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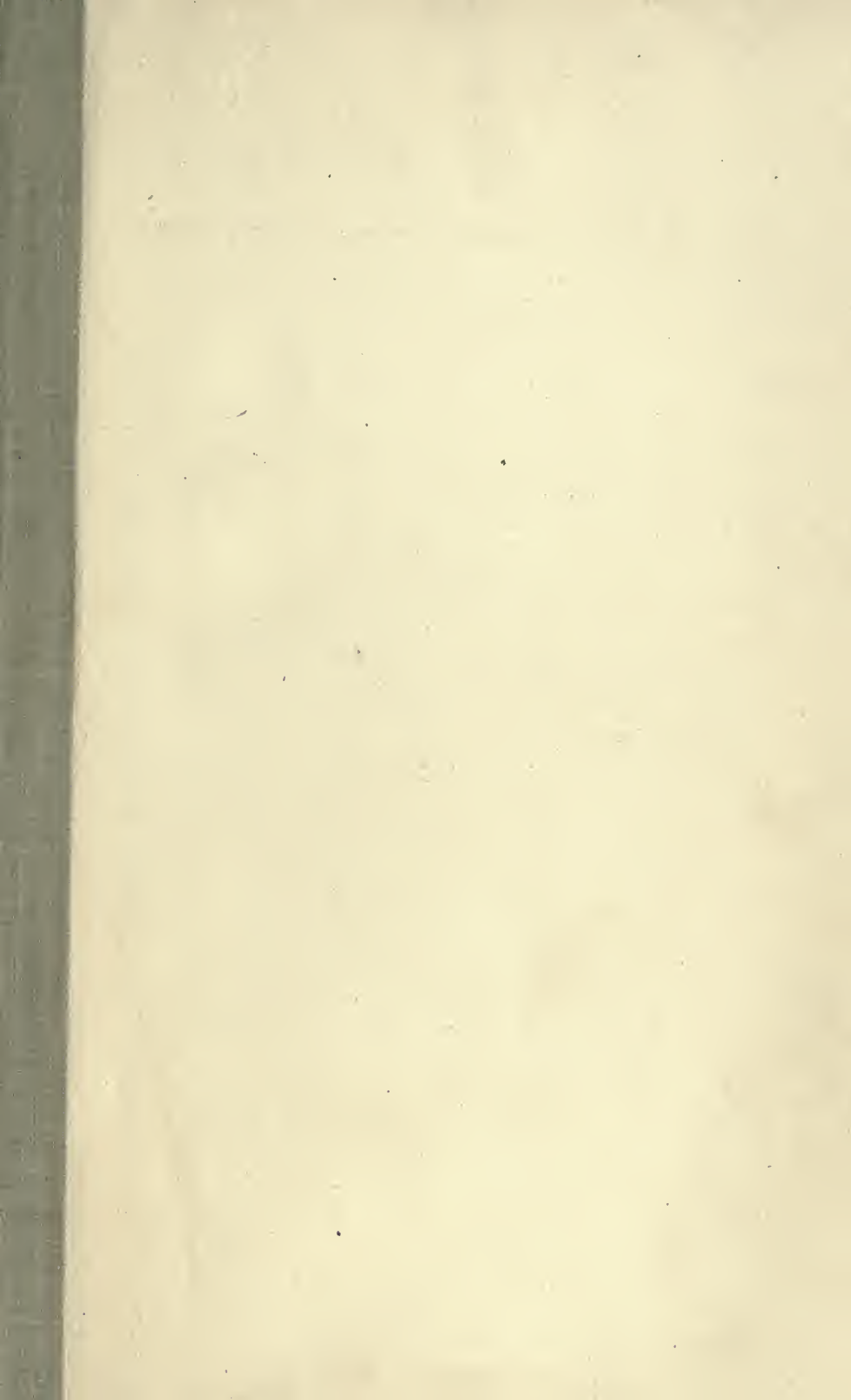
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HISTORY OF FLOUR MANUFACTURE IN MINNESOTA.*

BY COL. GEORGE D. ROGERS.

PROGRESS IN METHODS OF MILLING.

It is recorded, and is probably true, although it does not come within the milling experience which it is my privilege to review here tonight, that the first mill operated in Minnesota was the hand mortar of the Indian aborigines. This make of mill seems to have been much on the plan of that described in the Bible, the mortar used by Moses in grinding corn and manna in the wilderness within sight of Canaan. Speaking of Moses and milling, you will pardon me, if in passing I call attention to the fact, that this great law-giver of Bible record, the first legislator of historic repute, exempted the mortar or mill of that day from being taken in pawn, because, said he, it would be like taking a man's life to take the mill from which proceeds life's staff. But the hand mortar of Moses and the red man is no longer used in the flouring industry of Minnesota, and its further history we will leave with our friends, the apothecaries, who long since secured the monopoly for the use of this kind of milling machine.

The next step in the evolution of milling in the Northwest was the introduction of the hand-mill by the early territorial pioneers. The hand-mill was the prevailing mill in use among the ancient Britons down to the time of the Roman conquest. It is

*An Address at the Annual Meeting of the Minnesota Historical Society, January 21, 1901. The author was aided in the preparation of this paper by Mr. Frank N. Stacy, who also read it at this meeting.

still in use in Minnesota by the wives and daughters and by the retail grocers for grinding the family coffee. For a full account of the milling industry and process connected with the hand-mill, you are respectfully referred to the Daughters of the Revolution or to the Minnesota Retail Grocers Association.

