INDUSTRIAL PROGRESS

Highways and Waterways

By Lillian Mackesy

The woodland Indian trail and the turbulent river with its dangerous rapids and whirling waters offered the only highways of travel in the county when the white man first came here. The Indian used his foot-trail and canoe, the fur trader brought the bateau and with the settler came the American Durham boat and finally the steamboat and railroad.

As soon as the pioneer settled on his homestead he turned to building a crude road for himself by the process of chopping his way through the forest. Later he traveled the early plank toll roads until the county and state governments evolved their public road systems.

In earlier days the Indian canoe and French bateaux, laden with furs and pelts, went up and down the Fox River. Indian totem poles stood as symbols of safety below and above the rapids of the Grand Chute. The more adventurous voyageurs and travelers "shot the rapids," but more often, they unloaded their cargoes and portaged them around the treacherous spots in the river, particularly at the Grand Chute, the Petite Chute and the Grand Kakalin rapids.

The bateau was used especially by the French fur traders who found need for a larger and sturdier boat than the Indian canoe. This boat was usually manned by 10 or 12 Indians who propelled the boat with oars or long poles while the fur trader kept his eyes on his precious goods. It was valuable in that it carried up to 12 tons of cargo and drew but two feet of water.

The later Durham boat carried more cargo and used fewer men in the crew. This was an American boat, invented in 1750 by a Pennsylvanian. John P. Arndt, boat builder at Green Bay, introduced the craft to Wisconsin when he built one in 1825 for the transportation of goods up the Fox River. Within five years he had a brisk business and Durham boats carried all the heavy traffic on the Fox and Wisconsin rivers right up to the time that the rivers were made navigable to steamboats.

In a way the Durham was picturesque with its wide, platform deck on which walked the crew of eight men, poling the boat through the water as they walked. Each man started at the bow of the boat,

and setting his pole in the river bottom, he walked the length of the boat, disengaged the pole and then walked back to the bow to start poling all over again. Thirty tons of freight were carried in these boats which measured from 40 to 60 feet in length. When the Durhams came to the rapids they were portaged by either being pushed through the shallows at the shoreline with the steel-tipped poles or being pulled by oxen hired from some enterprising settler who lived near the portage. Indians frequently were used in getting the boats and goods around the rapids.

Henry A. Gallup, a traveler in 1836 on the Fox River, gives a description of the Durham boats in action in his writings.

"Five miles further brought us to the Grand Chute. Here was a perpendicular fall in the river of seven feet, but close to the shore the rock had worn away so that a boat could take a plunge in going down and be led by ropes if quite light. Here the Durham boats which did all the freighting at the time, up and down the river, were obliged to discharge their freight and roll it along the banks on poles to above the falls. The boats were then lifted and dragged up by a large party of Indians and reloaded above.

"The amount of freighting was then considerable. All the government supplies for Fort Winnebago were passed up this way and detachments of soldiers often passed in the same grand manner."

EARLY ROADS

The Menominee Indians at Little Chute helped build one of the earliest important roads in the county according to George W. Lawe, Kaukauna pioneer, who describes in pioneer records how a wagon road was cut in 1839 from Kaukauna to connect with the Military road that ran from Fort Howard at Green Bay through Fond du Lac to Fort Crawford at Prairie du Chien.

"When I arrived in Kaukauna (1839), I found a veritable wilderness, there were no roads and no way of traveling except on Indian trails or by water. Green Bay was our source of supplies and I was desirous of opening wagon communications with that place. I went down to see Mr. Wright (Hoel Wright), the founder of Wrightstown five miles down the river, he was a particular friend of mine, and had settled there four or five years before. I wanted him to run a ferry across the river so that he could reach the military road running from Green Bay to Fond du Lac. This he agreed to do if I would open a road from Kaukauna to his ferry. I pledged my word I would do so at once.

"Much pleased in making such arrangements, the next day I called on my neighbor and laid the matter before him for approval, expecting him to aid me, but to my surprise he was opposed to any such radical change. He said, 'My father lived a good many years in Kaukauna and had no wagon road to Green Bay; he got along very well by travelling on horseback or afoot and I guess I can do the same.

"Not to be overcome by this exhibition of conservatism I resolved to try the head Menominee Chief at Little Chute, Tyometaw, and see if he would aid me. He summoned young men to council—they said yes we will go. The next day I had 50 Indians to help me. In the 2 days time we had a road cut out. The next week we all worked together again and cut the road to Appleton. They were not worked out highways but trails wide enough for wagons from which logs and underbrush were cut and removed."

The next year Ephraim St. Louis chopped a road for his ox team and cart to travel from Little Chute to the Grand Chute since, as he points out in the County Pioneer Association records, settlements round Lake Winnebago were increasing and he found that money could be made with his ox team and cart. He was in those days his "own supervisor, path-

master and had no bridge fund on hand either."

Indian trails were widened and new paths were made through the dense forest, not in any sense a finished highway, but more to make a pathway wide enough to allow ox teams and wagons to pass through. These rough passages connected settlers and settlements to the Wolf and Shioc Rivers, Black Creek, Duck Creek, the Fox River and the early Military road the government had built to connect the various forts.

These early roads were followed by the era of plank roads, which were constructed by private companies chartered by the legislature. The users paid tolls. In January of 1840 Daniel Whitney, William Dickerson, Alexander Grignon and David Johnson were appointed commissioners by the legislature to lay out a territorial road from Fort Howard by way of Grand Kakalin and Little Butte des Morts to Knagg's Ferry. By 1849 a state road ran from Menasha by way of Appleton to Bruce's Mill (Stephensville), which when extended through New London became known as the Plank Road. William Rork, James Blood and J. S. Buck were the commissioners for this road and John Stevens the surveyor.

Before very long, other roads were being built and, although the planks soon rotted and made the roads impractical, they were used for many years throughout the county until long after the Civil War. The *Fond du Lac Journal* in 1853 gave this report on the plank roads:

"The Citizens of these thriving villages (Appleton and Grand Chute) appear to appreciate fully the advantages of Plank roads. They have built a plank road to Grand Kaukauna some nine miles and one to intersect the Menasha and Kaukauna road and are now building one westward to the Wolf River some 20 miles which is to be continued to Michiljohn's mill, Waupaca Falls, Plover, Portage and Stevens Point. A large quantity of planks and logs have been got out for it during the winter and workmen are busy and expect to reach the Wolf River by next fall."

In contrast a *Crescent* article published in 1866 shows how the plank roads deteriorated by pointing out that the main road from Appleton to Black Creek that year "averaged 100 teams a day and for many months the teams could carry only half a load owing to conditions. A team and a man for hauling made four dollars a day."

Early County Mail Carrier in His 89th Year (1889)—Capt. Alexander Clermont, De Pere, started carrying the mail in 1825 following the Indian trails and early roads on foot and horseback from Green Bay to Portage.

In 1866 the county board met in a special session to consider the state of county roads and discussed ways to raise money to start a proposed 10 year road building and improvement project. An important road bill was passed by the state legislature in March, 1867, which affected the county in that it provided the levy of

certain taxes for the improvement of principal roads.

With the building of the plank roads came the heyday of the stagecoach and country hostelry. Stagecoach routes connected the principal cities and villages, and when the Fox became navigable through the building of canals, the stagecoaches met the boats on schedule, took on passengers and started off for inland destinations. Passengers stopped for food and lodging at country hotels along the routes.

The stagecoach era in spite of its short life, was a boon to the settler who lived out in the county, for the stages carried not only passengers, but also mail. Up to this time the mail service was uncertain, irregular and very slow. Pioneer mail delivery usually meant a long, tiresome journey to the larger towns, and obliging farmers collected the mail for each other when they went to town and then delivered it to each other in person when they were able to find the time.

The very first post routes in the county were granted in 1832 when United States postal carriers rode the available roads from Chicago by horseback. This early route crossed the county and the carrier often had to walk the Indian trails with his mail pouch. As settlements grew into villages and towns, postmasters were appointed and the mail followed the main trail, water and road highways as they developed.

THE TAMING OF THE FOX RIVER

We have seen how the early priests, explorers, fur traders and even the first settlers adapted themselves by necessity to the dangers of water travel on the Fox-Wisconsin river route to the Mississippi. With the development of settlements into cities along the waterway and the advent of the steamboat, there grew an idea of harnessing the impeding rapids of the lower Fox and connecting the two streams by means of canals.

For 28 years interested citizens of the territory and later the state worked unceasingly against bitter odds, both political and financial, to achieve their dream of an improved Fox-Wisconsin waterway only to have it come true in 1856 at a time when railroads were soon to supplant the slower steamship commerce.

