and the water power connected with it. They also purchased a nearby power site owned by A. B. Bowen of Oshkosh. With $200,000 they organized the Ames Pulp Mill, stockholders being William M. Van Nortwick of Batavia; A. M. Hastings
and Gustavus Ames of Rochester, New York; Henry J. Rogers, Cheyenne, Wyoming, and Bowen. Rogers moved to Appleton to super­intend the new plant. Hastings was president of a paper firm in Rochester where Ames had developed a cylinder grinder to cut wood, thus evading the Voelter patent. In late September, 1873, when financial disaster struck the East, the Ames mill went into operation with twenty employees and used four cords of wood per day to produce 5,000 pounds of pulp which was shipped to the Batavia mill where it was made into better paper for the Chicago Tribune.

The infant industry in the valley was too young to feel the great pains which financial crisis brought to banking, textiles and metals in the eastern part of the country in the fall of 1873. Manufacturers in the West remained fairly prosperous. Kimberly, Clark and Company became so prosperous that with two-year profits it bought out its local competitor and on June 1, 1874, took possession of Smith and Van Ostrand's "old red mill." Of the transaction of the local newspaper said:

Consolidating two local mills either of which already have an immense business, and an enviable reputation, the manager of the Globe will now swing the largest paper manufacturing business of any company in the state, the two mills making about five tons of rag print paper per day or about sixty miles if in a continuous sheet.

A business advancing at such a rate could not be alone in the field long. That same year the Winnebago Paper Mill and
the Patten Paper Mill opened in Neenah and another started at Kaukauna, site of the greatest fall and greatest water power on the lower Fox.

W. S. Davis had organized the Winnebago Paper Mills in 1872 and when the old government grist mill in Neenah burned in February, 1874, he and J. R. Davis, J. R. Ford, and others built a paper mill on the site. The Winnebago mill used neither rags, nor straw, nor ground wood. Instead, it extracted and cleaned waste paper and from it got a fiber to make print paper. In 1876, George Whiting, who had had the paper yen in 1872, bought an interest in this mill. Whiting paid $2,300 for the stock holdings of Hiram Shoemaker with $175 down and worked out the balance as secretary of the company at a salary of $60 a month.

Azel W. Patten, who had been in the flour business in Neenah for more than ten years, also switched to paper in 1874. He tore down the old Empire Flour Mill and built a mill to make print paper out of old paper stock, just as the Winnebago firm was doing. Three years later Patten startled the valley by installing a Fourdrinier machine and produced three tons of paper daily. The Globe added a Fourdrinier in 1878. Previously, all mills in the valley had used the cylinder paper machine which did not turn out as fine a quality paper as the Fourdrinier but was less complicated and less expensive.
To facilitate handling the volume of products from four paper mills, the Chicago and North Western Railway in 1875 built a side track the length of the water power in Neenah enabling the mills "to load and unload cars direct from their own doors, thereby saving the enormous transfer bills between the mills and depot." Soon the Wisconsin Central, which had reached Menasha in 1871, did the same thing. 42

Colonel H. A. Frambach, who arrived in Kaukauna in 1872, brought with him the Keller-Voelter ground wood process. 43 Frambach, born in Syracuse, New York, moved to the Middle West as a child and after military service in the Civil War engaged in the mercantile business in St. Louis. 44 In Kaukauna, he and his brother, John Stovekin, 45 erected the Eagle Mill on the site of Stovekin's flour mill which had burned in 1871. The mill, which began operations July 16, 1874, used its pulp to make two to three tons of paper a day 46 until it was destroyed by fire in 1881. 47

Frambach left the Eagle Mill to his brother's management in 1878 when he went to Menasha to operate the Menasha Paper and Pulp Company for John T. Woodside, R. M. Scott and Henry Hewitt Jr. This company, the first on the Menasha channel of the Fox River, made three tons of straw news and wrapping paper in 1877 but by adding its own pulp mill, with Frambach's aid, it was producing seven and one-half tons by 1880. 48
Down river at Appleton the Richmond mill still turned out paper as it had for more than twenty years, but it gave up making print paper and in 1880 produced 500 tons of wrapping paper made from straw. The Ames Pulp Mill enlarged its establishment in 1876 and changed its name to the Appleton Paper and Pulp Company. The new firm, with John Van Nortwick as president, and Henry J. Rogers secretary and treasurer, made six and one-half tons of newsprint every day. The paper mill unit consumed all the pulp produced in the plant and the bulk of the paper was sent to jobbing firms in the West. The company set up a wholesale house in St. Louis to handle its products.

Power to grind the wood was derived from water wheels. It took from seventy-five to 100 horse power every twenty-four hours to grind enough wood for one ton of pulp. In the mid-1870s the total horse power available in the lower Fox was estimated to be 50,400, of which not more than 10 per cent was then in use.

The highest charge for the power was five dollars per horse power per year; but many powers were leased for three dollars and some as low as one dollar. A publisher in the area said so much power was going to make the valley "sooner or later, the greatest manufacturing center of the West." Gustavus Ames, the inventor who had invested in the Van Nortwick enterprise in the valley, was quoted as saying: "I would not change the power
in your city [Appleton] for any like quantity in any other place, because of its immense body, and for purposes where pure water is required, no place can compare to the power in Appleton.\textsuperscript{56}

**TABLE 3**

**DISTRIBUTION OF WATER POWER, 1874**\textsuperscript{57}

<table>
<thead>
<tr>
<th>Place</th>
<th>Horse Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neenah and Menasha</td>
<td>3,000</td>
</tr>
<tr>
<td>Appleton</td>
<td>11,500</td>
</tr>
<tr>
<td>Cedars (Kimberly)</td>
<td>3,000</td>
</tr>
<tr>
<td>Little Chute</td>
<td>11,500</td>
</tr>
<tr>
<td>Kaukauna</td>
<td>14,500</td>
</tr>
<tr>
<td>Rapid Croche</td>
<td>2,300</td>
</tr>
<tr>
<td>Little Kaukauna</td>
<td>2,300</td>
</tr>
<tr>
<td>De Pere</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50,400</strong></td>
</tr>
</tbody>
</table>

