

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report

of

Committee on Examination

This is to certify that we the undersigned, as a committee of the Graduate School, have given Charles Byron Kuhlmann final oral examination for the degree of Master of Arts . We recommend that the degree of Master of Arts be conferred upon the candidate.

Minneapolis, Minnesota

1 June 1920

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THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report
of
Committee on Thesis

The undersigned, acting as a Committee of the Graduate School, have read the accompanying thesis submitted by Charles Byron Kuhlmann for the degree of Master of Arts. They approve it as a thesis meeting the requirements of the Graduate School of the University of Minnesota, and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts.

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1 June 1940

THE DEVELOPMENT OF FLOUR MILLING IN MINNEAPOLIS

A Thesis Submitted to the
Faculty of the Graduate School of the
University of Minnesota

by

Charles Byron Kuhlmann

In partial fulfillment of the requirements
for the degree of
Master of Arts

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Chapter I. INTRODUCTION.

1. There are in the United States today some seven thousand merchant flour mills manufacturing wheat flour. In recent years they have produced over one hundred million barrels of flour annually. ⁽¹⁾ To make the flour over five hundred million bushels of wheat had to be ground each year. In cost of raw materials, flour-milling ranked second, and in value of product, third, among all the manufactures of the country.

Because the process of milling is comparatively simple, and the capital-investment required small, there are many small flour mills scattered throughout the country. But at certain favorably located centers, there have been developed flour mills of large capacity which have certain advantages over the small mills in economy of production but some disadvantages in cost of distribution. On the whole, however, the balance inclines toward the large mills and these are increasing their proportion of the total output. ⁽³⁾

Probably at least half of the flour is marketed at points commercially distant from the place of manufacture, being sold in the great competitive markets of the country or exported. ⁽⁴⁾ And more than half of the flour sold in those markets is produced in the three largest milling centers of the country--Minneapolis, Kansas City and Buffalo. It is in these great centers of the industry that flour-milling has reached its highest development and can best be studied.

2. From the earliest days of our history the flour mill was an important institution. It produced the chief item of export for the middle colonies--the one product which assured them a market in the

1. Millers' Almanack, 1920-21, p. 166.
2. Abstract of the Census of Manufactures, 1914, p. 26.
3. Federal Trade Commission, Report on Flour Milling and Jobbing, p. 6.
4. Federal Trade Commission, Report on Flour Milling and Jobbing, p. 12.

(1)

rich West-Indian trade. It was the pioneer in the commerce of the Great Lakes which has since reached such enormous proportions. "At every important city from Albany to Minneapolis, it at sometime dominated all other commercial interests, giving the first settlers a market for the first product of the newly cleared land, (which was almost invariably wheat), followed by more diversified and generally more profitable production."

The first settlers of course had no flour-mills to grind their grain. Fortunate those, who came to the wilderness provided with pestle and mortar or hand-grinding mills. The man who was not so fortunate imitated the Indian by fashioning a rude wooden pestle which he fitted into a hollow stump. Sometimes he improved on the Indian's scheme by rigging up an apparatus like a well-sweep from which the heavy wooden pestle was suspended. Then it could be operated with less expenditure of labor.

(2)

With the growth of population, came a certain degree of specialization, and the miller soon appeared. His mill was at first simply an enlarged hand grinder propelled by cattle. In New York the early settlers, applying their own experiences in other lands, evolved the windmill, and soon it was an important source of power. The first windmill erected in New England appeared in 1632. In New York naturally the windmill was the chief source of power; the New Englander being much more inclined to secure his power by damming some small stream.

(3)

The mills built in the colonial period were almost all grist-mills. Occasionally the miller ground a few bushels of wheat of his

1. Clark, History of Manufactures, pp 98-99.
2. Bishop, History of American Manufactures, Vol. I, pp. 116-151; Bolles, Industrial History of the U.S., pp. 532-534.
3. Bolles, Industrial History of the U.S., pp. 532-534.

own and sent the flour to New York or Philadelphia to be exported. But most of the time, the miller was grinding his neighbor's wheat for a toll, which was usually fixed by law. In New England the toll for grinding only, was a sixteenth of the wheat, --in New Jersey the miller took a tenth of the wheat for grinding and bolting. This suggests that the smaller, ruder mills of New England had ordinarily no bolting facilities so that the customer had to bolt his own flour. In New York, where the export of flour was early developed to a considerable extent, the attempt was made by the people of New York City to monopolize the bolting of flour and the baking of ship's biscuit. This created some dissatisfaction in the country districts of the colony, but was a powerful factor in building up New York City.