Morgan L. Martin, a Green Bay lawyer, became interested in the canal project and gave up a promising political career to devote a large part of his life to its building. Martin was born in New York state in 1805 and came to Green Bay in May, 1827, where he lived for 60 years. He served four years in the legislative council of the Michigan Territory, which included Wisconsin at the time, and was a territorial delegate at Washington for two years. Although Martin never lived in Outagamie County, he owned in 1847 with Theodore Conkey the section of Appleton on the Fox River known as Grand Chute. Originally the newly platted village was to be named Martin, but Conkey and Martin chose the name Grand Chute instead.

River improvements were being discussed by Green Bay citizens as early as 1820 and in 1829 a public meeting was held there with Morgan L. Martin presiding. Two years later as the territorial delegate to Congress he tried to rouse government interest in the project but his appeal, along with later appeals including those of Territorial Governor Henry Dodge, fell on apathetic ears. In spite of the support of communities along the river route, Congress took no action until 1846 when it accepted a proposed land sale plan to finance the improvement project and passed a bill granting for public sale half the land in a six mile strip running 216 miles in length from Green Bay to Portage.

The land sale had to wait until Wisconsin became a state, so in August, 1848, the new state of Wisconsin turned the project over to a board of public works with C. R. Alton the chief engineer. This first board of commissioners included

Hercules L. Dousman, Curtis Reed, John A. Bingham, Albert S. Story and James B. Estes. Land sales started booming in 1849 and early 1850, public interest in the waterways improvement ran high and work was started.

However, trouble came when land sales dropped off sharply in 1850 and the canal project found itself in debt for $65,000. Work was suspended at Appleton and only the canal at Portage had been completed. An article written by Samuel Ryan, Jr., in the *Green By Advocate* on May 2, 1850, expressed the high feelings of Appleton people at the time.

"The act is entitled, 'An act for the improvement of the Fox and Wisconsin Rivers and to connect same by a canal . . . The intention of the act is clear enough, that the Fox River was to be first and foremost improved. Taking into consideration the composition of the board of commissioners, the problems and propositions of the chief engineer, the log-rolling system practiced in the Legislature hitherto, well may the people of Northern Wisconsin despair of the completion of the only main obstruction between the lakes and the Mississippi; viz., the Grand Kaukaulin and Grand Chute rapids."

At this point, Martin stepped in and obtained government permission to take the job privately. With this he put 500 men to work at Kaukauna, but 1852 brought another delay when the new governor, Leonard J. Farwell, opposed the project and ordered both a suspension of work and an investigation of Martin's motives. When Martin was cleared the state withdrew completely from the project and in 1853 it was turned over to private enterprise under the newly organized Fox and Wisconsin Improvement Company. The directors of this company included Martin and Otto Tank of Green Bay, Mason C. Darling and Edgar Conklin of Fond du Lac and Theodore Conkey of Appleton.

Congress in 1855 added two sections a mile to the original land grant but the land sales were too slow and Wisconsin men spent $400,000 of their own money before the project was finished. Water was turned into most of the locks in 1855 and by 1856 the improved waterway from Green Bay to the Mississippi River was a reality.

The *Aquila*, a stern-wheeler captained by John Nixon, was the first steamship to make the complete trip from the Mississippi River to Green Bay. The steamer started from Pittsburgh and went down the Ohio River to the Mississippi and then up the new improved waterway. All the way along the route crowds gathered to cheer the steamer and between De Pere and Green Bay charges of gunpowder were fired on anvils, while the guns at old Fort Howard boomed forth salutes as the vessel approached. An account of the steamboat passing Appleton in June, 1856, is related in the *Appleton Crescent*. The steamer, *Pioneer*, and tug, *Ajax*, had come up from Green Bay, according to the newspaper, and as the *Aquila* approached from the other direction all three vessels blew their steam whistles at the same time to celebrate the event.

"Passing the Locks—One of the most beautiful sights we have ever seen was the meeting of the steamer *Pioneer* from Green Bay, and the steamer *Aquila*, from the Upper Fox, on Monday morning, just above the locks and dams at Appleton. The *Pioneer* had just left the last lock as the *Aquila* came around the point into the basin.

"Both shores were swarming with people; hundreds lined the banks of the canal cheering, and the band on each boat discoursed eloquent strains of music while flags and banners were flying and the steam whistles screaming with delight. Altogether it was a sight—the marriage of the waters of the Mississippi with Lake Michigan. Both boats stopped to exchange greetings. The Menasha brass band and the Appleton Saxe Horn band, heading a large delegation from Appleton, Neenah and Menasha went on board the *Aquila* and passed down the Fox River to Green Bay, where all were duly wel-

comed with great ceremony by the city officials and by a speech from James Howe."

In 1866, again because of financial difficulties, the property, franchises and land grants of the Fox River Improvement Company were sold to a new corporation originally backed by eastern capitalists, the Green Bay and Mississippi Canal Company. This company exists today and deals largely in water power. The United States government purchased the locks and canals for $145,000 in 1872 and took over the control and upkeep of the locks and other aids to navigation.

River transportation decreased with the coming of the railroads and finally the Wisconsin River was found impractical for steamship travel. Today the Fox River is used largely for the shipment of coal between Green Bay and Oshkosh. The last load to go through the entire waterway was a group of barges in 1920, sent from their dry docks in Green Bay to Iowa.

STEAMBOATS ON THE FOX

Although steamboat traffic on the Fox and Wisconsin River route never fulfilled its hope and was comparatively short-lived in the history of the state, it did represent a romantic era in the development of its counties and river towns.

Steamboats on the Fox

Actually those early days of steamboating on these waters represent the active days of boats propelled by steam in the whole country. The *Clermont*, the first successful steamboat in the United States, made its maiden voyage on August 7, 1807. Only 14 years later the steamer, *Walk-in-the-Water*, arrived at Green Bay and the Fox River in 1821. The Fox River at that time was navigable at its mouth

for about six miles, from the Bay to the first of the long series of rapids at DePere. Thomas Roche, electrician on the old *Oshkosh City* in 1908, wrote a detailed record of steamboating in the early days on Lake Winnebago, the Fox and Wolf Rivers for a history of Winnebago County, using the log data of two veteran Oshkosh boatmen, Captain W. W. Neff and Captain E. M. Neff.

Although steamers arrived and departed from Green Bay for many years on the lower lake route, these were irregular trips and the first regular line was established about 1850. An attempt was made in the forties to promote steam travel to Appleton from the Bay when Captain Stephen Hotelling, or Hotalling, managed to get up the river as far as Kaukauna where he made an attempt to haul his steamer over the Kaukaulin rapids. He abandoned the trip as an impossibility, however, and turned back to Green Bay. In 1849 Captain H. A. Hanson managed to haul his schooner, *Snowbird*, out of the water at Kaukauna, portage and re-launch it at the Grand Chute and completed a trip to Oshkosh. The *Jenny Lind*, built at Neenah by Dr. W. Peake and Captain Patrick Tiernan in 1851, was the first steamboat to travel the Wisconsin River to the Mississippi. In 1844 the machinery from the old *Black Hawk* was put in a new boat, the *Manchester*, which Captain Hotelling and James Worden had built on Lake Winnebago. This boat was the first and only commercial steamboat on the lake previous to 1850.

When the new lock and dam was completed at De Pere in 1850 the steamer, *Indiana*, captained by William O. Lyon, began a regular schedule of trips between Green Bay and Kaukauna, soon followed by the *Pioneer*. The sidewheeler, *Van Ness Barlow*, and the *Morton*, both built in 1851, were run between Neenah and Appleton. These boats were the first steamboat connections on the lower Fox between Green Bay and Lake Winnebago ports. Much of the Fox River trade was still carried by Durham boats during this time, and the two types of vessels transported passengers, merchandise, farming implements, household goods and produce. Passengers and freight that traveled on steamers arrived at Kaukauna where wagons and teams picked up the travelers and goods and carried them to make connections with the steamers on the Appleton to Lake Winnebago run. Soon after 1850 the lake was alive with boats that ran special lake routes. Many of these boats never sailed the rivers at all but served the shores of Lake Winnebago and made connections with the river boats at Neenah, Oshkosh and Fond du Lac.

Of particular interest in these waters was the development of the unique tugboat used in the lumbering industry, known as the "grouser." This boat originated and developed in this locality during the lush days of lumbering and disappeared from these waters as lumbering activity decreased. The grouser was built specifically for the purpose of towing logs from the rafting places to sawmills on the lower Wolf and Fox Rivers and Lake Winnebago to replace the inadequate horsepower boats previously used. The first steam tugboat grouser was the *Active*, built in 1854 by the Rudrick and Company at Berlin.

According to Thomas Roche the grouser tughull was usually from 80 to 100 feet in length with a 20 foot beam and was built strong to withstand the strain of towing logs. On the forward deck was located what was known as the grouser box, built of oak timber and projected from about four feet above the main deck clear through the bottom of the hull. The grouser fit in this box and passed up and down through it freely. The grouser was a selected oak timber about 45 feet long and about 12 by 16 inches in diameter, with its lower end sharpened and covered with a large iron shod point. A chain cable attached to the foot of the grouser passed up through the grouser box to a reel or spool operated by machinery for the purpose of hoisting the grouser.