The horse-mill followed the hand-mill. Fifty years ago it was not an uncommon sight, on the prairies of Illinois, Iowa and southern Minnesota, to see a farmer coming in a distance of ten to twenty miles with an ox team and camping around a bonfire sometimes two days and a night, dining meantime on parched corn, while he waited his turn to get a sack or two of corn ground at the one and only horse-mill in that section. For the horse-mill we are said to be indebted to the Romans. For an exhaustive account of its modern use in Minnesota, you should apply to the farmers who grind feed for live stock.

From the horse-mill there was a broad progressive stride to the windmill as a source of power in flour manufacture. Wind grist-mills are of great antiquity, and are still operated in Europe. The crusaders of the thirteenth century introduced them into England, France, Germany, and Holland, borrowing the invention from the Saracens. In the seventeenth century wind grist-mills decorated the hills of New England, just as the water mill afterward sung in the valleys. An early historian of Minnesota, J. W. McClung, speaks of the wind grist-mills at St. Peter and Mankato, that at the latter place, in 1868, grinding 160 bushels of wheat daily, which would be equivalent to perhaps thirty barrels of flour. In 1876, Mr. A. Simpson, of Owatonna, in a contribution to the Northwestern Miller, in answer to an inquiry regarding wind grist-mills, said: "I have operated a Halliday power mill since 1867 with satisfactory results. The wind wheel is 60 feet in diameter and furnishes 45 horse power. It runs three run of buhrs with all necessary machinery in a common gale. The wheels are perfectly self-regulating and durable. I have ground in one month 3,540 bushels of wheat and over 1,200 bushels of feed. As good flour can be made with wind power as with any power and as much per bushel. The mill runs about three-fourths of the time during the year, part of the time running one run of feed. There are seven 60-foot wind wheel flouring mills in this state, two in Wisconsin, one in Nebraska, and several more with smaller wheels, all doing a good business."

This description is doubtless news to most of the milling profession of Minnesota, as well as to many of our pioneer citizens. The writer talked as though he might be an agent for the Halliday mills, and before his words are accepted as verified history it might be well to have the subject of wind-grist mills investigated by a joint committee of eloquent members of the legislature now in session.

(Nature laid the foundation for the milling industry of Minnesota when she filled the soil and atmosphere of this chief wheat belt on the globe with such a remarkable quality and quantity of food nutrition, and laid through the woods and across the prairies such a cordon of strong and reliable streams, carrying power to cheaply and efficiently convert the wheat of the Northwest into flour.) After that, it was simply a matter of human energy and method; the ultimate result was assured. In 1899 Minnesota raised the largest wheat crop ever produced by this or any other state, and the largest mill-power ever got together in one state converted it, with half the crop of the Dakotas thrown in, into 25,000,000 barrels of flour,—enough to feed one-third of the people of the United States one year.

THE GOVERNMENT MILL OF 1823.

It is interesting to note that the first flour mill built in Minnesota was owned and run by the government, and that the first wheat raised was planted and harvested by the government. One of the first acts of Col. Snelling on taking possession of the fort named after him was to send a detachment of fifteen soldiers to St. Anthony falls to build a mill. Commissary Clark, father of Mrs. Charlotte O. Van Cleve, who is still a resident of Minneapolis, was the first to suggest the raising of wheat and flour to support the soldiers. That was the beginning of Minnesota's wheat and flour industries.

At the annual meeting of the Minnesota Historical Society, twenty-one years ago this month, there was exhibited a letter, dated Washington, D. C., August 23, 1823, from General George Gibson, commissary general, as follows:

From a letter addressed by Col. Snelling to the quartermaster general, dated the 2nd of April, I learned that a large quantity of wheat would be raised this summer. The assistant commissary of subsistence at St. Louis has been instructed to forward sickles and a pair of millstones to St. Peter's

If any flour is manufactured from the wheat raised, be pleased to let me know as early as practicable, that I may deduct the quantity manufactured at the post from the quantity advertised to be contracted for.

In a second letter General Gibson said :

Below you will find the amount charged on the books against the garrison at Fort St. Anthony for certain articles, forwarded for the use of the troops at the post, which you will deduct from the payments to be made for flour raised, and turned over to your free issue :

One pair buhr stones	\$250.11
337 pounds plaster of Paris.....	20.22
Two dozen sickles	18.00

Total..... \$288.33

Such was the infantile milling plant and harvesting outfit with which the grain and milling industries of Minnesota saw daylight and a cradle. That was seventy-eight years ago, back in the infancy of the oldest pioneer members of this society.

THE FIRST CUSTOM MILLS.

It was not until about a quarter of a century later, that the first grist mills were built for the accommodation of the general population. (The wheat industry and the milling industry properly may be said to cover a half century. The United States census of 1850 credits Minnesota with a wheat product of 1,401 bushels, and a flour product valued at just \$500. In the fifty years history of our cereal industries, therefore, the wheat product has grown from 1,400 bushels to near 70,000,000, and the value of the flour output from \$500 to about \$100,000,000.)

Excepting the government mill, the earliest flouring mill in Minnesota was built by Lemuel Bolles in Afton, Washington county, in the winter of 1845-6, as noted in Folsom's "Fifty Years in the Northwest." A grist mill had been built in Little Canada, Ramsey county, by Benjamin Gervais in 1844.