In Delaware, merchant milling became so much more profitable than custom grinding that the legislature had to pass a law compelling all mills to grind for customers on certain days. Even before the Revolutionary War, there was a concentration of milling on Brandywine creek, where there was a fall of one hundred twenty feet in four miles, and from which there was a navigable channel to the sea. Within a radius of forty miles of Wilmington, Delaware there were said to have been no less than one hundred and thirty mills. Wilmington was a considerable exporter of flour. Another city of flour manufacture in those days was Baltimore. The Patapsco river, which enters Chesapeake Bay at that point also provides a fine water-power. When Oliver Evans revolutionized milling methods right after the Revolution, the Patapsco mills were quicker to adopt his methods than those of the Brandywine. In consequence, Baltimore became the leading milling center of the country, which position she held from

1. Clark, History of Manufactures, pp. 63-64.
2. Ibid., p. 51
3. Ibid., pp. 64-65
4. Encyclopedia Americana, Vol 11, p. 385.

1785 to 1840. At the latter date there were sixty mills on the Patapsco River, and Baltimore was carrying on a very large export trade with the West Indies. (1)

Toward the end of that period, Richmond on the south and Rochester in New York became important milling centers. Richmond's chief advantage was in the water power of the James River and the wheat supply from the Shenandoah valley. In 1845 there were at Richmond the two largest flour-mills in the United States, producing together more than 350,000 barrels of flour per year. Just before the Civil War, Richmond was drawing wheat from eastern Tennessee, western North Carolina and northern Georgia and exporting flour to Cuba and South America. It was claimed that her flour was the best for warm climates and that it stood the sea voyage better than any other. (1)

A fine water power and the rich wheat-raising region of the Genesee country determined the location of Rochester. As early as 1835, Rochester had twenty-one mills which marketed their products throughout the Atlantic coast states. In 1865 these mills produced 800,000 barrels of flour and Rochester had become the leading milling city of the country. Its local wheat supplies were no longer sufficient to supply the mills and much of the flour, therefore, was made from western wheat.

By that time the westward movement of wheat growing had caused the springing up of new centers of flour-milling west of the Alleghanies.

The best market for these western mills was at first in the southern states. It was natural therefore that St. Louis with her unrivalled water and rail routes into that territory, should take the lead. In addition the St. Louis millers could count on the choicest

of the country's red winter wheat for it grew almost at their door. With these advantages St. Louis became the milling center of the country after the Civil War, and held that position until 1881. She then gave place to Minneapolis ^{ich} ~~who~~ has held it ever since.

It is the latter city, whose fortunes in milling are the subject of this thesis. No city has had a more rapid and wonderful industrial growth than has Minneapolis. No city has ever had a similar position of leadership in milling. It seems worth while, then, to study the rise of the city to that position of leadership and its effects on the growth of Minneapolis and the Northwest.

CHAPTER II. BEGINNING OF FLOUR MILLING IN MINNEAPOLIS
AND MINNESOTA TO 1870

1. The old government mills at the Falls of St. Anthony.

Any account of the milling history of Minneapolis must necessarily begin with the story of the old government mills built by the soldiers of Fort Snelling at the Falls of St. Anthony in the years 1821 and 1823. The story has been told repeatedly, and, accordingly, we may note only the outstanding facts. When Colonel Snelling started to build, at the junction of the Minnesota and the Mississippi, a fort which later came to bear his name, he found it necessary to erect a sawmill to cut the necessary lumber for the buildings. Water power was essential for such a mill. At first it was planned to build it at the "Little Falls" as Minnenana Falls was known at that time, but after an examination had proved that there was not sufficient water there to provide the necessary power, the Falls of St. Anthony was selected as the site. In the winter of 1820-21 a number of men were sent up the Rum River to cut pine logs, and in the spring these were rafted down the stream to the falls. In the autumn of 1821 the saw mill was built at the west end of St. Anthony Falls. A small upright saw was installed, and the cutting of lumber for the fort buildings was begun.

(1). Fieldhouse, W. R.-History of the Flour Milling Industry of Minneapolis. A Master's Thesis, University of Minnesota, 1916. The history of the Government Mills is given in great detail. This study when tested has proved reliable, and the writer has not hesitated to depend on his account for the main facts of this chapter.

(2). Prescott, Reminiscences, Minnesota Historical Society Collections. vol. VI., pp. 478-99.

(3). Bliss, Reminiscences of Fort Snelling, Minnesota Historical Society Collections. vol. VI., p. 339.