The great power available at Appleton brought Kimberly, Clark and Company out of Neenah and into its first step of expansion down the river. The Appleton Post noted that the firm was about to buy a water power spot and said: "This is one of the most energetic firms in the Northwest, and their advent to Appleton may well be considered a piece of good fortune for this city."\textsuperscript{58} At Appleton in 1878 the partners formed the Atlas Paper Company and built a three-machine mill, combining with it a ground wood unit, with a capacity of ten to twelve tons of pulp and paper daily.\textsuperscript{59} Only in the East could such capacity be
equaled, said the *Appleton Post*. The Atlas used poplar for its newsprint and pine for manila paper. Now the biggest firm in the valley had joined the ground wood process users. Kimberly was sure that the process could produce high quality manila, just as good as that made in the East. "Here commenced the war to demonstrate to the consumer that wood manila could take the place of jute papers, so largely used, and furnished entirely from Ohio," he said. Jute, the plant with a strong, glossy fiber, produced largely in the East Indies, made excellent envelope paper, but it was expensive. Kimberly, Clark and Company spent $125,000 to build and equip the new Atlas plant which employed sixty persons. The first year's profit was about $325,000.

Kimberly spread the word about this new big plant when he went East in August, 1878, to meet with executives of long-established paper companies. He represented his young firm at a convention of paper manufacturers in Springfield, Massachusetts. The formal call for the meeting said it would discuss "matters affecting the general good of the trade...especially the question of demand and supply and the best means of insuring stability to our business, now so seriously demoralized." The high prices of the post-Civil War era had vanished in the aftermath of the financial crisis in the mid-1870s. Ledger paper sold for eighteen cents a pound in August, 1878; book papers had dropped to eleven cents; newsprint was down to six and one-quarter and seven and
one-half cents. At the Springfield meeting, twenty-one delegates formed a committee which "recommended a curtailment of one-sixth of the product of all the mills of the country for six months, if 85 per cent of them would consent thereto." In the discussion following the committee's proposal, the president of the convention reminded his listeners that "God helps those that help themselves" and his words were "greeted with applause."

The session ended with formation of the American Paper Makers Association which met again the next year, at Saratoga, New York, and formed regional units. 63

The Oshkosh Northwestern accused the association of "organizing a ring." The ring, its editorial said, was so big that "they have no difficulty in running things to suit themselves." It said the western division of the association, with headquarters in Chicago, held monthly meetings since September, 1879, and each month added a cent to the price of paper.

For example, the common white paper such as this family journal is printed on cost six cents per pound last summer, and the price has been worked up month by month so that it now costs nine and one-half cents. The Chicago division of these paper philanthropists meets this week in Chicago when another cent is to be added to the price. They declare that these prices are only temporary and that they are bound to get the price up to twelve cents, just double what it was last August. And they will do it, unless frightened out of it by fear of public opinion, for they control the market and can do as they please.64

The editorial said a reasonable increase in the price
of paper "would have been acquiesced in by the consumers without complaint." But, it added, "the present condition of things is one form of extortionate petty larceny on the part of the manufacturers... It is said that one paper manufacturing establishment in Wisconsin since the raise enjoys an income of $2,000 per week." The Northwestern of Oshkosh--twenty miles south of the valley's paper mills--did not name the Wisconsin firm. But it went on to urge Congress to modify the duty on paper and the articles used to make it. "Protection is sometimes necessary to encourage infant manufactures but this infant appears to hold its own well enough to get along without any more protection." 65

It did seem that the paper making industry in the valley was rushing out of infancy. Nearby the big new Atlas mill in Appleton stood the Genessee Flour Mill, once the city's largest merchant milling concern. The Kimberly-Clark-Shattuck-Babcock group bought it in 1879 and for four years used it to make flour; 66 paper could wait until the price was right. With the added property, the four-man partnership reorganized into a corporation with capital stock of $400,000, each of the four holding 100 shares at total par value of $100,000. Assets included the Globe and Neenah paper mills, the Genessee Flour Mill, and a miscellany of water rights and other values. Atlas remained a separate company. Kimberly became president, Babcock vice president, Clark secretary, and Shattuck treasurer of the
new Kimberly & Clark Company. The Appleton Post, happy about the business the Neenah-based firm was bringing to the city, said the "big four" now had to be counted among the "paper kings of the country" because they owned "one of the largest and wealthiest" corporations in northern Wisconsin.

In eight years the number of paper mills in the valley had grown from two to nine: Four were in Neenah, one in Menasha, three in Appleton, and one in Kaukauna. Their 510 employees were paid $186,455 in wages and production was valued at $1,031,536.

While the industry edged over the million-dollar figure, a move by some of its leaders pulled it clear out of infancy and into what would seem near maturity. The Appleton Post reported what it called "this auspicious event."

Important negotiations have been in progress for several weeks past which involve, to a very great extent, the future prosperity of this city and of the Fox River Valley in general. These have lately been consummated and it is in order now to make public mention of the matter. Mr. A. L. Smith, H. J. Rogers and the Messrs. Van Nortwick have purchased the majority of the stock in the Green Bay and Mississippi Canal Company. They have thereby secured the control of a vast amount of water power in this section as well as of other valuable property. The old policy of the company will be abandoned and a new one adopted which will be more in accord with the wants of the city and adjacent points, and with the enterprise which now obtains in this valley.

We congratulate the people of Appleton and neighboring points upon this auspicious event. It is certainly one of great importance and will tend to the rapid development of the Fox River Valley.
The Green Bay and Mississippi Canal Company held its annual meeting in May and elected John Van Nortwick president, H. J. Rogers vice president, and Augustus Ledyard Smith secretary-treasurer. The directors were: John Van Nortwick, William M. Van Nortwick, H. J. Rogers, Perry C. Smith, John S. Van Nortwick, R. J. Stevens, Erastus Corning, and Horatio Seymour. Stevens, Corning, Seymour, and A. L. Smith long had had interest in the Fox River, ever since the days of the Fox and Wisconsin Improvement Company. Smith, a Connecticut-born teacher, businessman and politician, had moved to Appleton in 1859 when he assumed charge of the Fox and Wisconsin Improvement's affairs. He became a state senator in 1866, the year the Green Bay and Mississippi Canal Company was formed. In 1870 he was elected mayor of Appleton and in that year organized the First National Bank of Appleton. Ten years later he was president of the bank and secretary-treasurer of the canal company.