From 1850 to '55 small grist mills were planted on the streams of about a dozen counties of the territory. The river counties, Houston, Winona, Wabasha, Dakota, Washington, Chisago, Hennepin, Sherburne, and Stearns, were the first to build mills. Chatfield and Rochester had each a mill in 1855, and Northfield and Preston in 1856. E. P. Mills & Sons of Elk River, Sherburne county, place the date of construction of the little 30-barrel mill by the famous pioneer, Ard Godfrey, at that place,

in 1851. It was in 1851, also, that the first grist and merchant mill was erected at St. Anthony Falls, in East Minneapolis. It was built by Richard Rogers, between First and Second avenues southeast, and began business on May 1, 1851, as a grist mill with an equipment of one run of stone, all told, to grind corn. In 1852, Franklin Steele became partner in the enterprise, and the growth in the firm and capital was celebrated by the addition of a second run of stone to grind wheat as a merchant mill. This pioneer mill survived until the fire of 1857.

EARLIEST MERCHANT MILL AND EXPORT.

(Merchant milling in Minneapolis made its first substantial beginning in 1854, when Eastman, Rollins and Upton erected on the lower end of Hennepin island a five-run mill, 40 by 60 feet, at a cost of \$16,000. That it was a profitable enterprise, is shown by the fact that the firm realized \$24,000 profit the first year. This mill was famous for the title, "The Minnesota," and it well earned its name. There was not wheat enough tributary to Minneapolis within the state in those days to supply the mill, and wheat was hauled by wagon 100 miles from Wisconsin, or was brought up the river by boat from Iowa.

|"The Minnesota" was the first mill to ship Minnesota flour to eastern markets. This it did in 1858, paying \$2.25 per barrel freight, which is over five times the present transportation rate and is three-fifths of the present value of the flour itself.)

THE FIRST MILL CORPORATION.

New Ulm, the home of ex-Governor John Lind, lays claim to being the first town to incorporate a milling company under the laws and constitution of the state. Its articles of incorporation read: "Recorded in Vol. 1, pages 1, 2 and 3 of Incorporations." The firm name was the Globe Milling Company of New Ulm. The incorporators were the German Land Association. The purpose of the milling company was stated to be: "The business and object of this company is to manufacture lumber and flour. The capital stock of the company is \$30,000; the number of shares, 1,500. The capital stock actually paid in is \$265." The mill, which had a daily capacity of fifty barrels, was already constructed and in operation when Minnesota entered the Union as a

state. It was operated until the Sioux outbreak in August, 1862. At that time New Ulm had three mills: The Eagle, erected as a sawmill in 1856; the Globe, erected in 1857-8; and the Windmill, with "one set of buhrs for flour, and one run of stones for flax-seed," in 1859. All were burned to the ground in the Sioux attack of August 23, 1862. The Indians began firing the town to windward early in the day, burning 190 houses, including the Globe and Eagle mills. The Windmill, which held a strategic position at the foot of the range of hills, was used by the white riflemen as an outpost, during several hours of the fight, but finally succumbed to the flames.

The Eagle mill was rebuilt after the war and converted into a 4-run flour mill in 1867; again into a 225-barrel roller in 1881; and finally was enlarged by the present Eagle Roller Mill Company into a 1,200-barrel mill, being one of the best country mills in the state. As an outgrowth of the Globe Milling Company, the New Ulm Roller Mill Company, with Benjamin Stockman, president, and the veteran Charles L. Roos, secretary and treasurer, operates two mills of an aggregate capacity of 700 barrels. New Ulm has retained its early precedence as a milling town, and today boasts an annual output of 400,000 barrels of high grade flour. Brown county today runs eight flouring mills, with a total daily capacity of 3,500 barrels.

MILLING AT NORTHFIELD.

Two years before the incorporation of the Globe Mill Company at New Ulm, John W. North founded a mill and a town at Northfield. Jesse Ames & Sons bought the mill in 1864, building a new mill in 1869-70. The Ames mill was known as one of the most successful in southern Minnesota. Unlike the New Ulm mills, the Northfield mill did not have to contend with the Indians and fire; but it did have to fight the Grangers and water.

So impressed were the Grangers of Rice county with the success of the Ames mill, that they organized a company of well-to-do farmers and built another just a mile down the stream, starting up their mill in the winter of 1873-4. Spring opened with war. The Grange mill backed its water upon the Ames dam, and the Ames mill employed its tail race as a weapon of war to no avail. The result was a battle of lawsuits and newspaper articles,

which led to flowery eloquence, but not to profits in flour. It was at that time that Capt. John T. Ames achieved great celebrity, not only as a miller, but as a brilliant writer of Philippic invective. He always maintained that the Ames mill made larger profits and paid less for wheat after the Grange mill came into the field, than before.

THE FAME OF ARCHIBALD.

(On the Cannon river, only three miles from the Ames mill, was the mill of the famous Archibald, the Scotchman who made Cannon river celebrated in eastern markets long before Pillsbury added fame to the upper Mississippi. Long before the new milling process was introduced in 1871, Minneapolis millers used to make trips to Dundas and peek into Archibald's mill, to see if they could fathom the secret of Archibald's flour beating Minneapolis flour \$1 or more per barrel in the New York and Boston markets. Charles A. Pillsbury had an idea that the difference in the flour was due to the quality of the wheat. So he managed one day to put in his pocket a handful of the Ames and Archibald wheat; but when he got home he found the Cannon valley wheat no better than that in his own hoppers.

The difference was, that Archibald was his own scientific and practical miller. He dressed his stones with greater care, did better bolting, and used less pressure, and more even, in grinding, so that a whiter and purer flour was produced. He was also progressive, being among the first to use the new middlings purifier in 1871 and the roller process in 1880. A staff correspondent of the *Northwestern Miller*, March 24, 1876, then published at La Crosse, spoke of Archibald as "the man or firm who takes the leading place among the flour makers of this country or of the world."