The operation of this mill required the stationing of a squad of soldiers at the falls, and so a small house was built to serve as a barracks. The level open plain back of the falls was especially fitted to serve as pasture for the herd of cattle which supplied meat for the soldiers at the fort.⁽¹⁾ To provide a winter food supply for these cattle, Colonel Snelling had ploughed up several hundred acres of prairie land and sowed wheat, corn, and oats. It was determined to build a grist mill beside the saw mill at the falls to grind this grain.⁽²⁾ So in 1823 Lieutenant McCabe and fifteen soldiers built a stone building about twenty feet square beside the saw mill.⁽³⁾ This was undoubtedly the first mill built in Minnesota. It stood on the river bank between Sixth and Seventh Avenues South on the site of the present Northwestern Mill (the D Mill of the Northwestern Consolidated Milling Company).⁽⁴⁾ There was no attempt to build a dam or power canal for these mills. The water was carried from the crest of the falls by a wooden penstock to a wooden water wheel, and thus power was obtained to turn the mill stones.⁽⁵⁾ To furnish the mill, the Commissary Department of the army forwarded from St. Louis by boat a pair of buhr millstones.. The official record shows that the equipment for the first Minneapolis flour mill cost the government less than three hundred dollars.⁽⁶⁾

(1). Hesler, 'St. Anthony Falls', Northwestern Miller, August 22, 1879, p. 121.

(2). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

(3). Ibid., p. 30.

(4). Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 1.

(5). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

(6). Bromley, E. A., Old Government Mills, Minnesota Historical Society Collections. vol. 10, pt. 2., p. 642.

Probably at first it was intended to grind only feed for the cattle. But the difficulty of transporting flour from St. Louis by boat, suggested the possibility of grinding flour as well. Lieutenant Nathan Clark seems to have fathered the project of wheat cultivation, and perhaps he was the one to propose flour making as well.⁽¹⁾

At that time it was generally believed that wheat could not be successfully grown in Minnesota. As late as the year 1859, John H. Klippart, a recognized authority on agricultural matters, argued that Ohio was the western limit of successful wheat growing.⁽²⁾ But Lieutenant Clark's proposal was adopted, the wheat was ground into flour, and made into bread for the soldiers at the Fort.

First results were not encouraging. The mill had no proper bolting apparatus. There was no screening machinery to remove the unripe and smutty grain and weeds.⁽³⁾ Possibly, too, the wheat had not been properly dried and stored and so become somewhat mouldy. At any rate the bakers at the fort turned out only black, bitter-tasting bread which, when issued to the soldiers, almost caused a mutiny.

(1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

(2). Edgar, W. C.-The Story of a Grain of Wheat, pp. 87-94; Bullman, The Wheat Plant, Report of the Commissioner of Agriculture, 1862, p. 66. "The natural and permanent wheat region lies between 33° and 43° north. This wheat region embraces Ohio, the south part of Michigan and New York, the whole of Pennsylvania, Maryland, Virginia and Delaware, and in these states we find where is raised or has been, the greatest wheat production, Ohio stands at the head of all the wheat growing states in the aggregate of her production. He goes on to argue that the soils further west are too light for wheat. Bullman says he overlooked the adaptability of spring wheat to lighter soils

(3). Holcombe and Bingham, Compendium of History and Biography of Minneapolis, pp. 32-33.

All that winter there was much dissatisfaction at the fort because of the shortage of provisions. ⁽¹⁾ Wheat grinding seems to have continued for three or four years after this. Possibly they succeeded in making a better flour in later attempts. But meanwhile they were having poor success in wheat raising. Whether this was due to the number and rapacity of the blackbirds, as one writer suggests, ⁽²⁾ or whether the failure was due to the use of a soft winter wheat which was not acclimated to Minnesota, ⁽³⁾ we do not know. Whatever the reasons, the grinding of flour was discontinued and the soldiers once more supplied with flour from St. Louis. The idea that Minnesota ⁽⁴⁾ could not raise wheat successfully was strengthened. From 1826 or 1827 on, the mill ground only feed for cattle. It seems to have been operated by the soldiers rather irregularly for some twenty years longer, and then in 1849 the whole property--saw mill, grist mill, and barracks--was leased to the Hon. Robert Smith of Alton, Illinois.

Smith rented the grist mill to Calvin A. Tuttle ⁽⁵⁾ who operated it until 1855. In the St. Anthony Express of May 31, 1857, appears his advertisement in which he offers to grind corn, rye, oats, peas, buckwheat, and whatever else requires grinding, including salt, at lawful rates of toll, and offers to receive grists on the east side of the river and to return the finished product ⁽⁶⁾ to the same place.

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- (1). Adams, Reminiscences, Minnesota Historical Society Collections, vol. 6, p. 95.
(2). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.
(3). Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 3.
(4). Ibid., p. 3.
(5). Bromley, Old Government Mills--Minnesota Historical Society Collections, vol. X., pt. 2, p. 641.
(6). Quoted in Bromley, Old Government Mills, Minnesota Historical Society Collections, vol. X., pt. 2, p. 641.