The grouser tug worked somewhat like this: moving forward under steam, the tug would pay out lengths of tow line attached to the fleet of logs behind it, then the grouser would go down to anchor the tug, disengaging the paddle wheels so the engine could operate a spool which reeled the fleet of logs toward the boat. When the logs reached the desired distance away from the tug, the grouser would be hauled up from the river bottom, the paddle wheels engaged, and the tug would again move forward while it payed out line to the correct distance needed. In this manner the sturdy tug would tow up to 2,000,000 feet of lumber at about three miles an hour in good weather.

With the sailing of the *Aquila* through the entire Fox-Wisconsin waterway in 1856 an active steamboat commerce sprang up on all the navigable rivers of the area. As the railroads came into the territory, they chartered passenger boats on the rivers to make train connections at specified points until the railroad lines were completed. Boat transportation companies operated scheduled daily lines for freighting and passenger service on several routes, many connecting with river traffic on the Mississippi River.

Steamers that traveled the Wolf River route included such boats as the steamer, *Pearl*, the stern-wheeler *Wolf* that was built at New London, the *Tigress*, the *Northwestern*, the *Tom Wall* and *Lady Ellender*.

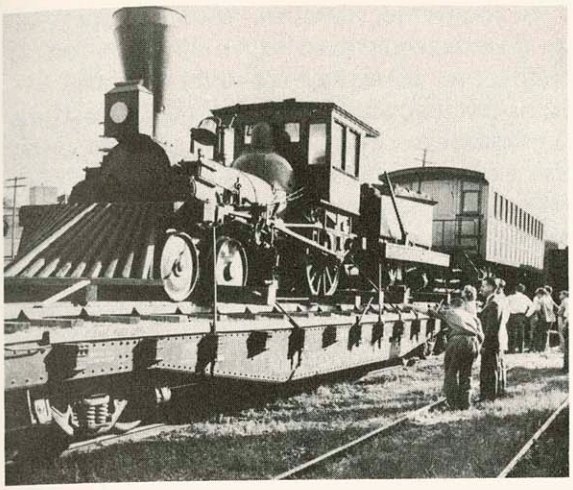
The *Aquila* after its historic journey was sold to a local boat company that put it in service on the Fox River run and in 1857 on a trip to Oshkosh, the boat sprang a leak in the rough waters of Lake Winnebago and sank in 10 feet of water off Long Point before it could make shore. The *Oshkosh City*, hearing the ship's distress signals, came alongside and rescued the crew and passengers from the sunken steamer. The *Aquila* was raised and repaired, plying these waters until 1859 when it was abandoned and its machinery placed in the new steamer, *Ellwood*. The *Ellwood*, a side wheeler, had a peculiar design in that it was constructed as large as possible to carry huge amounts of freight and still fit in the locks. Unwieldly, but an excellent freight carrier, the boat had its paddle wheels recessed in the sides of the hull. On one occasion the steamer went through the lower lock at Appleton at midnight and on coming through this level the boat went over the dam broadside. Since the water was very high no damage occurred to the steamer but two members of the crew were drowned. Much to the surprise of the lock tender, who had not seen the accident, the boat came back and whistled for the same lock a second time. In 1863 the boat went to Cairo on the Mississippi River and was used as a floating hospital ship.

The *Appleton Belle* ran the Fox River route from 1856 to 1860 and the side wheeler, *Menominee*, built at Shiocton in 1856, was called "the daintiest little steamer of her size." This boat later became a circus boat and carried a circus troupe up and down Minnesota rivers. Later boats remembered on the Fox River route were the *Bay City*, *Fountain City*, the *Winnebago*, the *Brooklyn*, the *Evelyn*, the *K. M. Hutchinson* and the side-wheeler, *Leander Choate*. The *Leander Choate*, "the largest and best steamer on the Fox River" sailed under Captain Mike Goldin in 1908 and is well remembered by many residents of the county as the excursion boat of its day. It used to stop regularly at the old Eden Park landing at Kaukauna to take on gay crowds of excursioners back in the horse and buggy days of Kegling, (forerunner of modern bowling) sporty racetracks, hand-turned Merry-go-rounds and family picnics.

The History of Utilities

By William E. Schubert

The first railroad to push its rails into Outagamie County was the Chicago and North Western which built on from Neenah and Menasha in 1861. This construction was a part of its line to Fort Howard and the Upper Peninsula of



The "Pioneer" Rode the County's Rails in 1861

Michigan. The Northwestern had reached Oshkosh in 1859 and Neenah in 1861, coming by way of Janesville, Watertown and Fond du Lac. It followed the north and west bank of the Fox River through Appleton, Little Chute and Kaukauna.

In the flurry of railroad building of the early seventies, three lines came into Outagamie County about the same time. These were the Green Bay and Lake Pepin (now the Green Bay and Western), the Wisconsin Central and the Milwaukee, Lake Shore and Western.

The first named was promoted by Green Bay interests to connect that city with the Mississippi River and it was built across the county from the Oneida Reservation in a southwesterly direction through Seymour, Black Creek and Shiocton to New London in 1871. It has continued as an independent road.

The Wisconsin Central crossed the southwest corner of Outagamie County through Dale township with its rails in 1871, two stations, Medina and Dale, being located on the line. This road started in Menasha and secured a land grant to build from "Doty's Island to Lake Superior" and did go on to Ashland via Stevens Point and Marshfield. Subsequently it built west to St. Paul, south to Chicago, and east to Manitowoc, where it established the first car ferry connection with Southern Michigan. The Central was leased by the Soo Line in 1909.

The Milwaukee, Lake Shore and Western came into the county in 1876 in Buchanan township and touched the south and east bank of the Fox River at Ledyard, now South Kaukauna. It followed the river to Appleton which it traversed through the "flats," and after bridging the Fox, crossed the Northwestern at Appleton Junction and went on in a northwesterly direction through Greenville and Hortonville to New London, meeting the Green Bay road at New London Junction and then running north along the county line to Clintonville, which it reached in 1878. Construction on part of the line was carried out under the corporate name of the Appleton and New London Railway. The southern terminal of the M.L.S. & W. was Milwaukee, and it started construction in 1871 up the shore of Lake Michigan through Port Washington, Sheboygan and Manitowoc, where it turned west. Eventually it built north and west to Wausau, Antigo, Eagle River and Rhinelander to Ashland before being absorbed by the C. & N.W. in the middle nineties. A branch was run south from Hortonville to Oshkosh through Medina in 1878-1879. In 1873 the Wisconsin Central leased this road, with the idea of connecting with its line at Menasha and giving it a through route to Milwaukee, but it never operated it as a more satisfactory lease arrangement was concluded with the Milwaukee and Northern.

The M.L.S. & W. built extensive shops in 1882 and maintained a division point at South Kaukauna which was continued for many years after the Northwestern took it over. The latter absorbed the Lake Shore in 1893.

Next in order was the Menasha and Appleton Railroad which built a line between those cities in 1880 on the south and east branch of the Fox. This road was taken over in the same year by the Milwaukee and Northern which was in turn sold to the Chicago, Milwaukee and St. Paul in 1893. It crosses the river twice in

Appleton and maintains a station in the "flats" which is the end of a branch from the main line of the Milwaukee Road at Hilbert. The Wisconsin Central operated the Milwaukee and Northern under lease between 1873 and 1882.

The last railroad construction in Outagamie County was done in the early part of this century. It was the Wisconsin and Northern, now a part of the Soo Line, which was built south from Shawano to Black Creek in 1917 and then continued on to Appleton in 1918. This road was originally projected by a group of men from Oshkosh, Menasha and Shawano to reach their timber holdings north of the Menominee Indian Reservation, and had its northern terminal at North Crandon on the "old" Soo Line. The general offices of the road were in Appleton from the time its rails reached there until it was built south to Neenah and sold to the Soo in 1921.

COMMUNICATIONS—TELEPHONE SERVICE

Just a year after the invention of the telephone by Alexander Graham Bell, in 1876, an Appleton banker, Alfred Galpin, put into use the first practical telephone ever seen in this part of Wisconsin, connecting his bank with his residence. Galpin, at that time, 1877, a student in chemistry and electricity, probably became interested in the "instrument that talked" when he read of the invention in magazines and newspapers and observed the interest it attracted at the Centennial Exposition in Philadelphia.

He succeeded in interesting L. N. Benoit, a prominent druggist at Appleton, who immediately installed several telephones in his drug store and then strung wire to connect with telephones placed in the offices of several physicians in the city. Thus, an Appleton drug store became one of the first telephone exchanges to be established in Wisconsin and one of the earliest in the United States. The only other Wisconsin city reporting telephone development in 1877 was Milwaukee.