THE GARDNER MILL AT HASTINGS.

As a boy, in 1859, I drove over from Janesville, Wisconsin, to St. Paul, and I still distinctly remember stopping at the famous Gardner mill at Hastings, on my trip both ways. This was not only one of the earliest, but one of the best mills of Minnesota. Scientific milling resulted in unusual prices and large profits for

the Hastings flour, because of its fame in eastern markets, at a time when Minneapolis flour yielded neither fame nor profit. (The benefits of the middlings purifier process and high grinding with reduced speed and pressure, which were introduced in Minneapolis in 1871, were in great measure anticipated in the Hastings process of years before. By reducing the pressure and increasing the number of grindings, the Hastings mill avoided the undue heat which injured both the color and quality of the flour; and by special pains with both stone-dressing and bolting, the Gardner mill turned out a product which sold in the east at one to two dollars per barrel higher than the Minneapolis, the Wisconsin, or the best Illinois flour.

It is said that the Gardner mill, by its exceptional quality of flour, in the earlier days realized a profit as high as \$3 per barrel, which beats all other records for profitable milling in the Northwest. The average mill of today is well satisfied with a net profit of ten cents. Successful milling in Hastings is by no means at an end. Only the other day Hastings exported to Europe a cargo of fifty cars of flour to fill a single contract.)

"HONEST JOHN" KEARCHER.

The ups and downs of milling are well illustrated in the history of John Kearcher, the miller of Isinours on the Root river. The miller is a prey to more of the ills of business life, by fire, by flood, by drouth, by storm, by panic, and by patent sharks, than perhaps any other business man. John Kearcher's career is in point. Born in 1831, in Alsace, then a province of France, he lived successively in Canada, Illinois, Iowa, and Minnesota. He came to Preston, Fillmore county, in 1855, and put up a mill which ran with success until the financial crash of 1857. He lost the mill, and afterward regained it, to lose it again. He then ran mills at Chatfield, Hampton, Fillmore, and Troy, and succumbed to fire, flood, and misfortune, until he landed on his back on the South branch of the Root river, with a debt of \$30,000 and no assets except lost faith and confidence in every quarter. He then swore that he would live to pay up every dollar of debt and build one of the finest milling enterprises in the state. He managed to build a little mill with one four-foot stone and a two-foot pony and called it "Clear Grit." And "Clear Grit" won. Inside of ten years

it grew into a large modern structure of fourteen run of stone, one of the largest in southern Minnesota, and marketed 100 barrels or more daily of high-grade flour in the Chicago and Albany markets. "Honest John," as he was known to the trade, earned the unusual editorial tribute from a well-known milling journal, in 1877, of being "the maker of probably the best straight spring flour now manufactured in the United States, if not in the world."

RISE AND FALL OF MINNETONKA MILLS.

The ups and downs of milling are dramatically pictured in the tragic career of the once glorious, but now effete hamlet known as Minnetonka Mills, Hennepin county. As early as 1852, Simon Stevens, brother of Col. John H. Stevens, the founder of Minneapolis, started up Minnehaha creek to find the famous inland sea described by the Indians. He followed the creek until he came to lake Minnetonka, the sea in question. On the way he noted the rapids at the present site of Minnetonka Mills, and the next year he located a claim and built a mill which lived three years. In 1860, T. H. Perkins erected on the same site a three-and-one-half story mill, which afterward fell to the present congressman from Minneapolis, Hon. Loren Fletcher, and his partner, C. M. Loring. On Oct. 20, 1874, they organized the Minnetonka Mills Company. They doubled the size of the mill, put in four run of stone and nine double rolls, turned out 300 barrels of flour daily, which found a ready market in Boston, New York, and Europe, and then sold the plant to two Canadian capitalists for the round sum of \$95,000.

The mill wheels at Minnetonka Mills never turned again. First, the new partners had their partnership tangle to settle. Then, the property owners at lake Minnetonka brought suits without end against the county for damage to property by reason of the dam raising the water level, and the county in turn laid violent hands upon the dam. Next came the owners of damaged property along Minnehaha creek. The result was fifteen years of lawsuits at a cost of \$30,000 to Hennepin county taxpayers, and death and decay to the once blooming hamlet of Minnetonka Mills.

STATISTICS OF 1859-60.

The first report of the Minnesota commissioner of statistics,

Joseph A. Wheelock, on page 121, reviewing the flour industry of Minnesota for 1859-60, says:

Two years ago Minnesota imported flour to supply the deficiencies in her own product. She has now probably 140 grist mills, 122 being the sum of those actually reported to this office. Some of these mills are very large and fine, and the quality of flour produced rivals the best eastern brands.

This earliest estimate of the statistics of Minnesota milling was apparently too large; for in the following year's report detailed figures, quoted from the government census, are given, placing the number of flour mills at 85, instead of 140. Of the 85 mills, 63 were run by water, and 22 by steam. The wheat ground amounted to 1,273,509 bushels, and the flour produced reached 254,702 barrels. The value of the entire mill product was \$1,310,431, as compared with \$500 in 1850. The 1861 report estimated the daily output at Minneapolis to be 4,000 barrels, which is about one-third of the present output of the "Pillsbury A" mill.