In reporting the election, the Post said the policy of the new leadership "will be much more enterprising and aggressive than in the past. It will aim to develop the wonderful series of powers along the lower Fox, at an early day and on as great a scale as possible." The Republican Post's opposition, the Appleton Crescent, was just as elated about the change.
"The Lowell of the West" will extend from Grand Chute falls at Appleton to the rapids at De Pere, and from Appleton to Kaukauna in less than thirty years, will be one continuous manufacturing city.75

The Van Nortwicks and Rogers, operators of the Appleton Paper and Pulp Company and second only to Kimberly & Clark Company in annual tonnage, now controlled the organization to which the government in 1872 left ownership of the power rights along the lower Fox.

Unused power sites lined the descending Fox. Wood fiber was being accepted. Prices for paper were inching upward. There was capital for investment with less risk. More mills would employ more men. Expansion down the river lay ahead.
CHAPTER V

RIVER OF PAPER

The giant of the valley's paper industry, Kimberly & Clark Company of Neenah, led the way down the powerful river. It had made the first move in 1878 with the Atlas mill at Appleton. The Atlas, and the Globe and Neenah mills in its home city, gave the company a total production of 2,500 tons of print paper and 1,500 tons of wrapping paper in 1880. It far outweighed its nearest competitor, the Van Nortwicks' Appleton Paper and Pulp Company, which that year made 1,950 tons, all of it print paper. ¹

Talk of more manufacturing in the mill section of the valley caused some consternation in Green Bay. When a newspaper there complained about residents moving to Appleton, the Appleton Crescent begged for more. "Come neighbor," it called, "you've got 2,000 more population than you need in Green Bay and Fort Howard....You don't need them for any business or enterprise in existence or in contemplation, while we want 2,000 more right away to invest their money, brains and labor in manufacturing."² A year later the same paper said: "The more the better. Let them all come, as there is plenty of room for many more factories."³
Success in Appleton prompted Kimberly & Clark in 1881 to erect the Vulcan mill, capitalized at $100,000, adjacent to the Atlas. In late summer of the same year De Forest M. Hyde, a civil engineer and mathematics professor at Lawrence University, went into paper manufacturing in Appleton. In the first twelve days of operation his Valley Pulp and Paper Company produced twenty-six tons of wrapping paper and sold it in Chicago. Hyde equipped his plant for both news and wrapping paper so he could adjust to the market. He chose wrapping paper because Kimberly & Clark and the Van Nortwicks were large producers of newsprint.

The Van Nortwicks were not making as much newsprint as they might have because they were short of pulp. The lack of it drove them down the river to Kaukauna in 1881 where they built the Union Pulp Mill with a capacity of three tons a day. Kaukauna with its enormous water power was in need of development but it had to wait while the Van Nortwick executives investigated and invested in something new.

In the East, Thomas Edison had developed a system of generating and distributing electric current for light, heat, and power and the Western Electric Light Company of Chicago was set up in May, 1882, with territorial rights for Wisconsin. From the Chicago firm Henry Rogers and A. L. Smith purchased the right to manufacture and supply the towns in the valley with light from the Edison electric lamp. The Appleton Post, complimenting
Rogers for his maneuver, said: "The near future will develop this investment in another fortune to be added to his millions, and it serves him right." 

Rogers, who was also president of the Appleton Gas Light Company, installed an Edison dynamo in the beater room of Van Nortwick's paper mill. This mill and the Vulcan, owned by Kimberly & Clark, and the new mansion which Rogers was building on the bluff overlooking the river, were wired and connected directly to the generator. The first test on September 27 failed because of too much moisture created by steam in the beater room. But the second try, on the night of September 30, was a glowing success. Those who watched in wonder said it was "as bright as day." The Post called the electric light "perfectly safe and convenient" and predicted a brilliant future for it. It was the first central electric lighting station in the world to be operated by water power and Rogers' house was the first residence ever lighted by electricity from such a station. By the end of the year a second dynamo had been installed and a few residences and a half dozen more mills were lighted by electricity.

While the valley cheered the coming of the lights and the Van Nortwick executives accepted plaudits, Kimberly & Clark went about its business—paper. At Appleton in 1882 it bought from Bradner Smith & Company the old Western Wood Pulp Company—the
granddaddy of all the valley pulp mills—complete with water power, leases, and all other rights. It thereby eliminated a competitor, just as it had eight years earlier in Neenah. The next year the firm tore down the old Genessee Flour Mill and built the Tioga mill with a daily capacity of nine tons of paper.

Another flour miller, Samuel K. Wombold, long in the business in Appleton, teamed up with John H. Wharton, a lumberman, to form the Fox River Flour and Paper Company with a capital of $100,000. Wharton and Wombold made book and newsprint from rags only; thirty years would pass before they used any wood. They employed about eighty men in the beginning and made four tons of paper. In 1887 they gave up flour milling completely, changed the name to Fox River Paper Company, added another paper unit and made twelve tons.

In Neenah, the Kimberly family forsook flour milling, too. Kimberly & Clark Company bought the Reliance Flour Mill from John R. Kimberly, the father of the papermaking Kimberly, for $20,000, and for a like amount purchased John A. Kimberly's Winnebago Flour Mill. On the flour mill properties they erected the Badger Paper Mill.

It was 1884, another year of mechanical advancement for the industry. The Voelter patent, which the Pagensteckers had bought in 1869 and had extended twice, expired in that year. The competition which followed among engineering firms resulted
in improved mill machinery. Wider and faster machines made the "old red mill" with its narrow gauge and low speed unprofitable. Kimberly & Clark tore it down in 1885 and built a new twelve-ton book paper mill, retaining the name Neenah Paper Mill. Only thirteen years earlier the four men had begun business with one machine making two tons of 100 per cent rag-content newsprint. Now with six mills, three in Neenah and three in Appleton, they produced more than thirty tons of newsprint, book and wrapping paper daily. The Atlas alone employed 200 and the other five mills had a total of 300 workers.