In the latter part of 1878, Benoit set up a switchboard to serve 25 telephones. Until that time he had operated his exchange without a switchboard, furnishing the best service known at that time with his crude apparatus.

Upon Benoit's death in 1881, an organization which, a year later, became the Wisconsin Telephone Company purchased the exchange from the widow. Miss Kate E. Hoolihan was the first manager for the company. At that time there were about 60 telephones in use in Appleton. Today, the exchange furnishes service to over 14,500 telephones.

Miss Hoolihan, who married E. W. King in 1884, remained as manager until 1887. In 1883, the telephone exchange was removed from the drug store to the second floor of the same building in order to provide more spacious quarters to handle the increasing business. Several years later the office again was transferred to still larger quarters at 816 College Avenue. In July, 1912, the company moved into its own new building at 126 North Superior Street where it is located at present and from which modern dial telephone service is offered in 1948.

The first telephone to appear in Little Chute was installed by the Fox River Valley Telephone and Telegraph Company in 1884. Long distance service was established to Appleton, the first long distance telephone being located at Langedyke's Store on the corner of Grand Avenue and Main Street. Peter Schafer was the Wisconsin Telephone Company's first agent. In December, 1909, the Fox River Valley Telephone and Telegraph Company set up the first exchange at the Post Office on the corner of Depot and Main Streets, serving 25 telephones. The first manager was R. McGillan and the first operator Miss Mayme Langedyke. In 1912, the Little Chute exchange, located in the building at Main Street and Grand Avenue, was sold to the Wisconsin Telephone Company. And now, the recently-completed telephone building at Grand and

Canal provides dial service for about 1,275 telephones.

March, 1882, marks the first appearance of the telephone in Kaukauna, a small switchboard being set up to handle 28 subscribers in T. M. Kellogg's drug store. The first Kaukauna manager for the Wisconsin Telephone Company was Kellogg. Miss Margaret McDonald was the first operator. Next the exchange was moved to Claspill's Grocery Store with 52 subscribers, then to the J. G. Fechter building on Wisconsin Avenue with 75 subscribers, and in 1902, to the location at Wisconsin Avenue and Lawe Streets. There were then 220 subscribers. Now the new Kaukauna telephone building at 135 West Wisconsin Avenue provides dial telephone service for almost 2,000 telephones.

The first telephone was installed at Hortonville in about 1897. The first exchange was started about 1900, the manager being J. M. Tuttle and the first operator Miss Nina Maberry. Among those interested in promoting the telephone were Dr. J. Reineking, L. Jacquot and M. L. Graef. The exchange was located at the corner of Nash and Appleton Streets, but later was moved to space above the Bank of Hortonville in 1916. Today Hortonville is served by about 570 telephones.

The telephone was introduced at Greenville in 1900, the subscribers getting rural telephone service direct from Appleton. The exchange was started in July, 1915, there then being about 175 subscribers. Otto Dau was the first manager. In 1917, the telephone office was moved to the first floor of the Post Office building and in 1920, to the second floor. Now a new telephone building has been erected on Highway 76, east of the intersection with Highway 45, to provide dial telephone service for over 300 subscribers.

ARTIFICIAL GAS FOR ILLUMINATION AND COOKING

George MacMillan was largely responsible for the introduction of artificial or manufactured gas into Appleton and environs. Construction of the first plant and distribution system was started in June of 1877 under the direction and supervision of one S. D. Carpenter. The finished plant actually began to manufacture gas late during October, and there is reason to believe that by November 1, 1877, gas service was being delivered to public buildings and for street illumination. Several factories and mills on the flats were also served thru a pipe line attached to the so-called second ward bridge. News files of October 20, 1877, gave important space to the "Turner Hall Gas Light Party."

The Turner Hall had been fitted with chandeliers and jets and a "blaze" of light was promised for the enjoyment of those attending the party. What happened at the party is best reported in the news issue of November 3, 1877:

"The party was a perfect success last Saturday night in attendance as well as socially, and the large number present had a delightful time, dancing under the gas light. The light was not all that could be desired, still with the aid of coal oil the hours passed pleasantly to all participants."

The early advertisements of the Gas Company reveal that the dangers of kerosene could be avoided by buying gas at the "exceedingly low rate of $3.25 per thousand cubic feet."

During the fall of 1877 the city council provided the first gas street lighting system in Appleton, and before winter the "very handsome cylinder globe lanterns from Philadelphia" were in service.

The Appleton Gas Light and Fuel Company along with early railway and electric companies was one of the predecessors of the "Traction Company" which in turn gave way in 1927 to the present Wisconsin Michigan Power Company operating not only in Outagamie County but numerous counties in Wisconsin and upper Michigan as well.

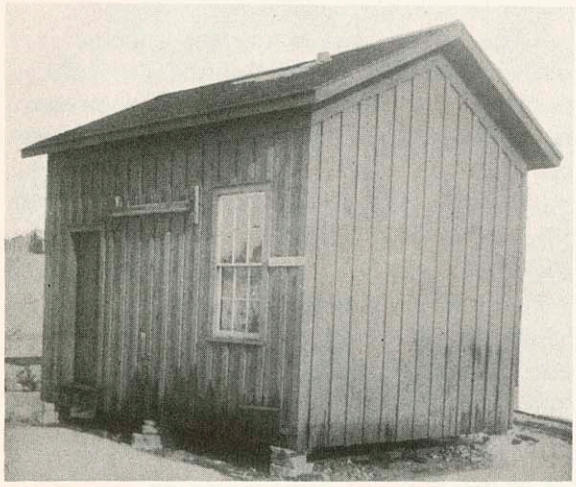
ELECTRICITY

"The electric light is perfectly safe and convenient and is destined to be the great illuminating agent of the near future."

With these prophetic words the editor of the *Appleton Post* on October 5, 1882, forecast the future of a then infant industry that since has more than fulfilled all early expectations.

It was on Saturday night, September 30, 1882, that the world's first water driven electric central station was placed in successful operation at Appleton, Wisconsin. This fact was duly recorded in the weekly newspapers of the time—the *Appleton Post* of October 5, and the *Appleton Crescent* of October 7.

Three buildings were lighted—two paper mills and one residence. The people of Appleton went to see them in those early fall evenings and marveled, declaring them to be "as bright as day." Then they went home to their own oil lamps or gas jets to discuss not only the new light, but also many other things of significance and interest.



First Hydro-Electric Plant in the World erected in Appleton 1882

Those were the days of livery stables, porous plasters, wood and coal stoves, and fleece-lined underwear, according to advertisements in the newspaper. Doctors, dentists, and lawyers were consistent advertisers, as were horse dealers and railroads. Patent medicines were offered, and presumably imbibed, in great profusion. A parlor organ, it seems, was required to impart the proper musical tone to the well regulated household.

Into such surroundings came electric service first in form of light, then power and heat, to contribute to and in many instances make possible the progress that since has been achieved.

Appleton, pleasant and progressive city in the bustling Fox River valley of Wisconsin, owes its distinction of having been served by the world's first Edison hydro-electric lighting system to the courage and foresight of a small group of its business leaders.

These pioneers of 1882 had no predecessors in the electric lighting business. The Edison system of producing light from power generated by dynamos had been demonstrated in exhibition plants, but its application to practical commercial service had never been tested. Thomas A. Edison's original central station, the Pearl Street plant in New York, wa still under construction when the Appleton plant was being projected.

Under such circumstances H. J. Rogers, A. L. Smith, H. D. Smith, Charles Beveridge, and a few others invested funds and staked their business judgment in this brand new enterprise.

The electric lighting system that they established was the first in the world to be operated by water power and the first central station system of any kind in the west, thus sharing historic interest with the Edison steam-driven Pearl Street lighting plant. Contemporary records show that the New York plant began operation September 4, 1882, and the Appleton plant September 30, 1882.

Mr. Rogers was the moving spirit in the introduction of electric light in Appleton. He was president of the Appleton Paper and Pulp Company and, odd though it may seem, president of the Appleton Gas Light Company.

The story is told that Mr. Rogers first became interested in the electric light while on a fishing expedition with his friend, H. E. Jacobs of Fond du Lac. Jacobs represented the Western Edison Electric Light Company of Chicago, incorporated May 25, 1882, for the licensing of Edison lighting plants in Illinois, Wisconsin and Iowa. Between nibbles, it is related, Fisherman Jacobs gave Fisherman Rogers a glowing oration on the future of the electric light.

At any rate P. D. Johnston, an engineer for Western Edison, appeared in Appleton in July to explain the new lighting system to a group of men headed by Rogers. As a result of his visit these men determined to test the possibilities of electricity for lighting their mills and their homes.

Rogers at this time was building a pretentious new home on a bluff overlooking the river. Probably a desire to provide his dwelling with all the newest conveniences partly prompted his interest in the electric light.