(The leading states in volume of flour production in 1860 were in order, New York, Ohio, Pennsylvania, Illinois, and Virginia. The largest mill, 300,000 barrels per annum, was in Oswego, New York; the next two, 190,000 and 160,000, respectively, were in Richmond, Virginia; and the fourth, 140,000 barrels, in New York city. The value of the annual product of these mills was around \$1,000,000 each. The so-called big mills of New York and Virginia in 1860 were about the same in capacity, but greatly inferior in mechanical perfection, to the mills of such Minnesota towns as St. Cloud, Mankato, New Ulm, Faribault, Northfield, Hastings, Red Wing, Wabasha, and Waseca, today.)

MILLING IN 1870.

(By the census of 1870, the 85 Minnesota mills of 1860 had multiplied to 216, requiring 281 water wheels and 38 steam engines, and representing 507 run of stone with a daily capacity of 61,314 barrels. The capital invested had grown from \$587,000 in 1860 to \$2,900,000; and the value of the milling product had increased from \$1,300,000 to over \$7,500,000. The output of the 216 mills represented about a million barrels of flour and half a million bushels of corn meal and feed. The milling industry had therefore more than trebled in the decade; although the aggregate flour output of 1870 is today very nearly equalled by one of

several Minnesota counties, even outside of Hennepin and St. Louis, while either one of two milling companies in Minneapolis ground last year five times more flour than the total amount credited to the state by the census of 1870.

The leading milling counties of 1870 by number of mills were: Hennepin, fourteen; Winona, thirteen; Rice and Goodhue, with eight each; and Houston, Le Sueur, and Stearns, with six mills apiece. In value of milling product, there were fourteen counties that made a showing of over \$100,000: Hennepin, leading with \$1,125,000; Rice and Winona, following close with about \$800,000 each; Goodhue, the fourth, with \$600,000; then Dakota, with close to \$400,000; followed by Olmsted and Fillmore, with \$200,000 to \$250,000 each; and then, in order, Stearns, Le Sueur, Mower, Scott, Blue Earth, Meeker, and Houston, with a product of \$100,000 to \$160,000 each.

Flour manufacturing had not yet obtained a foothold in Duluth or the Red River valley. St. Paul was holding her own with a total of two mills and a product valued at \$51,748. And speaking of St. Paul, permit me to say that however sensitive or seemingly hostile that city may have been as regards her sister town up the river in the matter of population figures and real estate bargains, St. Paul has never refused to eat Minneapolis flour. The fact will go down the corridors of history and stand as a monument of self-abnegation and sisterly affection, that for over twenty-five years the good and devout people of St. Paul, whenever they asked blessing upon the morning, noon, or evening meal, invoked the blessing of Providence upon bread made from Minneapolis flour.

BIRTH OF THE "NEW PROCESS."

(The year 1870 stands as a landmark in the history of milling, because that was the year when Edmund N. La Croix of Faribault went to Minneapolis and introduced the middlings purifier into the "Washburn B" mill, thereby increasing the value of Minnesota flour \$1 to \$2 per barrel and the value of Minnesota spring wheat ten to forty cents per bushel.

For nearly three generations American millers had made little advance on the milling system invented by Oliver Evans. It was he who invented the American automatic mill. He made it possible, by the use of the elevator and conveyer and other appli-

ances, for a bushel of wheat to make the rounds of a two to seven story mill without the aid of a human hand from the time the grain was dumped by the farmer into the hopper at the platform until it reappeared as a barrel or sack of flour. The dusty miller might swap stories over the farm wagon, visit the neighboring inn, or go-a-fishing, and the old mill and babbling brook would pursue the even tenor of their way and grind the grist with business-like precision. From the inventions of Oliver Evans down to 1870, about the only improvements were the substitution of a French buhr stone for the granite, a silk bolting cloth for wool, with some advancement in cleaning the wheat and dressing the stones.

For a hundred years the ambition of American millers was to emulate the mills of the gods and grind "exceedingly fine," and likewise grind all the flour possible at one grinding. The mill-stones were set close together and run at as high speed as practicable, with the idea of reducing the grain into flour at one grinding. This was the fast reduction and low grinding process. Middlings, or meal from that part of the berry which lies beneath the bran covering and the starchy center, was a thing to be avoided; for the old-fashioned miller did not know what to do with them.

It was the mission of the "new process" to make middlings the most valuable part of the product. The middlings purifier, with its horizontal shaking screen and air blast for cleaning and separating the middlings, preserved for re-grinding that which for bread-making was by far the best portion of the wheat. Gluten, which not only gives bread its rising power or strength, but is the most nutritious quality in wheat for sustaining life, lies in the hard exterior of the kernel just beneath the bran covering, and therefore is contained in the middlings. Flour made from the purified middlings, according to the new process system, immediately commanded in the bread-making markets of the east from \$1 to \$2 per barrel higher than other Minnesota flour.

The result was a revolution in flour manufacture. Instead of making as little middlings as possible, the aim became to make as much middlings as possible. To do that, instead of grinding as much flour as possible at the first grinding, the aim became to grind as little flour as possible at the first grinding. So, instead of running the stones at the rate of 250 to 300 revolutions per min-

ute, they were run at 100 to 150. Instead of being set low or close together, they were set high so as to simply crack the berry at the first grinding for the liberation of the bran covering. Instead of reducing the kernel to flour at one grinding, the cracked chop was put through two or three grindings. Low and rapid grinding by the old process made of hard spring wheat dark and specky flour. Pressure and speed generated heat which made dark and pasty flour, damaged in both color and quality. The new process required more time and labor, but the far higher price repaid the extra effort handsomely.)