The business of Kimberly & Clark, said the Appleton Post, was "larger than that of any other paper making firm outside of New England," and its annual production was "enough to load 1,000 freight cars, or 40 trains of 25 cars each." The business of Kimberly & Clark, said the Appleton Post, was "larger than that of any other paper making firm outside of New England," and its annual production was "enough to load 1,000 freight cars, or 40 trains of 25 cars each."26

While Kimberly & Clark tore down, rebuilt, and extended its domain, the Van Nortwicks eyed Kaukauna, the site of their little Union Pulp Mill. There the river, with almost 15,000 horse power ready to be harnessed, divided two small communities, Kaukauna on the north side and Ledyard on the south. The settlements combined in 1885 to form Kaukauna. The godfather of Kaukauna's industrial development was Joseph Vilas, the railroad promoter from Manitowoc, Wisconsin, who also promoted power sites on the lower Fox. The Green Bay Advocate said God had "sent His agents in the persons of Henry Hewitt and brother and Hon.
Joseph Vilas (millionaires)" to build up Kaukauna. Henry and William P. Hewitt were long-time businessmen in the community. Vilas influenced the Green Bay and Mississippi Canal Company to build the Kaukauna Water Power Canal on the Ledyard side of the river. Then he got the Milwaukee, Lake Shore and Western Railway, which ran from Milwaukee in the southeast to Ashland in the far north of the state, to move its car shops to the canal site in 1883. The coming of hundreds of railroad workers and their families resulted in schools, stores, banks, and a newspaper opening for business. So did paper mills.

The town's first paper mill, Stovekin and Frambach's Eagle which burned in 1881, had been supplied with one ton of pulp a day from George F. Kelso's little mill. After the fire, Kelso found a market up river. Two other little pulp mills were operating. Bradner Smith of Chicago, having sold its Appleton unit to Kimberly & Clark, set up the Ledyard Pulp Mill, and A. W. Patten built one to supply his Neenah mill and the one he hoped to build soon in Appleton. In 1882 Frambach reopened the Eagle, renamed it the Frambach Paper Company, and resumed using Kelso's pulp to make three tons of paper a day. Frambach's new mill, capitalized at $80,000, in 1884 fell into the hands of William M. Van Nortwick who retained Frambach to manage it. Later the name of the mill was changed to Kaukauna Paper Company. By 1885 the Van Nortwicks owned three mills in the
valley; two made both pulp and paper and the other produced only pulp. The mills employed 123 persons. Their daily production amounted to eight tons of newsprint, eight tons of wrapping paper, and seventeen tons of wood pulp. With so much water power in the growing village, the Van Nortwicks' competition was immediate and plentiful.

The American Pulp Company, organized September 18, 1883, and financed by Milwaukee bankers, began operations the next year. It hired ten men and eight women to make "butter plates," often referred to as grocers' plates, out of ground wood pulp. Officers of the firm were Jacob and Robert Nunemacher and John Le Lones of Milwaukee and Oscar Thilmany of Appleton, the latter being manager of the mill. In 1889 Thilmany became sole proprietor and changed the name to Thilmany Pulp and Paper Mills. His seventy employees stopped making "butter plates" and converted the pulp into ten tons of newsprint which was sold mostly to Chicago and Milwaukee newspapers. Thilmany's investment then was $150,000 and total sales in 1890 amounted to $112,243.

Vilas, who had done so much to bring industry to Kaukauna, watched the mills going up and decided to join the field. With Frambach, who left the Van Nortwick mill, Vilas incorporated the Badger Paper Company in 1885 and erected a nine-ton capacity mill. To equip it Frambach bought the machinery from Valley Pulp and Paper Company in Appleton where De Forest Hyde
quit the business. In a few years the Badger took over the old Ledyard Pulp Mill, then owned by N. H. Brokaw. The combined mills had a work force of 115 and produced fourteen and one-half tons of paper by the end of the decade.

Hyde's vacated building in Appleton was purchased by A. W. Patten who now set up the Patten Paper Company, Limited, with his son. They leased their little Kaukauna pulp unit to Thilmany and a short distance away built the Outagamie Paper Mill where, by 1890, they employed 115 persons and made ten tons of paper daily. Patten's old Neenah plant was taken over by F. T. Russell, who had been superintendent of it. Russell renamed it the Neenah Paper Company.

The Davis family still held on to the Winnebago Paper Mill in Neenah but George A. Whiting left it and moved across the channel to Menasha where, with William Gilbert, he set up the Gilbert & Whiting Paper Company. William Gilbert had been in the paper supply business in Chicago and moved to the valley in the early 1880s. The Gilbert-Whiting team broke up and by 1887 the Menasha channel of the Fox was the site of both the George A. Whiting Company and the Gilbert Paper Company. In his new mill Gilbert made two and one-half tons of rag-content fine writing papers. By 1890 he employed sixty-five persons and his product was valued at $20,000.

Whiting's plant was destroyed in 1888 when an explosion
In it killed seventeen persons and injured seventy, not one of them in his mill. The victims were sightseers gathered along the railway side track. In the previous year fire had wrecked the Menasha Pulp and Paper Company; it was never rebuilt. The pioneer Richmond plant at Appleton perished forever in flames during the same period. The Van Nortwicks' Union Pulp Mill in Kaukauna also was put out of commission temporarily because of fire.

While Whiting was building anew, two more mills opened on the Menasha channel. John Strange, for seven years the owner of a tub and pail factory, in 1888 installed a paper machine with a capacity of ten tons. Charles W. Howard operated his mill of the same potential tonnage that year.

Fires were the scourge of the paper industry. And the giant Kimberly & Clark Company did not escape it. In 1888 the ten-year-old Atlas burned to the ground when wind overturned a torch in the basement and oily rags caught fire. Kimberly & Clark set up a crash rebuilding program for the Atlas and at the same time opened another Appleton mill which was organized as a separate corporation, the Telulah Paper Company, capitalized at $250,000. The company purchased the power site and property of the Appleton Furnace Company for the Telulah mill and planned it to be "the largest paper mill in the western country."