Two Edison "K" type dynamos were ordered, the first being installed in the beater room of the Rogers mill. That mill, the Vulcan Paper Mill, and the Rogers home were wired, and each was directly connected to the generator.

Little of the preparatory details was published at the time. There was still considerable public skepticism over the venture, and its sponsors were far from cocksure over what might happen. In fact, a false start was made. On September 27 the dynamo was operated but the lamps wouldn't light. Edward T. Ames, who had installed the generator, was summoned from Chicago. Survivors of those thrilling times relate that even Mr. Ames had to use the trial and error method of correcting the deficiency.

On the night of September 30, however, a successful start was made. As the dynamo gathered speed the carbonized bamboo filaments slowly became dull red, bright red, and then incandescent. The miracle of the next age had been performed, and the newspapers of the next week reported that the illumination was "bright as day."

The early operators encountered plenty of problems but they conquered them with ingenuity and promptness. Because of the varying load on the paper mill beaters, the first generator ran irregularly, causing the lights to grow unduly dim or bright. Often the high voltage burned out the lamps. After a few weeks this condition was remedied by moving the machine to a lean-to attached to the mill office, where it was attached to a separate water wheel.

There were no voltage regulators, the operators being obliged to depend upon their eyes to gauge the proper brightness for the lamps. There was also no fuse protection, and when storms or falling branches caused short circuits, the plant had to be shut down until the trouble was found and corrected. At first there were no meters. Customers were charged so much per lamp per month, and they often left lights burning all night, since it cost them no more. In 1882 service was from dusk to dawn; 24 hour service came along later.

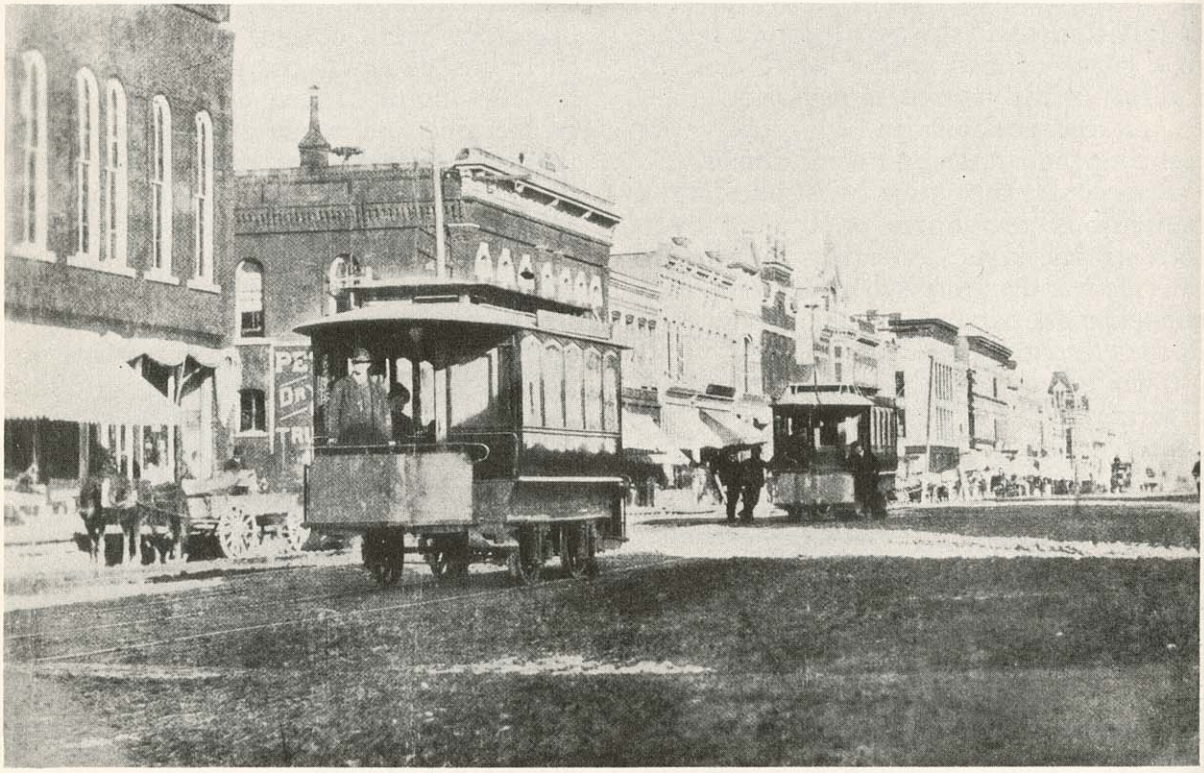
Distribution lines were of bare copper wire. Early house wiring had very little more protection. The thin wires were covered with a light insulation of cotton. The rubber casing in use today was not known then. Wires were fastened to walls with wooden cleats, and tape was wound around wires when they passed through partitions. Early fuse blocks were of wood, and wood was extensively used for sockets and switch handles.

The first dynamo installed in Appleton was capable of lighting 250 sixteen candle power lamps. This is equivalent to a rating of about 12½ kilowatts. Progress from this point was rapid. From irregular, undependable, flickering dusk-to-dawn service first supplied for lighting only, the industry has progressed to serve also thousands of power, heating, domestic, therapeutic and other requirements, and this with such a high degree of regularity and dependability that the most accurate clocks now obtainable are those that

operate on central station electric power.

An interesting glimpse into the past is obtained from a paper written by Al Langstadt, one of Outagamie County's pioneers.

"The charge for current was based on a flat rate of $2.00 per month per lamp (16 candle power) burning 15 hours per day. Customers were required to furnish their own equipment, including lamps which were sold at a uniform price of $1.60 each and had an efficiency of about 115 watts per 16 candle power. These lamps were supposed to have a life of 600 hours, but they lasted about 200 hours on the average."



First Electric Street Car in Appleton

ELECTRIC STREET RAILWAY SYSTEM

The year of 1881 saw a good deal of political, commercial and industrial activity in the city of Appleton. It was in 1881 that the present "City Park" was purchased for the sum of $13,000. At the same time considerable discussion had begun on the possibility of starting a movement for a street railway. George Kreiss was leader of the movement which by October 1881 resulted in the passage of an ordinance authorizing construction of a street railway "provided that the railway was to be operated by animal power only" unless the common council found the use of any other power not detrimental to the safety and comfort of the public.

On August 16, 1886, the Appleton Electric Street Railway Company commenced its operations over a system about four miles in length extending from State and Prospect Streets on the west to the cemetery end of Pacific Street on the east. The original system included a line from the C. & N.W.R.R. depot down Appleton Street hill to Oneida Street bridge and across the Fox River to the C.M. & St.P.R.R. depot on the flats. Operators

on this leg were short lived, since they made but one trip only. The car couldn't climb the Appleton Street hill under electric power and horse teams had to get it back to its starting point.

The early history of street cars in Appleton is best summarized in a letter written by Judge J. E. Harriman, president of the Street Railway Company, to the Van Depoele Company, which reads as follows: (*Electrical World*, May 21, 1887)

"Our road, as you know, commenced operating Aug. 16 last; except a few weeks to get the track all right and get the cars limbered up, we had a continuous run. The snow we found we could master; and did with the electric cars, pushing a snow plow which we made ourselves. The overhead wire, which we feared would give us the most trouble, has never bothered us, to exceed two hours twice this winter, although the telephone and telegraph wires were made useless for their business many times. We know that we have made more hours and better time all winter than we could possibly have done with animal power. We operate our road three miles, in schedule time, with three cars regularly, and the time does not vary a minute any day at the switches or at the end of the line. We run five cars on busy days. I do not need to elaborate—we cannot find any fault with the system. The wires have not been touched since last fall and the motors are doing their work perfectly. The travelers are doing well. The dynamo I have not heard from in a long time, although a new man is running it. All of the help that we have are new at the business, yet all runs like a clock. Hundreds have been here to examine our road, and, without an exception, have been perfectly satisfied that electricity is the future power."

During 1898 interurban service was inaugurated between Appleton and Neenah-Menasha. The Kaukauna extension followed in 1900. Electric street car service in Appleton was maintained continuously from 1886 to 1930 inclusive. Interurban service was abandoned during May of 1928. The inroads of motor bus competitions finally drove the electric cars out of the transportation field in Outagamie County.

Industrial Outagamie County

By Walter H. Brummund

On a recent map published by the National Geographic Society, that part of Wisconsin which includes Outagamie County was classified with the industrial northeast of the United States. While Wisconsin is now known the world over as an agricultural state, and is publicized as "America's Dairyland," a narrow band along its eastern border is pock-marked with islands of industrial activity. One such island is the Fox River Valley where in the short space of 35 miles from Lake Winnebago to Green Bay, the lower Fox River drops 170 feet. It happens that about 150 feet or roughly 88 per cent of such drop is within the borders of Outagamie County. It was only natural, therefore, that the ingenious minds of our pioneer business men soon turned the tremendous force of the racing river into a commercial advantage. Like the air, it was there for the taking and using.