Number and Distribution of Flour and Grist Mills
in Minnesota in 1860 by Counties.
U.S. Census of 1860



BY ARTHUR NORMAN

ONE DOT REPRESENTS ONE MILL

persuaded

In 1853 Smith got the War Department to sell the mills to him. During the negotiations the Quartermaster at Ft. Snelling was asked to make a valuation of the property and reported as follows: "The old stone gristmill--the building somewhat dilapidated and the water wheel worn out entirely--and the other machinery including the two millstones, \$400; the old frame of the sawmills, greatly decayed, together with the mill irons on it, and extra posts, mostly worn out, \$100; the one story frame building (dwelling) much decayed, \$50; total \$750."⁽¹⁾

What improvements were made by Smith and Tuttle does not appear. The grist mill seems to have continued to grind feed until 1858, when the Minneapolis Mill Company, having completed its power canal, caused its removal to make way for larger mills.

II. The Early Mills of Southern Minnesota.

From the building of the old government mill down to 1851, there were very few gristmills erected in Minnesota. Up to the year 1837 only the angle between the Mississippi and the St. Croix was open to settlement. The natural resources of this region encouraged the settlement of the trapper and the lumberman, rather than the farmer. The scattered settlers could not raise even enough grain to feed their cattle. As late as 1849, the settlers of that region except for a little colony in Washington County brought all their provisions up the river, "Whole cargoes of flour and pork⁽²⁾ were shipped from Galena, St. Louis, Quincy, Hannibal and Dubuque".

(1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

(2). Stevens, Personal Recollections, pp. 47-48.

Consequently there were very few mills in Minnesota at this time. Samuel Bolles had built a small mill at Bolles Creek, in Afton township, Washington County, in the winter of 1845-6. ⁽¹⁾ Stevens thinks ⁽²⁾ this was the first mill built in Minnesota, but Rogers speaks of a mill built by Benjamin Gervais at Little Canada, Ramsey County, in 1844. There may have been other mills in Minnesota at that day, but we seem to have no record of them. When, in 1850, a few of the farmers in that region raised wheat, they were forced to send it to Prairie du Chien to have it ground. The St. Anthony "Express" began to urge the building of a large flour mill at the Falls. It was confident that enough grain could be raised to keep it operating all ⁽³⁾ the year round. But there could scarcely have been any great need of such a mill at that time, for the Census of 1850 shows only 1401 bushels of wheat raised in Minnesota and only one gristmill with a ⁽⁴⁾ product of over \$500.

With the opening of southern Minnesota to settlement as a result of the treaties of Traverse-des-Sioux and Mendota in 1851, there was a rapid increase in population, which by 1855 had become almost overwhelming. From Iowa, Wisconsin, and Illinois came wagon ⁽⁵⁾ trains of settlers and still greater numbers came by steamers.

(1). Stevens, Personal Recollections, p. 116.

(2). Rogers, 'History of Flour Manufacture in Minnesota', Minnesota Historical Society Collections, vol. X., pt. 1, p. 38.

(3). Stevens, Personal Recollections, p. 116.

(4). Rogers, 'History of Flour Manufacture in Minnesota', Minnesota Historical Society Collections, vol. X., pt. 1, p. 38.

(5). Flandrau, 'Progress of Minnesota', Minnesota Historical Society Collections, vol. IX., p. 590.

From 1850 to 1854 the increase of population was about 5000 a season; after the completion of the railroad from Chicago to the Mississippi (at Dunleith in 1855) the increase rose to 35,000 a year. Doubtless many of these settlers stayed in the towns, but it seems probable that most of them passed on to the wheat raising country and went into farming.⁽¹⁾

During the first years all their energies were devoted to supplying the home market. Bond, writing in 1850, predicted that the farmers of Minnesota would have a market for all that they could raise for years to come in supplying the Indians, soldiers, traders, and lumbermen of the state, who up to that time had been drawing all their supplies from the older states.⁽²⁾ Up to 1857 "the imports of foodstuffs largely exceeded the exports;" in the following year "the supply barely met the demand", but in 1859 after an excellent harvest, there began an export of wheat which steadily grew from that time on.⁽³⁾

The home-market demand, the lack of railroad connections with the East, and the undeveloped transportation system within the states, all tended to stimulate the building of grist mills in the newly developed region. In 1853 Simon Stevens built a mill at Minnetonka Mills, Hennepin County. John Kaercher built one at Preston (Fillmore County) in 1855. The mill at Northfield (Rice County), later made famous by Jesse Ames and Sons, was built in 1857.

(1). Robinson, Development of Agriculture in Minnesota, p. 44 and cf. maps pp. 42 and 46 showing population of Minnesota in 1850 and 1860.