The Atlas was rebuilt in five months and by that time
Kimberly & Clark was ready to experiment with the newest development in paper—sulphite fiber. Benjamin C. Tilghman had invented the sulphite process in Philadelphia in the mid-1860s but a satisfactory method of operation was slow to develop. The first sulphite produced in the United States was made in East Providence, Rhode Island, in 1884. In this process the wood is barked as usual, then cut into small chips which are dissolved by cooking with sulphurous acid in large boiling tanks, or digesters. The fiber resulting from such treatment is much longer and stronger than that secured from mechanically ground wood and hence adds strength to the paper. News and wrapping paper and some other grades consist mostly of ground wood with 10 to 25 per cent of sulphite fiber added to hold them together. Strong wrapping papers are made entirely of sulphite fiber. The first sulphite mill to operate successfully on a commercial scale in the United States was built by August Thilmany in Alpena, Michigan, in 1887 for two lumbermen who wanted to utilize the refuse from their lumber mills. The process would be a boon to the valley: Lumbermen were about finished clearing the best of the timber from the north woods and now even the stumps they left behind could be used by the paper mills with the sulphite method because chips, instead of larger pieces of wood needed for the grinders, were usable.

The Atlas was the first to test the sulphite in the
but within a year the Badger mill in Kaukauna was building its own sulphite plant. In the beginning sulphite sold for four and one-half cents a pound, a bit more than half of what the first ground wood pulp had cost in 1869. Just as ground wood had produced better paper than had straw or soda pulp, so sulphite could yield a stronger paper than ground wood. Hence, sulphite became widely used and its price fell until it reached a penny a pound by the end of the century. When the new process reached the valley the price of writing paper ranged from fourteen and seventeen cents for the finest to seven and one-half cents. Newsprint varied by its grade but was never less than three and one-fourth cents.

The sulphite process indicated technological permanence for the paper industry in the valley. But another development at the end of the decade proved the confidence of at least two of the manufacturers that it would be the major industry along the lower Fox.

Kimberly & Clark Company and the Van Nortwick family each announced plans to build an entire community around a mill site. On December 27, 1888, the directors of Kimberly & Clark decided to purchase for $120,000, from the Green Bay and Mississippi Canal Company, acreage and all the water power at the Cedars—the place where the Menominees in 1836 had ceded their lands to the government and thereby opened the valley to the
white man. Cedars became the village of Kimberly, three miles down the river from Appleton and directly opposite Little Chute where the water power was estimated to be equal to that of Appleton.

Three months after the purchase the company resolved, since its "real estate and personal property...had advanced in value by the rebuilding of mills and purchase of property," to increase its capital stock from $400,000 to $1,500,000. The stock was divided equally, each of the four holding 375 shares at a total par value of $375,000. The inventory of property value, excluding Atlas and Telulah, included: Globe, $60,000; Neenah Paper Mill, $250,000; Badger, $150,000; Vulcan, $175,000; Tioga, $120,000; Kimberly, $500,000.63

The plans for Kimberly were elaborate. The first year Kimberly & Clark built a twenty-five-ton ground wood pulp mill, a thirty-ton sulphite plant, and a ten-ton straw wrapping paper mill. The company would wait two years to add a thirty-ton newsprint plant.64 While work progressed during the summer of 1889, the valley press said that the enterprise "is destined within a year to be the biggest paper, sulphite and ground wood plant in this part of the country."65 The Appleton Crescent, announcing public sale of some lands in the new village, said: "About 1,000 men will be employed in the enormous new mills and in the village, where a hotel and ten buildings are now being built...It is
bound to be a place and purchasers of lots can easily double their money."

One mile down river from Kimberly, on the same south side of the river, the Van Nortwicks in 1889 leased property and water power from the Green Bay and Mississippi Canal Company and planned the village of Combined Locks. They incorporated the Combined Locks Paper Company and built at a cost of $800,000 a pulp mill and a paper mill; a sulphite mill was added in the winter of 1890. On the bluff above the mills they later erected houses for employees, One hundred and seventy-five persons were employed at the beginning of the operation and only rags were used to make twenty tons of bond paper a day. The mill was capitalized at $150,000 and its first year's product was valued at $840,000.

Two miles down river but on the north side of the Fox the Van Nortwicks, who lived at Batavia, Illinois, and Rogers, who lived at Appleton, continued to operate the Kaukauna Paper Company and the Union Pulp Mill. They also owned the Appleton Paper and Pulp Company, their original investment in the valley.

The nine valley mills of 1880 had grown in ten years to twenty-two, nine of which produced both pulp and paper in one establishment. Two firms made only pulp which they sold to the paper manufacturers. Kimberly & Clark controlled eight of the twenty-two paper mills. It had been a busy, building decade
and the "big four" indicated the next would be similar. At a directors' meeting in 1890 they purchased water power and other real estate at De Pere,\textsuperscript{71} the site of the last of the rapids in the lower Fox and the first sighted by the missionaries two hundred years earlier. The next year the firm set up the Shattuck and Babcock Company, capitalized at $92,550, to build on the De Pere property "the finest and largest paper mill in the West" to make high-grade writing paper.\textsuperscript{72}

The industry had spread all the way down the river. The lower Fox, so full of power, had become the river of paper.
CHAPTER VI

CONCLUSION

An abundant supply of water power brought the paper industry to the lower Fox River Valley. The power had been created by dams and locks built into the river in an effort to make it a canal link between the Atlantic Ocean and the Mississippi River.

The paradox of the development of paper making is that it began to thrive during the era of wood pulping in a section almost denuded of coniferous timber. Growth of the industry was encouraged when wood became an acceptable substitute for hard-to-get rags used in the making of paper, but the use of wood was not the dominating factor in the beginning.

When machinery and chemistry replaced the intricate old hand process used by Rittenhouse and Willcox, paper making spread from east to west. The Fox River Valley mills adapted to the advances of technology and increased both the quality and tonnage of their paper. As the price of newsprint, the industry's staple, dropped from fourteen cents a pound in 1869 to a minimum of three and three-fourths cents in 1889, the mills diversified. Kimberly & Clark made two tons of newsprint a day in 1872;
eighteen years later its eight mills made seventy-two tons of newsprint, book, wrapping, and colored poster paper every day. The Van Nortwicks moved from the production of pulp to newsprint to wrapping paper, the latter two products totaling forty tons daily.

The post-Civil War era of cross-country transportation of mass circulation publications increased the demand for the cheaper paper which could be made from wood pulp. Many firms in the lower Fox River Valley included pulp making units in their mills; but separate pulp mills also were established and sold their product to the paper making firms. Other manufactures supplemented the paper industry. The Appleton Woolen Mill, built in 1862, started to make felts used in drying paper; the machine shop which did repair work in 1867 began to make paper mill machinery; another factory made wires for the Fourdrinier.