Clusters of manufacturing plants now line the shores of the Fox, sluicing its water much like the ancients must have done with their fish nets, the paper mills taking big swallows to satisfy their industrial thirst.

From the vantage points of the Memorial Bridge at Appleton, and the Lawe Street Bridge at Kaukauna, it is easy to see that the river is the industrial backbone to the surrounding area.The weathered appearance of some of the older buildings perhaps gives the impression that it has always been that way. Actually, all that is visible today are the results, the totals and balances, the fruits of a century of promotion, of business venturing, of reverses by fires, bankruptcies, panics, depressions, booms and wars of inventions and development. Industri-

ally, Outagamie County wasn't always as we now see it.

Initially the river was solely a means of transportation, and the histories of the time tell of the early use which was made of it by travelers coming from the east on the way to the Mississippi. The Fox was then as now, a link in the marine highway from the Atlantic coast to the middle west. Only water transportation was much more important in those days because there were no railroads servicing the area. But the very characteristic which makes it valuable today, its abrupt descent, proved a barrier to its earlier full use. The river, in its natural state, presented almost a continuous series of rapids from Lake Winnebago to Green Bay. There were eight rapids within a space of 28 miles. As a consequence, river improvement by way of dams, canals and locks became an all important matter.

The importance of the river to an industrial community was recognized early. As one enthusiastic editor of the time put it, "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 driving all kinds of mills and machinery."

The facilities afforded by the river attracted industries which depended on water and power, and soon flour and paper mills were built along its banks. None of the early establishments is here today. During the years that the county has had existence, authorities claim that its industry went through three rather distinct periods of economic development. The original lumbering was succeeded by flour milling which in turn was eclipsed by paper making. But even as the first phase was beginning, forerunners of the succeeding ones were already present. Thus, in May, 1854, it is recorded that there were the following industries in Appleton alone: Lumbering: 4 saw mills, 2 lath mills, 1 planing mill, 2 sash and blind factories, 1 chair factory, 3 cabinet ware rooms, total 13; Flour Milling: 2 flour mills; Paper Making: 1 paper mill.

Much of the industry was financed by eastern capitalists, who had heard of the wonderful water power, came to have a look and invested.

The first saw mill and first grist mill were erected at approximately the same time. Famed Augustin Grignon settled on the north bank of the Fox at Kaukauna and there in 1818 (some say 1817) he erected a saw mill and a grist mill. Several years later, in 1825, David Whitney erected a saw mill just across the river on the south bank of the Fox. Three years later, in 1828, John Smith established a flour mill in Kaukauna.

It wasn't until 1850 that the first saw mill was put in operation in Appleton. It was built in 1848 and 1849 for Amos A. Lawrence of Boston, and incidentally was the first building erected on the water power at Appleton. It was eventually known as the Riggs Saw Mill after C. R. Riggs who years later became its owner. Actually there was little industrial activity registered in Appleton until about 1853 or 1854 when there were many industries commenced within apparently a matter of months.

Indicative of the amount of building going on was the fact that in 1854 three and sometimes four saw mills were in operation day and night. Practically all lumber was used right in the county, and much was even shipped in. Paradoxically, in this early forest, the shortage of lumber was great. Appleton boasted that there was more building going on in the city than in Madison, Fond du Lac and Oshkosh combined. One shipment of lumber from the Fox River regions aggregated about 3,000,000 feet. People didn't wait until the river opened up for rafts, but began hauling as early as January in 1855. Not all of this lumber went into buildings, however. A plank road between Appleton and Kaukauna consumed much of it and also many wooden bridges were con-

structed over the Fox, adjacent small streams and large ravines. Four years later, in 1858, there were five large saw mills, two of them reputed to be the best in the state. While the amount of lumber manufactured is not known, it was estimated to be somewhere between two and three million feet.

Industrial operations of the time were by no means small. For instance, in the spring of 1858, the Dunn & Brewster barrel factory employed from 40 to 50 men, and its first year's trade totaled some $30,000. Its factory, consisting of 10 buildings spread over several acres of land, cost $40,000. Six years later, in 1864, its business had jumped to $75,000. Another example of the size of operations, during the winter of 1861-1862, loggers placed 12,170,000 feet of lumber on the Shiocton River. In 1871-1872 the amount of lumber logged was said to be 50,000,000 feet!

By 1864 the lumber business had taken a shift, and instead of importing lumber, the industry began exporting. Large quantities of timber had been purchased the previous winter through the northern portion of the county. An enormous amount was shipped to Chicago by rail in the spring, and it was said that many thousands of staves, barrels, rakes, hubs, brooms, hoe handles etc. were manufactured from it. In fact, so much lumber had been shipped out of the county that by June of the same year, lumber in Outagamie County was scarce.

The lumber business flourished. One Saturday in February of 1866, there were more teams in Appleton loaded with timber than had ever been in the city before. A timber lot within 10 miles of Appleton was said to be worth more than many wheat harvests. One manufacturer advertized for 500,000 feet of lumber. Where timber was a burden to a farmer but a few years ago, it was now a great resource. In the words of the then Mayor elect of Appleton, James Gilmore, "Many a farmer has told me, of a truth, that he could never have paid his debts,—and rear and support his family but for the timber on his land." And well they should have prospered from the prices they were getting. Oak, white pine and ash logs were selling as high as $10 a thousand, butternut ran as high as $12, basswood and maple $8. Today, in 1948, these same farmers would be getting $50 per thousand for oak, pine and maple, $40 for ash and $60 for butternut and basswood. Double that for veneer logs.

While to easterners this was crude backwoods country, in 1868, the Kaukauna Lumber & Manufacturing Co. was the first in the United States to operate a saw mill by electricity.

Tracing the history of this vast activity in lumber, one wonders where and how they disposed of it all, for surely the ordinary building activities would absorb but a fraction.

An answer is perhaps found in such transactions as the one in 1871 in which Parish, Webb & Welly, local barrel manufacturers, sold 12,000,000 oil barrel staves and headings to match to the Standard Oil Company of Cleveland, for a consideration of $400,000.

But even as timber still brought in the big cash money, the rumbling of the flour mills was getting louder. It was quite natural that as settlers stripped their land of wood, they inevitably became farmers and hence flour milling was a logical successor to lumbering. Flour milling as an industry, seems to have had practically an even start with lumbering. Its mills were built simultaneously with the lumber mills and flour milling also flourished almost immediately. While not a pound of flour was milled in Outagamie County in 1850, it was estimated that by 1858, 25,000 barrels of flour were shipped out of the county during the months of April, May and June alone. The next year the figure jumped to 30,000, the next to 45,000, and in 1861, for the same period, 70,000 barrels of flour left the county. F. & C. Pfennig, owners of the Genessee Flouring Mills in Appleton, in 1863 ground and marketed a little more than 30,000 barrels of flour alone. Their mill,

evidently one of the largest, was 70 feet by 32 feet, three stories high and it had a weekly capacity of 700 barrels. At that rate it must have run on a capacity basis the year round.

The prospects for Outagamie County as a flour milling center looked pretty good to John Verstegen too, for in 1863 he thought enough of the idea to build a mill at Little Chute. It had two runs and still an extra one could be put in whenever required. He was taking no chances on turning business away like the Pfennigs at Appleton most likely had to do.

For a time at least it seems that the millers had all the business they could handle, for one chronicler reports that "On the last Saturday in September (1864) there was paid out at Appleton in cash for wheat in wagons the sum of $14,000. Men who witnessed this condition of things remembered that but a few years before all the flour they used was brought in a boat. On the following Monday also there was an unbroken line of teams to the flouring mills from 8 o'clock in the morning until 6 o'clock at night."

That well may have been an all time record they made on that Saturday and Monday 84 years ago, for it would be impossible to duplicate today. The milling business has long since moved west with the wheat it ground. Flour milling does not seem to have assumed the proportions of either its predecessor, lumbering or its successor, the paper business.

Early Industry—Conkey Flour Mill (1853) on the left; pulp mill in center background; Rake Factory (1857) at right.

It must be remembered that paper was being manufactured in Outagamie County even as the saw mills and the flour mills were each in turn basking in the limelight. As the flour mills along the Mississippi at Minneapolis began to draw away the wheat trade, the local millers did not have to look far for a likely substitute.

The businesses of flour milling and paper making, related to each other through a common need for power and space, were industrial cousins at least.

History records a paper mill in Outagamie County (at Appleton) as early as 1853. It manufactured wrapping paper, and soon after it began operation in 1854 it was running night and day filling the orders. The establishment, as originally built was apparently called the Edwin Atkinson Mills, but soon was to be known as the Appleton Mills of C. P. Richmond, its owner. To the disappointment of the local newspaper, the *Crescent*, it did not manufacture newsprint, and this had to be imported from Beloit. By April 1857, however, the *Crescent* proudly reported that its issues were being printed on paper manufactured in Appleton, and it was of good quality, even if it was a little rough.