(2). Bond, Minnesota and its Resources, p. 165.

(3). Robinson, Development of Agriculture in Minnesota, p. 44.

The dates can not always be definitely ascertained, but we know that mills were built at Chatfield (Fillmore County) and Rochester (Olmsted County) about 1856. The Gardner mill at Hastings was well known as early as 1859; the Archibald mill at Dundas was built in 1857. By 1860 there were 85 mills in Minnesota--63 driven by water power and 22 by steam. These mills were grinding 1,200,000 bushels of wheat and turning out 250,000 barrels of flour worth \$1,300,000. By 1861 their daily capacity was estimated at 4000 barrels.

Very little is known of these early mills. Most of them had only a single run of stones. They were, with a few exceptions, custom mills grinding for toll. Because they supplied only a local market -- the state statistician reported only 114 barrels of flour shipped out of the state in 1859, -- they were scattered throughout the wheat growing territory. Wheat growing at that time was con-

(1). Rogers, History of Flour Manufacture in Minnesota, pp. 37-38.

(2). 'Early History of New Process Milling', Northwestern Miller, Sept. 7, 1883, p. 222.

(3). Rogers, History of Flour Manufacture In Minnesota, p. 44.

(4). It is difficult to say with any degree of accuracy what the capacity of a run of stones was. In the fifties, when low milling was the rule and there was little effort to produce the highest grade of flour, it represented probably a hundred barrels in a day of twenty-four hours. With the progress of the industry toward higher grades of flour this gradually decreased. In the sixties a run of stones represented about 50 barrels capacity and after the "New Process" was developed a run of stones usually meant a capacity of 20 or 25 barrels a day. See Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 124; U. S. Census, 1870, vol. "Industry and Wealth", p. 598.

(5). Rogers, History of Flour Manufacture in Minnesota, p. 44.

fined to southeastern Minnesota, and, in consequence, most of the mills were located there. ⁽¹⁾ Though the census of 1860 classifies them all as either water power or steam, we know that other powers were in use. Rogers speaks of mills driven by horse power and oxen power and says that as late as 1868 there were windmills at St. Peter and ⁽²⁾ at Mankato each of which ground out 160 bushels of wheat daily.

How crude some of these early mills were, is shown by a ⁽³⁾ description of one built in the sixties near New Ulm. The miller had diverted a small stream from its channel into a narrow ditch which served as a mill race. The water wheel was kept from being clogged by means of a trash rack of plaited willows. At the end of the ditch was the penstock, a hollow basswood secured by iron bands or clamps. The water wheel was made of rock elm with buckets pinned on, making an old style "flutter-wheel". The millstones were made from a large boulder which had rolled down from the edge of the bluff. The bolting system consisted of a piece of bolting cloth "sewed in the from of a sack about five feet in length and twenty inches wide, open at both ends---. The cash outlay in building was ten dollars, all the work being done by the miller, and under favorable conditions forty bushels could be ground in a day."

But that was one extreme. Archibald's mill at Dundas was a three story stone structure containing four run of stones. Besides the stones the principal machinery was the old fashioned shakedown bolts with slides arranged so that customers could mix their

(1). Rogers, 'History of Flour Manufacture in Minnesota', Minnesota Historical Society Collections, vol. X, pt. 1, p. 44;

(2). Rogers, 'History of Flour Manufacture in Minnesota', Minnesota Historical Society Collections, vol. X, pt. 1, p. 33; see also Northwestern Miller, March 10, 1876.

(3). Northwestern Miller, Holiday Number, 1887, p. 38.

flours as they saw fit. This mill did a custom business and was a big affair for those days, yet because it had acquired a good reputation its capacity was taxed to care for its trade. Farmers came with their ox-teams for eighty miles round, bringing their wheat to
(1)
be ground.

In the following decade the Civil War and Indian troubles did not suffice to stop the growth of Minnesota milling. The number of mills increased from 85 (1860) to 216 (1870). The number of run of stones increased from about 85 to 507. This indicates that there was also an increase in the size of the mills. The capacity of the mills increased from about 4,000 barrels to over 60,000 barrels. The capital invested in the mills had increased from \$587,000 to \$2,900,000 an increase proportionately, somewhat greater than the increase in run of stone, which would seem to show that mills were introducing more machinery. The value of the product had increased from \$1,300,000 to \$7,500,000. The output of flour had increased from 250,000 barrels to over 1,000,000 barrels, scarcely in proportion to development in other lines. But the census also lists 500,000 bushels of corn and feed as a part of the product. Evidently the millers were beginning to separate their product better and were putting more into cattle feed and less into flour
(2)
for human consumption.