EFFECT UPON WHEAT AND FLOUR PRODUCTION.

(The effect upon wheat and flour production in the United States was marked. The wheat product rose from 287,000,000 bushels by the census of 1870, or 7.5 bushels per capita, to 459,000,000, or 9.2 per capita, in the census of 1880. Specially notable was the increase in yield in the Northwest, which produced hard spring wheat rich in gluten and middlings. Minnesota spring wheat, instead of standing low in the market, because of the large amount of dark middlings flour which it carried by the old process of milling, at once rose to the top of the market, because of the large proportion of fancy middlings patent which it yielded. In the ten-year period of 1870-80, Minnesota's wheat crop rose from 18,000,000 bushels to 34,000,000, nearly doubling, and the mills multiplied from 216 to 436. The capital invested in Minnesota mills rose from less than \$3,000,000 in 1870 to over \$10,000,000 in 1880. The sum paid by the millers to Minnesota farmers for wheat increased from \$6,000,000 to \$37,000,000, multiplying six fold, and the wages paid to mill employees grew from \$293,000 to \$1,371,000; while the value of flour produced rose from \$7,500,000 to \$41,000,000. The newly discovered wealth in the production of spring wheat on the prairies of the Northwest brought to Minnesota and the Dakotas a vast pilgrimage, and the blossoming of farms, railways, towns, and cities.)

THE LA CROIXS OF FARIBAULT.

In 1861, Alexander Faribault, founder of the Minnesota town named after him, sent to Montreal for Nicholas La Croix to build for him a mill. La Croix came, and with him his brother, Ed-

mund N., and his son Joseph. After building the mill for Faribault, the La Croixs, in 1866, built at Faribault a mill for themselves. They were educated men, skilled millers and engineers, the two brothers being graduates of the "Ecole des Arts and Metiers" in France. Familiar with French milling and engineering works, as well as with French machines and processes, they began to experiment, and in 1868 made a draft of the middlings purifier patented in France by Perigault, August 16, 1860, and described in the French work by Benoit in 1863. They then constructed from this draft a machine with which they experimented at their Faribault mill during the next two years. But a freshet carried away their dam and they gave up their mill, Edmund N. La Croix moving to Minneapolis in 1870.

La Croix visited the millers of Minneapolis, and told them of the wonderful results which could be obtained from Minnesota spring wheat by his process. Some thought him visionary, and others feared he was insane. But George H. Christian, who was more of a student and had greater interest in scientific matters than most business men, had faith enough in La Croix and his project to give him opportunity to put a machine into the "Big Mill," the "Washburn B," which Christian was then operating. La Croix worked on his machine for a good part of a year, and with some later modifications it was a success. The machine was built in Minneapolis at the Minnesota Iron Works, owned by C. M. Hardenburgh & Co. It cost only \$300, but it increased the price of Minneapolis and Minnesota flour from \$1 to \$3 per barrel. The success of the middlings purifier at the "Washburn B" soon spread; and Pillsbury, Archibald, Ames, and other enterprising millers, rapidly got the new machines.

The fate of the La Croixs is that of many inventors. They realized nothing from their study and enterprise. After introducing the new milling system into many Minnesota mills, Edmund went to Rochester, N. Y., and Nicholas to Milwaukee, where he suddenly died in 1874. Edmund followed his brother to the grave a week later. Nicholas left a widow, three daughters, and a son Joseph, in straitened circumstances. Joseph got together the various improvements inaugurated by himself, his father, and uncle, and secured patents, and then interested capital to manufacture the La Croix machines. But meantime the greed of the

patent sharks had resulted in the formation of a gigantic combination, which crushed La Croix and left him bankrupt, with three helpless women to provide for. A committee of three, of which Henry L. Little, manager of the Pillsbury-Washburn Company, and W. C. Edgar, editor and publisher of the *Northwestern Miller*, are members, is now pushing the cause of raising a subscription from the millers of America to pay the long-standing debt of the milling industry of the world to the La Croix family.

When the purifier combine, twenty years ago, attempted to levy upon the millers of America a royalty tribute that would have reached millions of dollars, and relied upon the La Croix patents in order to perfect a complete monopoly, the La Croix family stood by the millers in the fight and refused from the combine at one time a one-sixth interest in the proposed monopoly, and at another time a gratuity from the combine of \$10,000. In the face of such loyalty and sacrifice, the millers of America should not now fail to stand by the La Croix family in an hour of need.

GRADUAL REDUCTION BY ROLLS.

After the middlings purifier, adopted from the French, came the iron and porcelain rolls, adopted from the Hungarians. In 1872, Minnesota millers, who for years had followed the English milling system handed down from colonial times, swore by every mill invention that was French, and in 1880 they vowed by everything that was Hungarian. The success of the middlings purifier in the Washburn mills caused Geo. H. Christian, the chief operator, to look for further novelties. He sent for the latest French and German works on milling, and learned of the chilled iron rollers used in the big mills of Hungary, in lieu of millstones. In 1874 he had a number of sets of rollers made for the big "Washburn A" mill just built. The experiment succeeded, and when the big mill was rebuilt after the explosion of 1878 it was equipped with rolls after the Hungarian pattern. Charles A. Pillsbury meantime had visited Hungary, and W. D. Gray, representing E. P. Allis, had made inventions which he perfected after a study of Hungarian milling. American ideas were engrafted, and the best principles of French and Hungarian milling were Americanized and reconstructed on the Yankee plan of an automatic mill.