As frequently happened in those days, the paper plant was nearly destroyed by fire. Its owners promptly issued a circular stating that a new mill would be in operation within a matter of three or four months. Today, if one goes to the Interlake Mill of the Consolidated Water Power and Paper Co. at 1130 East John Street, Appleton, he would be standing on the site of the old Richmond mill.

Under the supervision of John Stovekin, a large paper mill was built at Kaukauna in 1872 to 1874. The main building alone was three stories high and was 50 feet square. Three water wheels were used, the steam boiler had about 70 horse power and four boiling tubs were kept busy all the time in sections of two. By September of 1875, Stovekin and his associate, Colonel Frambach were making three tons of straw paper a day.

The Fox River Paper Corporation at Appleton began business in 1883. Today it is the largest single paper mill employer in Appleton. The company secured a site by acquiring the Lincoln and Ravine flour mills. It is one of the largest manufacturers of fine writing papers and the largest manufacturer of reproduction papers.

In 1878 the property still known as the Atlas Mill at Appleton, was built to produce ground wood pulp by a newly developed process. The story is told that the owners ran into patent difficulties, depleted their funds, and so Kimberly-Clark and Company, of Neenah, helped them complete their building for an interest in the concern and eventually, in 1907 Kimberly-Clark became its sole owner.

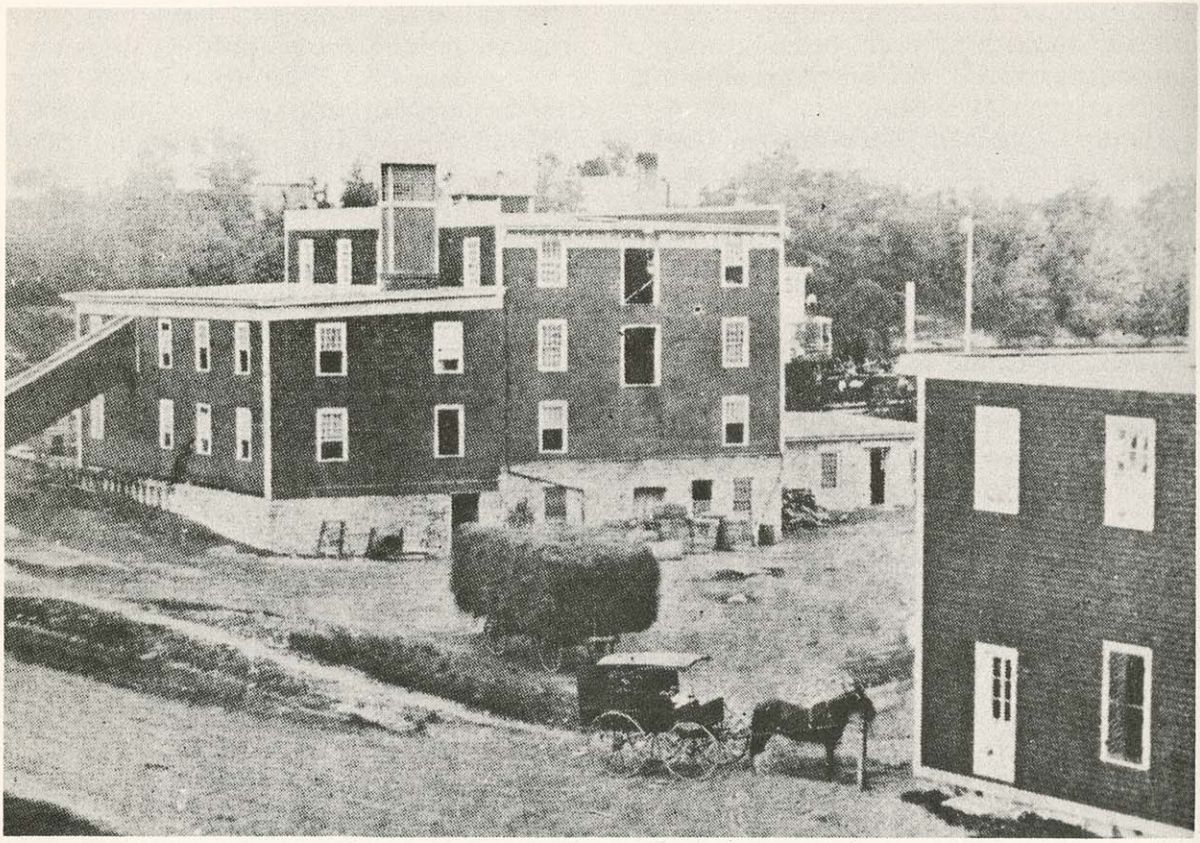
A year after Atlas came into being, in 1879, the old Genessee flour mill was purchased by Kimberly-Clark and Company who continued to mill flour for a time, but eventually converted it into a paper making establishment. That's what happened to the Genessee flour mill.

The Thilmany Pulp & Paper Co. at Kaukauna, got its start in 1883 and it is today one of the major producers of a large number of grades of sulphate fibre paper. It was first a ground wood pulp mill. In 1911 it had five machines; today it has seven. In 1911 it employed 190 people; today it employs 1,300.

A unique industrial development has taken place at Kimberly. There the Kimberly-Clark people built a mill and the village grew up around it. The mill furnishes employment for about 1,600 people which makes it the largest single employer in the county.

An unusual pattern of manufacturing activity is shaped by the peculiarities of the paper industry and the versatility of its commodity. As authorities explain it, first of all, while paper can be made of such things as agricultural products, the most important source of the fibre out of which paper is made is wood. Secondly, to get the fibres out of the wood, it must be processed. One way is to mechanically grind it to a pulp. Another way is through the use of chemicals, an "acid" process makes sulphite pulp, and an alkaline process makes sulphate or kraft pulp. Thirdly, paper is made from that pulp. Fourthly, from this paper are made a variety of special products. Timber to pulp to paper to product.

Thus, keeping these steps in mind, there are some mills where the tree goes in one



First Appleton Paper Mill Run by Richmond Brothers

end and the finished product comes out the other. The Kimberly mill of Kimberly-Clark using the ground wood and sulphite processes makes a wide variety of book paper. The Combined Locks Paper Company using the ground wood process makes similar grades. The Thilmany Mill using the sulphate process makes bag and wrapping paper. The Fox River Paper Corporation begins with rags (adds wood pulp to some) to make fine writing papers. Then again the Interlake mill starts with trees and ends with Mitscherlich sulphite pulp. Riverside Paper Corporation (writing paper) on the other hand, starts with pulp and ends with paper. Lastly, there are those who do nothing but convert, they are the factories which start with paper, print on it, form it, emboss it, or treat it. The Appleton Coated Paper Company coats paper for a variety of products including tickets and tags. The Atlas mill makes wall paper. The Badger Tissue Mills at Kaukauna makes tissue products, and the Tuttle Press at Appleton makes such items as crepe paper, table covers and napkins.

One significant result of this specialized activity in paper is that through the years, there has been built up in this area by generations of training a vast reservoir of skilled craftsmen and artisans such as is rarely duplicated elsewhere.

Perhaps mindful that the uncertainties of life also apply to industry, the entire paper fraternity has collaborated in establishing a graduate school and research body which specializes in the chemistry of paper. Called the Institute of Paper Chemistry, it is located at Appleton and is the only one of its kind in the United States.

In hearing of the industrial metamorphosis of the county for the past 100

years, one might easily gain the impression that lumbering, flour milling and paper making were the only industries of any consequence. Such, however, is not the case. Paging through the old books, one finds an unusually wide variety of enterprises, including such strangers to each other as tanning, watch making, machine shops, woolen mills, agricultural implements, blast furnace, horse nail factory, and yes, also a cracker factory, all of which have contributed to the present industrial diversification of the county. Today there are still many descendants of those same early industries and a number of new ones in addition. Among the new ones can be included a casein plant, a paint factory, several pattern works, an ornamental iron works, several printing establishments, a cooperative dairy products plant, and manufacturers of electric arc welding equipment, generators and motors, a veneer plant and foundry, canning factories and a car mover factory.