The mills which originated in the Paper Age laid the foundation for the larger establishments and the corporate organizations. The partnership of Kimberly, Clark, Shattuck, and Babcock had been born of a $30,000 investment. After adding mill after mill to their domain, the four men formed a corporation with assets valued at $1,500,000. Their names, and those of other beginners in the 1870s and 1880s—Van Nortwick, Davis, Gilbert, Whiting, Thilmany, Strange—lived on as their sons inherited the mills.
Faith in the future of the paper industry led to the growth of the valley. The wheat farmer who used to take his grain to the flour mills on the river banks now turned to dairying just as had the New England farmer in the mid-nineteenth century. The rich farm land produced food for the industrial workers in the three counties whose population by 1890 numbered: Winnebago, 50,097; Outagamie, 38,690; and Brown, 39,164.

Paper making knew no seasons; there was steady employment. Jobs increased as more and more mills were built; sons joined fathers on the payrolls. In 1870 there had been only two paper mills in the area. By 1880 there were nine, and ten years later they numbered twenty-two.

The fur trader and the flour miller had left the river valley. But the papermaker was there to stay. Where his precursors had tried to make a national waterway the papermaker found "the best and noblest river" to furnish the power needed for paper making.
NOTES

CHAPTER I

1. Alexander J. Reid, The Resources and Manufacturing Capacity of the Lower Fox River Valley (Appleton, Wis.: Reid & Miller, 1874), p. 11.


3. Whitbeck, p. 73.


8. Ibid., p. 11. See also State Board of Immigration of Wisconsin, Wisconsin: What It Offers the Immigrant (Milwaukee, Wis.: Cramer, Aikens & Cramer, 1879).

NOTES

CHAPTER II


2. Ibid., p. 279. Father Vimont says Nicolet "returned to the Hurons, and some time later to Three Rivers." Consul Willshire Butterfield, History of the Discovery of the Northwest by Jean Nicolet (Cincinnati: R. Clarke & Co., 1881), says Nicolet went up the river and visited several tribes during the winter. But Father Vimont does not mention it. See also Louise Phelps Kellogg, The French Regime in Wisconsin and the Northwest (Madison, Wis.: State Historical Society of Wisconsin, 1925), p. 82.


4. Jesuit Relations, LIV, 217. Puans was the French name for the Winnebago Indians.

5. Ibid., p. 307n. Thwaites says this portage evidently was around the rapids at Little Chute, only five miles from Appleton.


7. Ibid., LV, 193.
8. Ibid., LVI, 125.
9. Ibid., p. 91.
10. Ibid., LIX, 100.
11. Ibid., pp. 101-07.
13. James H. Lockwood, "Early Times and Events in Wisconsin," Collections of the State Historical Society of Wisconsin (Madison, Wis.: Calkins and Proudfit, 1856), II, 108-09. Hereafter Collections...will be cited Collections.
16. Letter from Lewis Cass, Detroit, to Alexander J. Dallas, June 20, 1815, printed in Collections, XIX, 378.
17. Gouverneur Kemble Warren, Report on the Transportation Route along the Wisconsin and Fox Rivers in the State of Wisconsin between the Mississippi River and Lake Michigan (Washington: Government Printing Office, 1876), pp. 22-23. This complete account of surveys made by Army Engineers on the waterway includes much of the history of the area and a description of a trip made on the rivers in 1819 by the Fifth Infantry.
20. Ibid., pp. 506-09.
22. Ibid., p. 29.


25. Ibid., p. 233.
29. Ibid., 1853, pp. 92-98.


34. McCluggage, p. 281.


37. Appleton Crescent, Feb. 10, 1866.


39. Thwaites, "Narrative of Morgan L. Martin...," Collections, XI, 413.

40. Appleton Crescent, Feb. 10, 1866.

41. Ibid., Feb. 17, 1866.

42. Wisconsin, Executive Office, Legal papers connected with the incorporation of, and purchase of lands by the Green Bay and Mississippi Canal Company, July 28, 1866-June 30, 1900. Wisconsin State Archives.


49. McCluggage, pp. 315-16.


52. Wisconsin, Senate Journal, 1870, Appendix, p. 21.


55. Ibid.

56. Ibid.

57. Ibid., Part 6, 5318.

58. U.S., Statutes at Large, XVI, 189-90.

59. Ibid.

61. Ibid., p. 13.


63. Green Bay Gazette, April 16, 1872.

64. Oshkosh Northwestern, April 25, 1872.

65. U.S., Statutes at Large, XVI, 189-90.


NOTES

CHAPTER III


2. Ibid., pp. 402-04.

3. Ibid., p. 415.


7. Appleton Crescent, June 24, 1854.

8. Ibid., Dec. 22, 1855.


12. Ibid., p. 917. Outagamie County was not formed until 1851.


15. Ibid., p. 203.

16. Ibid., pp. 217-18, 221.


22. Appleton Crescent, March 2, 1861.

23. Ryan, p. 430.

24. Neenah-Menasha Weekly Manufacturer, March 6, 1862; May 29, 1862; June 26, 1862; July 24, 1862.


27. Milwaukee Sentinel, Nov. 18, 1863.

28. Harney, pp. 204-05.

29. Winnebago County Press, May 7, 1870.

31. Ibid., p. 744. This figure seems unusually low but presumably the other units were too small to count in the federal census.

32. Ibid., p. 742.


36. Thompson, p. 106.


40. Compiled from the federal censuses. The federal census does not list statistics for flour milling by counties after 1880.

41. Thompson, pp. 192-93.

42. Ibid., p. 62.

43. Ibid., pp. 201-02. But see Ryan, p. 134, quoting wheat in October, 1877, at only $1.06 at Appleton.
44. Harney, pp. 198, 207-09.


47. Weeks, pp. 11-13, 93. Weeks has the most detailed account of paper making in the colonial period, pp. 1-103.


52. Ibid., p. 175.


56. Miller, pp. 303-04.
57. Milwaukee Sentinel and Gazette, April 27, 1847.
58. Ibid., May 15, 1847.
59. Ibid., March 8, 1848.
60. Ibid., March 27, 1848.
61. Ibid.
63. Oshkosh Northwestern, May 15, 1890.
64. Appleton Crescent, July 16, 1853.
67. Ibid., March 30, 1854.
71. Massachusetts, pp. 70-71, listing 111 substances tested in paper making.
73. Scientific American, VIII (Feb. 21, 1863), 119.
74. Ibid., VIII (May 9, 1863), 291.
75. Ibid., XIV (April 21, 1866), 266; (April 28, 1866), 277.
77. Ryan, p. 189.