The revolution in milling was complete. In 1870, the Washburn "big mill," the "B," was only a 600-barrel mill with twelve run of stone. The "Washburn A" of 1878 came out with an equipment of 86 sets of rollers,—48 corrugated iron, 26 smooth iron, and 12 porcelain,—through which the wheat, instead of being ground at one operation as by the old process, passed six times, being gradually reduced by six different breaks. After each break the chop or meal passed through the purifiers, of which there were 78, and the bolting reels, of which there were 148. The grain was prepared for the rolls by 58 cleaning machines, which successively removed the dust, the chaff, the oats, the cockle, polished the berry, removed the crease in the side and the beard at the end, and graded the kernels according to size. The "Washburn A" then had a capacity of 4,000 barrels daily, which was several times that of the biggest mills of the east. Then came the "Pillsbury A," larger still, the largest in the world, the first half only having an equipment of 94 sets of rollers, 100 middlings purifiers, and 170 reels, with a capacity of 4,500 barrels. The "Washburn A" today claims a capacity of 11,000 barrels, and the "Washburn C" over 8,000; while the "Pillsbury A" shows 13,000, and the "Pillsbury B" over 7,000,—the quartette of the largest hummers in the milling choir of the world.

(It is interesting from the present point of view to look back to 1870, before the day of the first middlings purifier. George H. Christian states that, when Judd & Brackett retired in 1867 from the so-called "Washburn Big Mills," because unable to make them pay, men of experience in milling pronounced the 600-barrel mill, which was the jumbo of that day, as too large ever to be successful. Today the cities of St. Cloud, New Ulm, Mankato, and other towns that could be named, are operating mills of double that size. Duluth's big mill has many times that capacity. The smallest of the twenty-one mills now operating in Minneapolis is as large as the Washburn "big mill" of the old milling days; and sixteen range from three to twenty times the capacity of the mill which thirty years ago was pronounced too large for profitable running.)

(One reason for the increase in capacity is that the change from millstones to rolls has largely reduced the amount of power and mill-space required for a given output; but a more important

reason is, that the new system, with its more intricate processes and maze of machinery, is more economically run on a large scale.)

THE MILL EXPLOSION OF 1878.

The history of Minnesota milling would not be complete without reference to the great explosion of 1878, perhaps the greatest catastrophe in the history of milling. Cut in a stone tablet on the north side of the "Washburn A" mill are the following words:

THIS MILL WAS ERECTED IN THE YEAR 1879, ON THE SITE OF WASHBURN MILL "A," WHICH WAS TOTALLY DESTROYED ON THE SECOND DAY OF MAY, 1878, BY FIRE AND A TERRIFIC EXPLOSION OCCASIONED BY THE RAPID COMBUSTION OF FLOUR DUST. NOT ONE STONE WAS LEFT UPON ANOTHER, AND EVERY PERSON ENGAGED IN THE MILL INSTANTLY LOST HIS LIFE. THE FOLLOWING ARE THE NAMES OF THE FAITHFUL AND WELL TRIED EMPLOYEES WHO FELL VICTIMS OF THAT AWFUL CALAMITY, VIZ.

E. W. BURBANK, CYRUS W. EWING,
E. H. GRUNDMAN, HENRY HICKS,
CHAS. HENNING, PATRICK JUDD,
CHAS. KIMBALL, WM. LESLIE,
FRED. A. MERRILL, EDWD. E. MERRILL,
WALTER SAVAGE, OLE SHIE,
AUGUST SMITH, CLARK WILBUR.

"Labor, wide as earth,
Has its summit in Heaven."

This inscription tells the story. It was the largest and best equipped mill at that time in America. It was 138 by 110 feet on the ground, six-and-one-half stories high, and was fitted out with 42 run of French buhr stone, 100 reels, and 80 purifiers. The walls were of solid masonry, and for the first story were six feet thick, and built down to the bedrock. The 80 purifiers had small fans, but no dust collectors. The mill was full of dust, and the millers commonly wore sponges for the protection of mouth and nose. The walls were blown down to the foundation and fell outward.

W. D. Gray, a mill expert, who at one time was employed in the Washburn mills, speaks of previous experiences which the millers had with the explosion of mill-dust. At one time several of the men had a severe shock from a slight explosion, and at another time the roof was partially lifted by the explosion in a dust room.

In the great explosion of 1878, the fire is supposed to have

started in some of the machinery before its communication to the dust room. There were eighteen lives lost, as partly named above, and six mills were wholly destroyed, as follows: Washburn A, 42 run; Diamond, 6 run; Humboldt, 8 run; Zenith, 6 run; Galaxy, 12 run; and Pettit-Robinson, 15 run; total, 99 run of stone. They were all promptly rebuilt with purifiers and buhr stones, not waiting for rolls, which at that time were being experimentally introduced. Property was damaged by the explosion in cases nearly a mile away, and the total loss exceeded a million dollars.

Governor C. C. Washburn, at the time, was building a new mill near the others. On the morning after the explosion he paced off a distance beyond the foundation as planned, and, driving a stake at the point to which he paced, said to the architect: "Build your mill out to here;" and it was done. The hastily added space, however, gave the new "Washburn C" more room than it could economically utilize until 1899.

MINNESOTA FLOUR EXPORT TRADE.