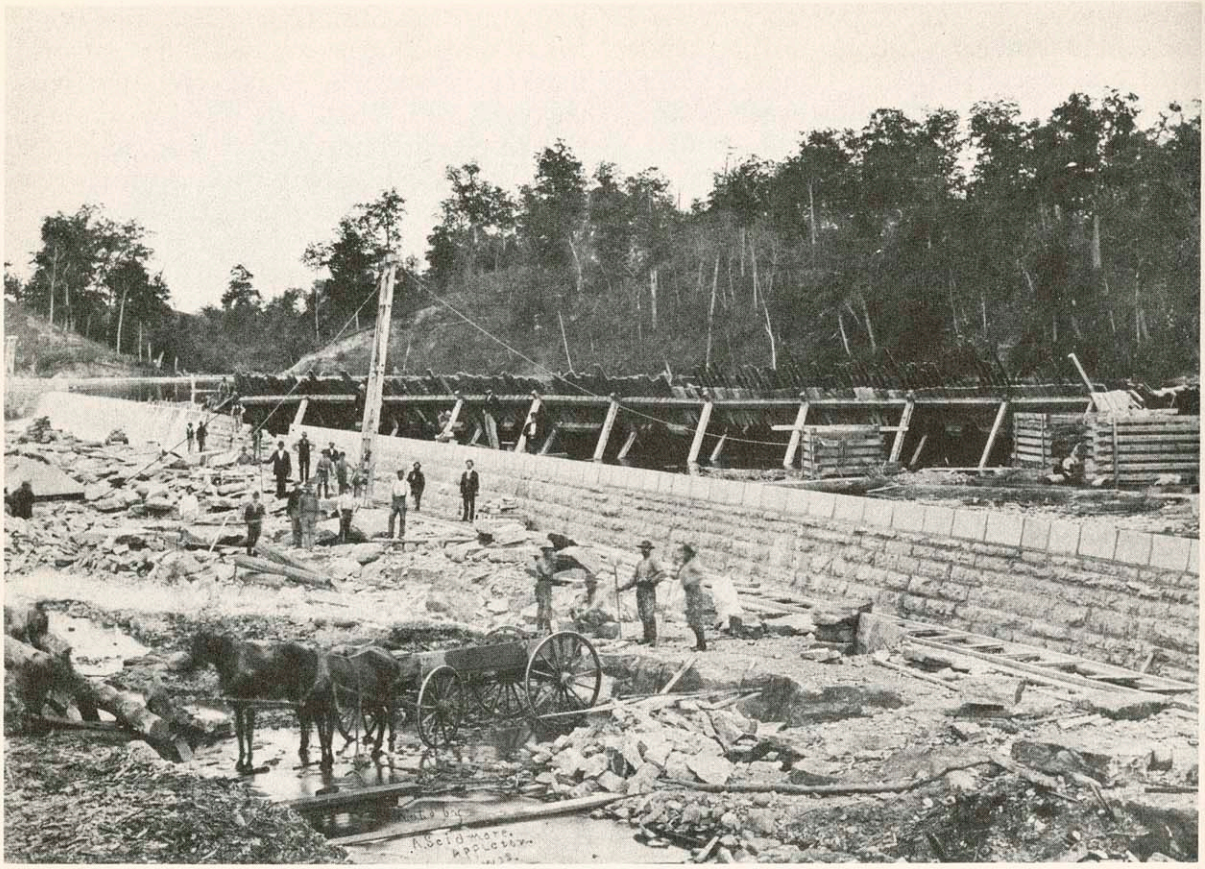
A unique industry of today is Western Condensing Company which manufactures such products as powdered whey, milk sugar, butyl alcohol and vitamin concentrates. Milk sugar is used in the process of manufacturing the new drug penicillin. Another industry is Scolding Locks Corporation, which, as its name might suggest, manufactures hair pins, and employs a sizeable number of persons in doing so (194).

In the wake of the paper industries are such specialists as the paper mill machinery companies, wire cloth weavers, manufacturers of paper makers' felts, of woods plugs for paper rolls, of plates for paper mill machinery, and of paper water marking equipment. The mythical firm manufacturing the hole in the doughnut had nothing on a real firm in Appleton which makes the paper tubes and cores for the paper rolls.

Some of these firms are not satelites, but are important in their own right. The Appleton Machine Company has a foreign market for its paper mill machinery. The larger Valley Iron Works, in addition to paper mill machinery manufactures other heavy duty equipment. It too has a world market. None the least are the wire weavers, the Wisconsin Wire Works and the Appleton Wire Works. The Appleton Wire Works ships woven fourdrinier and cylinder cloth wherever there is a paper mill. It is one of the largest producers of its product in the world.

No writing on the industrial history of Outagamie County however incomplete could afford to omit a special mention of the wool products industry. One firm, the Appleton Woolen Mills, makes special products such as felts used in paper making. Others have no connection with the paper industry and manufacture such items as mittens, hosiery, sweaters and other apparel. Historically too, the industry can boast of an early start. It is reported that the first woolen mill was built in Appleton in 1861 by a man named Huntington for a man named Hutchinson to help fill the war orders for the Union Army. By 1862 it was in full operation and was doing a large amount of carding. As the price of wool had gone up to amazing proportions, farmers began purchasing sheep. Believe it or not, 140,000 pounds of wool were marketed in the county in 1868. A year later the sheep population was registered at 12,555. One time in June of 1871 sheep were worth from $10 to $14 a head and the price of wool on the Appleton market shot up to 53½ cents per pound. Today it is around $1.00 a pound.

Fire broke out in the woolen mill just after it had a good start but a new one was erected and ready for operation "fully prepared for all kinds of work usually done by institutions of that kind." By 1862, Smith & Hutchinson, the then owners of the mill announced that an additional mill, to cost $200,000 was to be established in Appleton at the site of the old Wharton saw mill. It was supposed to be the largest plant in the state. The Appleton Woolen Mills, still on the original site, is today's successor to the old Hutchinson mill. It, together with



Construction of U. S. Upper Dam, Appleton, 1874

the Fox River Knitting Company and the Zwicker Knitting Mills employs about 1000 people, and Zwicker is Appleton's largest single employer.

As one skims over the explanations of why certain industries located here rather than somewhere else, the finger runs past "source of supply of raw materials" through "abundance of power" and comes to rest a moment on a third reason, namely, "proximity to a market for finished product." Especially rich in agricultural resources, the Fox River Valley is a natural location for industries which supply a farm market. Thus, it was no accident which caused Richard Miller, an enterprising young blacksmith from Stephensville, to start his Eagle Fork Company in Appleton in 1879. The company manufactured a mechanical fork for unloading hay and soon branched out into other agricultural equipment. Today, the Eagle Manufacturing Company, a direct descendant of the old fork company, itself now in its sixtieth year, and its neighbor the Fox River Tractor Company and several smaller concerns supply not only the needs of valley farmers, but those in the nation and in foreign lands as well.

While lumbering as an industry connected with the local source of supply faded, the wood products concerns never really died out and are very much in evidence today. Firms manufacture chairs, and not just ordinary chairs either, but high chairs and kindergarten chairs, crates, boxes, butcher blocks, cutting tables, plugs, cheese boxes and veneer for the tops of cheese boxes.

Ironically enough, one of the distressing things about the industrial growth of Outagamie County are the reports of the

large number of fires, this with an abundance of water nearby. It is perhaps understandable when it is realized that both the materials used and the structures were highly inflammable, but it deserves mention, nevertheless. Page after page tells of complete burn outs which by sheer repetition became commonplace. If one wonders about how some of the early industries vanished, this is what happened to them. Many a going concern ended in flames never to start up again. Some, however, like the Richmonds with their paper mill in 1859, and Hutchinson with his woolen mill in 1863, started right over again.

Few would suspect that in a corner of the industrial history lurks an oil boom. Yes, in Outagamie County, Wisconsin. More correctly speaking, it would be an oil, gas and mineral boom. Coal was supposed to have been found on a Ballard farm and copper was discovered in a number of spots but in no commercial proportions. As for the oil and gas, well, in 1865, a gentleman by the name of S. J. Roudebush had a farm near Appleton, and on this farm there was a well, and in the well there was some gas which, from a depth of 60 feet rushed out with "a gurgling noise in large quantities," and which, when ignited burned to a height of several feet. Where there's gas there must be oil, and one may imagine what this did to the price of land around farmer Roudebush's place. Two instances are reported when oil was actually discovered. One of the wells of the Northwest Petroleum Company is said to have brought up oil daily, and farmer Leonard Smith's land in the town of Center also showed traces of oil. A number of companies were formed and wells were sunk, but other than the two instances mentioned, they apparently only found what they already knew they had—gas. Gas there was. And in some quantity too, for in 1886 a fuel gas company was formed to sell the natural gas. An ordinance limited the price to 33 cents per thousand feet. In that year the firm of C. E. Grey & Son bored a well and struck gas at 50 feet. It roared up and promptly died out.

The Outagamie County industrial community would seem to be thriving and healthy. At night the thousands of industrial lights certainly give that impression. A number of reasons have been advanced for such a state of well being. Some have said that the diversity of individual enterprises has given the group as a whole a hard core. Surely the paper industries, no longer novices but masters in their field have given it stability and longevity. The promotional era is passed. Industries themselves are taking steps to assure a healthy future through research. There appears to be no evidence of the beginning of a transition into another phase of industrial development, and no disturbing influences are in sight.

In taking a final look over the last 100 years, there remains but one disquieting note. In 1891, 16 factories making 1,977,850 cigars were in operation around here. Today there are none.