78. Appleton Crescent, Oct. 29, 1864.

79. Ibid., March 10, 1866.


82. Ibid., Dec. 7, 1868.

83. Harney, p. 203.


85. Winnebago County Press, Sept. 24, 1870.

86. Neenah Gazette, Jan. 27, 1872.

87. Ibid., April 27, 1871.

88. Ibid., Jan. 27, 1872.

89. Ibid.
NOTES

CHAPTER IV


5. Pagenstecker, p. 20.


10. Ibid., p. 584.


15. Neenah Gazette, Jan. 27, 1872.


22. Four Men, p. 5.

23. Harney, p. 204.


25. Four Men, pp. 6-7.


29. Neenah Gazette, Nov. 9, 1872. Ernst Mahler, retired president of Kimberly-Clark Corp., tells of a tour through the Kimberly, Wis., plant during which a customer, noticing the debris gathered by the modern filtration system, asked: "What happened to all that stuff before you got this new filter?" Mahler replied: "We sold it to you for $75 a ton."

30. Appleton Post, May 1, 1873.


33. Ibid., p. 6. Appleton Post, May 1, 1873.

34. Appleton Post, Oct. 2, 1873.

35. Clark, History of Manufactures..., II, 154-57.

36. Neenah Gazette, May 23, 1874; June 6, 1874.

37. Memorandum from Bergstrom Paper Co., Neenah, Wis., received by the writer April 9, 1964. The Bergstrom firm took over the Winnebago mill Aug. 20, 1904.


41. Kimberly-Clark Corp. Papers relating to the Kimberly-Clark Corp., including materials used in preparing the company's 75th anniversary history in 1947, letters from retired employees (microfilm, State Historical Society of Wisconsin); hereafter cited as K-C Papers.

42. Harney, pp. 207, 222-23.


45. Ibid. After the parents' death, Stovekin was adopted by a family of that name. Frambach was the original family name.


50. Superior Facts, V (May, 1932), 6-7
51. Appleton Post, Jan. 1, 1880.
55. Reid, p. 8.
56. Ibid., p. 41.
57. Ibid., p. 10.
58. Appleton Post, March 7, 1878.
60. Appleton Post, Jan. 1, 1880.
63. Chester W. Lyman, "The National Organization: History of the American Paper and Pulp Association," Paper Trade Journal, XXVI (Oct. 16, 1897), 49-57. In 1883 the name of the association was changed to American Paper Manufacturers Association "as it was thought the name 'papermakers' was misleading, being applied quite as generally to mill employees as to mill owners." Ibid.
64. Oshkosh Northwestern, March 12, 1880.
65. Ibid.
66. Four Men, p. 10.

68. Appleton Post, Jan. 1, 1880.

69. This figure excludes the Western Wood Pulp Company which made only pulp, no paper.


71. Appleton Post, March 11, 1880.

72. Ibid., May 20, 1880.


74. Appleton Post, May 20, 1880.

75. Appleton Crescent, July 31, 1880.
NOTES

CHAPTER V


2. Appleton Crescent, March 14, 1880.

3. Ibid., Feb. 26, 1881.


13. Clark, p. 379. Kellogg, "The Electric Light..." pp. 189-91. The Pearl Street station in New York City was operated Sept. 4, 1882, but it was driven by steam. Ibid.

14. The Rogers house still stands, with some of the old fixtures in it, at 625 W. Prospect Ave., Appleton, Wis.


17. Kimberly-Clark Corp. Papers relating to the Kimberly-Clark Corp., including materials used in preparing the company's 75th anniversary history in 1947, letters from retired employees (microfilm, State Historical Society of Wisconsin); hereafter cited as K-C Papers.


20. Thomas J. Ryan (ed.), *History of Outagamie County* (Chicago: Goodspeed Historical Association, [1911]), p. 611.


24. *Four Men*, p. 11.

26. Appleton Post, April 23, 1885.

27. Ibid., March 5, 1885.


29. Green Bay Advocate, April 1, 1880.

30. The Lion of the Fox River Valley (Kaukauna, Wis.: Sun Publishing Co., 1891), pp. 52, 55-57.

31. Ibid., p. 62. Mel A. Raught, Early History of Kaukauna (Kaukauna, Wis.: Kaukauna Times Printing Co., 1952); pages are not numbered.


40. Appleton Post, March 12, 1885; March 19, 1885; April 16, 1885.


42. Appleton Post, March 12, 1885.

43. The Lion of the Fox..., p. 70. Kaukauna Times, Jan. 23, 1891.


46. Memorandum from Gilbert Paper Company to the writer, received April 13, 1964.


49. Letter from J. H. Levandoski, president and general manager of John Strange Paper Co., Menasha, Wis., to the writer, April 13, 1964.


52. K-C "Record Book."

53. Ryan, p. 361.


56. Weeks, p. 234.


59. Ryan, pp. 1007-08. Kaukauna Times, Aug. 29, 1890; Sept. 19, 1890.

60. Weeks, p. 234.

61. Ibid., p. 297.

62. K-C "Record Book."

63. Ibid.

64. Four Men, p. 12.


66. Appleton Crescent, Aug. 31, 1889.


68. Appleton Post, May 12, 1892.


71. K-C "Record Book."

BIBLIOGRAPHY

I. PRIMARY SOURCES

A. MANUSCRIPTS

Kimberly & Clark Company. "Corporate Record Book, 1880-1906, of the Kimberly & Clark Company, Neenah, Wisconsin." One volume of the board of directors and stockholders meeting minutes, including basic information about incorporation and operations during the formative years of Wisconsin's largest paper company. Madison, Wis.: State Historical Society of Wisconsin. (Microfilm.)

Kimberly-Clark Corp. Papers relating to the Kimberly-Clark Corp., including materials used in preparing the company's anniversary history in 1947, letters from retired employees. Madison, Wis.: State Historical Society of Wisconsin. (Microfilm.)