In 1858, the year Minnesota became a state, the people of this great wheat and flour producing commonwealth, according to the authority of both Joseph A. Wheelock and Ignatius Donnelly, were compelled to import a considerable portion of their flour. Horace Greeley, in a letter to J. W. McClung in 1858, confessed that his earliest impression of Minnesota was unfavorable, on the following ground: "I saw that your state imported not only loafers in great abundance, but the bread they ate as well as the whisky they drank; and I did not see how she could stand it (you must pardon my weakness) in the defection of home industry." The state statistician, Joseph A. Wheelock, found in 1859, however, that we were beginning to export flour. He discovered that we shipped out by way of La Crosse and Prairie du Chien, for example, 403 bales of buffalo robes, 100 bales of furs, 343 bushels of cranberries, 70,218 pounds of ginseng, and the grand total of 114 barrels of flour. Such was the first ripple of the tidal wave to follow.

From 1860 to 1870 Minnesota shipments of flour to eastern markets gradually increased until they reached several hundred thousand barrels. Among the leaders in this eastward business were Archibald of Dundas and Gardner of Hastings, the "Vermilion flour" of the latter being a much celebrated brand. (It was

not until 1878, however, that Minneapolis began to send direct exports abroad, independently of the New York and Boston middlemen. The delay and cost incident to shipment through the hands of eastern agents at length could not be borne, and Gov. C. C. Washburn got the well-known milling and elevator man, W. H. Dunwoody, to spend several months abroad and secure direct relations with European buyers. There was great opposition among New York middlemen for a time; but the enterprise was a complete success.

Direct exports from Minneapolis to foreign ports began in 1878 with 107,183 barrels. In five years the figure was multiplied ten times. For a period of years our direct export trade was stable, but comparatively stationary, and then after 1890 it again advanced. In 1890 our direct exports were 2,000,000 barrels, and in 1891 3,000,000 was reached. In 1899 Minneapolis topped 4,000,000 barrels as the direct export to foreign markets; and in 1900 it was 4,702,485, being one-fourth of the total exports of flour from the United States. Next to Minneapolis as a direct exporter stands Duluth, which in 1898 reached close to 1,000,000 barrels.

The principal foreign consumer of Minneapolis flour is the United Kingdom. During the ten months ending with October last, there were exported from the United States to foreign markets, all told, something over 15,000,000 barrels of flour; but over 8,000,000 barrels, or more than one-half, went to the United Kingdom. Next after Great Britain, the best consumer of American flour is the West Indies; and then follow, in order, Hong Kong, Brazil, and Germany. Oregon and other Pacific coast mills principally supply the Hong Kong and other Oriental trade, and the mills of our more southerly and easterly states have paid more attention than Minnesota to the West India and South American trade. Great Britain and the European continent are the principal foreign market for Minnesota flour. But geography and differences of language and customs are no obstacles to the Minnesota miller. He obliterates time, distance, and nationality, if there is a mouth on the globe that can eat bread; and Minnesota flour is the most cosmopolitan thing on the earth today. It is eaten by the German and the Jap, the Englishman and the Boer. It goes to the Arctic and the tropic zones, and conquers all competitors, colors, and climes.

Minnesota flour shipments are a large factor in the business

of the Soo canal; and the traffic of that great inland channel marks in a way the progress of Minnesota flour sales in eastern and foreign markets. In 1871, when the new milling process was just beginning to see day in Minneapolis, the flour shipments of the Soo canal were only 26,000 barrels. In 1881 the Soo canal flour shipments had multiplied twenty-fold and were 600,000 barrels. By 1891 nearly 4,000,000 barrels were reached; and for the year just closed the total will reach 8,000,000. Today over 90 per cent. of the flour ground in Minnesota is eaten by eastern states and foreign nations, and of the Minneapolis product over 97 per cent. is shipped away, the shipments of the year just closed reaching 14,800,000 barrels, of which one-third is eaten abroad and the balance in the eastern states.

MINNESOTA MILLS IN 1900.

(The census of 1890 gave Minnesota 307 flour and grist mills, employing 4,038 hands at \$2,243,855 wages, and paying out \$52,383,857 for grain, while turning out \$60,158,088 worth of flour.

There are in Minnesota in 1901 about 400 flour and grist mills. The capacity of twenty-one mills at Minneapolis exceeds 75,000 barrels daily, and they grind annually 70,000,000 bushels of wheat into 15,000,000 barrels of flour. The state gazetteer enumerates about 200 Minnesota mills, outside of Minneapolis and Duluth, with an aggregate daily capacity of over 42,000 barrels, and 180 others whose capacity is not given. Placing the capacity of this 180 conservatively at 20,000 barrels, we arrive at about 140,000 barrels daily as the milling capacity of the state. It is fair therefore to state that Minnesota mills consume from 110,000,000 to 120,000,000 bushels of grain per annum, and turn out upwards of 25,000,000 barrels of flour a year, which is enough to sustain one-third of the nation.)

The ten largest milling centers in America today, as measured by their flour output in 1899, are as follows: Detroit, 594,700 barrels; Nashville, 630,803; Buffalo, 1,068,944; Kansas City, 1,094,846; Chicago, 1,125,745; Toledo, 1,150,000; St. Louis, 1,166,439; Milwaukee, 1,737,826; Duluth-Superior, 1,763,920; Minneapolis, 14,291,780. It is gratifying that Minnesota contains within her boundaries the two largest milling centers in the Union,

and that one of them grinds more flour in a year than all the other nine put together and 4,000,000 barrels added.

, In conclusion, permit me to say that at the World's Exposition at Paris during the past year, bread made from Minnesota flour carried off the prize medal for the best bread in the world, and that Minnesota flour likewise took the first premium in the contest for the best flour in the world, showing that Minnesota holds the world's sweepstakes both for the quantity and quality of product.

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