1. 'Early History of New Process Milling', Northwestern Miller, Sept. 7, 1883 -- p. 222.
2. U.S.Census of 1870, vol.III,p.536; Census of 1860, Manufactures, p.284; Rogers,History of Flour Manufacture in Minnesota, Minnesota Historical Society Collections, vol. X, pt. 1, p. 44

There had also developed a concentration of milling in certain counties. Hennepin County led in the number of mills with fourteen, followed by Winona County with thirteen, Rice and Goodhue with eight each, Houston, Le Seur and Stearns, with six each. Hennepin County mills had a product valued at \$1,125,000; Rice of \$800,000; Winona of \$800,000 and Goodhue of \$600,000. There were no mills as yet at Duluth or in the Red River Valley.⁽¹⁾

Custom work was still the rule in all the mills but a few were beginning to work into the merchant-mill class. This was especially true of the mills belonging to Archibald of Dundas, Ames of Northfield, Mowbray of Winona and Gardiner of Hastings. These were then the leading millers of the state. Although up to 1870 there were mills in Minneapolis which shipped to Eastern markets, none of them had the reputation, or could compete on equal terms with, the millers named above.⁽²⁾

3. Beginning of Milling in Minneapolis

Up to 1870 the development of milling in Minneapolis was simply a part of a larger movement - the growth of milling in the state as a whole. The same forces were at work with substantially similar results. And while the industry grew rapidly in Minneapolis, its growth was not more rapid than in the state as a whole. The great transportation systems which were to make Minneapolis the

-
1. U.S.Census. of 1870, vol.III, pp. 683-684
 2. Early History of New Process Milling, Northwestern Miller, Aug.24, 1883, p. 174.

gateway of the northwest had not yet been created; the great hard-wheat fields of the northwest had not yet been opened up. The wheat regions of the period 1850-1870 were not naturally tributary to Minneapolis, but rather to cities further south, so that La Crosse, for example, was looked upon as more likely to become the milling center of the northwest, than Minneapolis. In the beginning Minneapolis had only two advantages as a milling center--its home market created by the lumber industry and the unrivalled water power of St. Anthony Falls.

It was the water power that first drew settlers to Minneapolis. Here was a fall of eighty-two feet in the river which, it was estimated, would develop 120,000 horse power. This was a rich prize for which the leaders among the pioneers eagerly strove. Even before the angle of land between the Mississippi and the St. Croix was thrown open for settlement, Franklin Steele had staked out a claim to the east bank of the river opposite the falls. As soon as he was able to secure title to the lands, he laid out the town site of St. Anthony, sold lots, and began to raise capital to develop the power. By 1848 his plans had matured sufficiently so that he was able to begin construction of a dam across the east channel at the upper end of Hennepin Island and thence to the lower end of Nicollet Island. On the dam between the east shore and Hennepin Island he

(1). 'Advantages of La Crosse as a Milling Center', Northwestern Miller, May 11, 1877.

(2). Minneapolis Board of Trade, Annual Report, 1876, p. 13. But this was a gross overestimate; it is reckoned that 50,000 h. p. is available now of which only 35,000 is developed. Minneapolis Civic and Commerce Association, Rail-Lake-Rail Rates, p. 13.

(3). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

built two sawmills to which in the following year were added two more. Within a few years others were built until there were eleven in all. (1) The dam was rudely constructed of logs cut on Hennepin Island. Because of its location, it had only a six-foot head of water instead of the thirty-five or forty they might have had, and consequently the power developed was small. (2) The growth of the lumber industry was so rapid that by 1856 it was found necessary to develop the far greater power of the main channel.

Steele had attempted to interest eastern capitalists--Caleb Cushing among others, but while his dam was building, (3) these men lost confidence in the project and dropped out. It is not necessary to go into the various sales by which Steele then sought to secure additional capital, nor the lawsuits that followed. In 1856, the various holders of shares in the property formed the St. Anthony Water Power Company. This company was given a charter by the legislature, Feb. 26, 1856, and the water power on the east side of the river was transferred to it. (4)

The day after the St. Anthony Water Company got its charter, a similar charter was granted for the development of the power on the west side of the river, to the Minneapolis Mill Company. (5) The St. Anthony Water Power Company was to own the power

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- (1). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 121.
 - (2). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 29, 1879, p. 138.
 - (3). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.
 - (4). Ibid.
 - (5). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 121.

from the center of the main channel to Hennepin Island, and from Hennepin Island to the East shore; the Minneapolis Mill Company was to own the rest.⁽¹⁾