Martin, Morgan Lewis. Correspondence, accounts and claims 1851-1887, of Morgan L. Martin, land speculator and legislator, relating to the Fox River Improvement Company. Madison, Wis.: State Historical Society of Wisconsin. (Microfilm.)

Stevens, Breese J. Papers, 1870-1887, consisting of newspaper clippings and copies of correspondence of the Board of Engineers for River and Harbor Improvement 1883-1884, dealing with Fox-Wisconsin Waterway and miscellaneous correspondence. Madison, Wis.: State Historical Society of Wisconsin.

Wisconsin. "Territorial Census, 1836." Wisconsin State Archives. (Microfilm.)

Wisconsin. Executive Office. Legal papers connected with the incorporation of, and purchase of lands by the Green Bay and Mississippi Canal Company, July 28, 1866-June 30, 1900. Wisconsin State Archives. (Typewritten copy received from the office of the Secretary of State, Madison.)


B. PRINTED MATERIALS


Harney, Richard J. History of Winnebago County, Wisconsin, and Early History of the Northwest. Oshkosh, Wis.: Allen & Hicks, 1880. A complete account of Neenah and Menasha with emphasis on names of town officials, preachers, teachers, businessmen and their activities from 1835 to 1879.
The Lion of the Fox River Valley: A Survey of Kaukauna.  
Kaukauna, Wis.: Kaukauna Times Publishing Co., 1890.
A concise account of the town's early history, homes, churches, schools and then a detailed description of the varied manufacturing concerns in operation.

Lockwood's Directory of the Paper and Stationery Trades.  
Older and more perpetual than Geyer's, this directory lists mills, officers, equipment, tonnage, sometimes employee totals. It remains today "the directory" of the trade.

Reid, Alexander J. The Resources and Manufacturing Capacity of the Lower Fox River Valley.  
Appleton, Wis.: Reid & Miller, 1874.  
The editor of the Appleton Post says his objective in this work is to "disseminate information" about his city and his valley and he does just that, with great emphasis on manufacturing possibilities available.

A paean for the Hollanders who built New York City and for the immigrants who would use river valleys and canal systems to find their way to the West.

Vol. XV, 399-438.  
A letter to the Secretary of War, dated Nov. 8, 1831, evaluating the lands in the lower Fox River Valley five years before the Treaty of Cedars.

"Narrative of Morgan L. Martin: In an Interview with the Editor," Collections of the State Historical Society of Wisconsin. Vol. XI, 385-416.


U.S. Congress. House of Representatives. Information Concerning a Road from Green Bay to Prairie du Chien. 22d Cong., 1st Sess., 1832, Doc. 83.


U.S. Statutes at Large. Vols. VII, IX, X, XVI.


Wisconsin. Assembly Journal, 1851.


Wisconsin. General Laws. 1848, 1851, 1856.

Wisconsin. Laws of Wisconsin Territory. 1848.

Wisconsin. Senate Journal. 1870.

C. NEWSPAPERS AND PERIODICALS

Appleton Crescent. 1853-1856, 1861-1866, 1880-1882, 1889.

Appleton Post. 1873-1874, 1878, 1880-1885, 1892.


Green Bay Advocate. 1856, 1880.

Green Bay Gazette. 1872.

Kaukauna Times. 1890-1891.


Milwaukee Sentinel. 1863-1868, 1874, 1888.

Milwaukee Sentinel and Gazette. 1847-1848.


Neenah Daily Times. 1889.

Neenah Gazette. 1872-1874.

Neenah-Menasha Weekly Manufacturer. 1861.

Oshkosh Morning Times. 1885.

Oshkosh Northwestern. 1871-1872, 1880, 1890-1891.

Scientific American. Vols. VIII (Feb. 21, 1863; May 9, 1863), XIV (April 21, 1866; April 28, 1866).


Washington Chronicle. 1872.

Winnebago County Press. 1870.

II. SECONDARY SOURCES


A publication of the Paper Makers Chemical Corp., Holyoke, Mass.


A book small in size but crammed with notes.


A twenty-page resume of the industry.
   The all-time classic.


   Especially good for details of the Van Nortwick family.

   Anniversary edition of the Kimberly-Clark Corp. house organ.

   Very technical.

   A perceptive history by the editor of the Neenah Gazette.

   Well-written biography of the log-rolling politician from Oshkosh.

Depew, Chauncey Mitchell (ed.). 1795-1895. One Hundred Years of American Commerce...A History of American Commerce by One Hundred Americans, with a Chronological Table of the Most Important Events of American Commerce and Invention within the Past One Hundred Years. 2 vols. New York: D. O. Haynes & Co., 1895.

The only one of its kind; a seventy-six page book telling the story of paper making in the entire state.

Of the company, for the company, and by the company.

An all-encompassing story of the state's busy lumbering era.

History of Northern Wisconsin. Chicago: Western History Co., 1881.
More than one thousand pages of history and biography.


Definitive and exhaustive.


As definitive as her later work on the British regime.

It also discusses the Milwaukee and Chicago milling centers.


Covers all facets of agriculture, manufacture, railroading and banking in the state in the 1860s.


Contains a good section on Seymour's dream of an Erie Canal in Wisconsin.

Tidbits about the industry, gathered from newspapers and journals in the United States and abroad.

From the original French sources.
Paper Making as Conducted in Western Massachusetts.
Vol. VIII, Massachusetts Miscellaneous Pamphlets.
A delightful, sometimes humorous, account of the early New England paper mills.


The complete story from the coming of the New Englanders to the age of diversified farming.

Includes a documented account of the Fox-Wisconsin improvement plans and a short history of Neenah and Menasha.


Tanner, Herbert Battles. History of the Streets of Kaukauna. Kaukauna, Wis.: Kaukauna Times Printing Co., 1929. The story of the people after whom the streets were named.


Emphasizes the importance of water power in a state without coal.


III. OTHER SOURCES


George A. Whiting Paper Co., Menasha, Wis. Memorandum to the writer, April 11, 1964.
The thesis submitted by Dorothy Mae Heesakker has been read and approved by three members of the Department of History.

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated, and that the thesis is now given final approval with reference to content, form, and mechanical accuracy.

The thesis is therefore accepted in partial fulfillment of the requirements for the Degree of Master of Arts.

4/18/65
Date

[Signature]
Signature of Adviser