For the history of the Minneapolis Mill Company, we must go back to the old government mills. During the years that St. Anthony was growing into a thriving village (1847-1851) the west side of the river remained a government reservation.⁽²⁾ But we have told how Robert Smith, congressman, of Alton, Illinois, with eyes on the water power possibilities, had obtained, in 1849, from the Commissioner of Indian Affairs, a lease of the old government mills.⁽³⁾ In 1855 he asked to be allowed to buy the mill and was allowed to do so. Shortly after this the Secretary of War gave him permission to make a claim on the land on which the mills stood, together with a considerable portion of the reservation adjoining. He was given this favor through the influence of the Honorable Henry M. Rice, and seems to have given Rice a three-eighths interest in the property in return for his assistance. Smith then hired R. P. Russell to live on the claim and hold it for him and gave Russell a one-eighth interest. Various other deals caused a still further division of the property so that in 1856 it was found desirable to incorporate, and the Minneapolis Mill Company was formed. The incorporators were Robert Smith, R. P. Russell, M. H. Olds, George Huey, Jacob Elliott, and Dorius Morrison.⁽⁴⁾

(1). Minneapolis Board of Trade, Annual Report, 1876, p. 13.

(2). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

(3). See above p. 9

(4). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 30.

The building of the dam across the main channel of the river was a far more difficult task than the original undertaking and involved a far larger expenditure of capital. Nevertheless the two companies began work upon it in 1856. "Heavy timbers strongly tied and ballasted were fastened to the bed rock near the center of the river, forming a dam nearly one-third as wide as the channel. From this were constructed on either side, wings, the east side terminating on the old north and south dam of '48 and the west wing running to a bulk head constructed as a limit of the stock ponds for the west side saw mills. The immense pieces of rock⁽¹⁾ were blasted out and removed from the foot of the fall and the descent made as true as possible from the ledge down, then huge timbers were fitted into place and heavily planked, forming on the western half, a perfect slide for the water, this protecting the bed of the river and preventing further demolition of the limestone ledge⁽²⁾."

It was not merely the lumbermen who wanted and needed the additional power which these dams were to create. By 1856 there were three flour-mills in operation on the east side of the river and for only one of these could room be found on the old dam in the east channel. This was the pioneer mill in the village of St. Anthony built by Richard Rogers in 1851.⁽³⁾ By that date there were four saw-mills on the dam and St. Anthony had become somewhat of a

(1). Pieces of the river bed which had fallen from the ledge from time to time as the soft sand was washed out by the undertow below the falls. /stone

(2). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 29, 1879, p. 138.

(3). Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 5.

lumber center. To supply feed to meet the local demand, Rogers installed a portable mill consisting of a single run of millstones in a small shed at the end of the row of sawmills. The following year, Steele built a one-story wooden building on the site, and Rogers put in a second run of mill stones. These were to be used to grind flour,⁽¹⁾ and so a bolting reel and a wheat cleaner were also installed.

At that time (1852) there was very little wheat⁽²⁾ raised in the neighborhood---very little grain of any kind, in fact. Nevertheless, so great was the local demand both for flour and feed that even before this small custom mill could secure a sufficient local supply of grain, a merchant mill was established at St. Anthony which created a still greater demand. This was the Island Mill which was built in 1854.

The Island Mill was a far more ambitious project than that of Rogers. Its owners--John Rollins, John Eastman, and R. P. Upton⁽³⁾ --planned a merchant mill from the start. So they built a three story mill, 40 by 60 feet and installed three run of stones together with all the necessary flour working machinery.⁽⁴⁾ The difficulties of such an undertaking were numerous. There was no room for the mill at the dam, so it was located at the lower end of Hennepin island and the water which furnished the power was carried to it in a wooden flume. There was no bridge to the island, millwrights were hard to obtain, machine shops did not exist in Minnesota, and most of the machinery had to be hauled by wagon from Milwaukee to the Mississippi and from St. Paul to Minneapolis. "After much vexatious delay

(1). Hesler, 'Stl Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 121.

(2). See above p.11

(3). Fieldhouse, 'History of the Flour Milling Industry of Minneapolis', p. 5; Barnes, 'Milling History of Minneapolis, Holiday Number, 1890, Northwestern Miller, p. 31.

the wheels were started but a breakdown soon stopped them. This was due to the ignorance of an itinerant millwright who had been engaged to put the mill together. He had made the frame for the flume in the same happy-go-lucky way a carpenter would make the frame of a house and in consequence it was not long before the flume burst and let down two floors, together with one run of stones.⁽¹⁾

For some years at least, most of the wheat ground at the Island Mill had to be brought in by wagon from Wisconsin or up the river from Iowa and Illinois.⁽²⁾ In May 1855, for example, Rollins, who was captain of a river boat, brought up 2,000 bushels of wheat by steamer from those states.⁽³⁾ But, notwithstanding the lack of grain, the mill prospered. The growing population of St. Anthony had to be fed. Freight charges on wheat were high, but those on flour were still higher, and the power to do the grinding, at least, was cheaper there than anywhere else.⁽⁴⁾ Home-grown wheat sold at the mill at \$1.15 per bushel or less; the cost of transportation from the older states may have added sixty or eighty cents to this, but even so there was a handsome profit when flour sold at ten to twelve dollars a barrel. There was practically no competition, and an enormous demand due to the flood of immigration which set in at this time. Rogers says that the mill cost \$16,000 and yielded a profit of \$24,000 the first year.⁽⁵⁾ The figures are somewhat doubtful, but there is no

(1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 31.

(2). Robinson, Development of Agriculture in Minnesota, p. 42.

(3). Stevens, Personal Recollections, p. 270.

(4). Robinson, Development of Agriculture in Minnesota, p. 42.

(5). Compare Fieldhouse, 'History of the Flour Milling Industry of Minneapolis', p. 7, and Barnes, 'Milling History of Minneapolis', Holiday Number, Northwestern Miller, 1890.

question of the fact that large profits were made, on the flour at least. With the offals it was a different matter. The farmers had not become accustomed to using them for feed, "and would pay no more for them than for hay. The middlings were especially hard to dispose of and what could not be sold for feed were reground and made into the low grade of flour known as "red dog" and sold to the Indians. Often the bins would be so loaded with bran that it would have to be spouted into the river."⁽¹⁾

As late as 1857 flour was being imported into Minnesota, but in the following year the Island Mill made what was probably the first shipment of flour outside of the State. Hesler attributes the shipment to a farmer named Getchell living in the town of Champlin, who, "having accumulated some money and being anxious to send it home to New Hampshire, and hesitating to trust the mails, bought ten barrels of flour and forwarded them to the desired destination. Good results were soon obtained in the shape of an order for 100 barrels. There was no barrel maker at the falls and the nearest point from which barrels could be obtained was at Anoka, there being a "wet cooper" at that point. He split by hand the necessary number of staves and got out the barrels in time---. The flour was packed with the old fashioned prod or mangle and the barrels, branded "Minnesota Mills" were sent on their way as the first complete shipment of Minnesota ^{flour} ever sent out of the territory."⁽²⁾

(1). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 121.

(2). Ibid.

The Island Mill seems to have prospered even through the hard times that came with the panic of 1857. Wheat prices dropped to a mere pittance, but mills were still so widely scattered that farmers hauled their grain from as far north as St. Cloud, and as far south as Belle Plaine and Mankato, to the Island Mill, and camped out on the Island for days waiting for it to be ground. In 1863 W. F. Cahill, one of the famous millers of Minneapolis, entered the firm, and the mill was enlarged by the addition of two more run of stones, the building of a cooper shop, and installation of flour-packers. Its capacity was thus increased to 500 barrels a day. In 1868 or 1869 more new capital was brought in, the mill remodeled, and a pair of middlings buhrs added. The Island Mill was one of the first to install purifiers and their middlings flour met with instant success on the New York market.

Then came a series of disasters. In April, 1870, floods destroyed the mill warehouse and partly washed out the foundation of the mill proper. After that came the difficulties with the river bed. The old proprietors transferred the property to the firm

of Brown and Martin who remodeled it

- (1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 31.
- (2). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 121.
- (3). The East Side company got into financial difficulties in the early sixties. There were many changes of ownership of stock and a conflict with W. W. Eastman and other Nicollet Island owners over riparian rights. This was finally settled by a compromise by which they gave up their claim in return for the free use of two hundred horse power and the privilege of renting fifty more at \$500 per year. Eastman and his associates in 1868 started a tunnel on Hennepin Island which was to run up the river under Hennepin and Nicollet islands to the latter island on which they had laid out factory sites. The bed of the river consists of a layer of limestone on top of a soft sandstone. The tunnel was not properly constructed and caved in. In doing so, large portions of the limestone bed were swept away, and for a time it seemed as if the falls would disappear also. This would involve a rebuilding of the dams at enormous expense. The government was induced to intervene, and the destructive work of the river was stopped by the building of the government dike. Barnes, 'Milling History of Minneapolis', Holiday Number, Northwestern Miller, p. 321.

it and were just about to reopen it when it was destroyed by fire in March, 1872.

Meantime a third mill had been built just below the Island Mill. This was the River or, as often called, the Farmer's Mill, a custom mill containing two run of stones--one for corn and one for wheat, which was built by B. C. Morrison and N. M. Prescott in 1856. It, too, seems to have been a financial success and at the outbreak of the Civil War it was enlarged to four run of stones. It was destroyed in the same fire that burned the Island Mill.

Still another mill destroyed in this fire was the old St. Anthony belonging to Stamwitz and Schober. In 1864 they formed a partnership and put in a small gristmill in the basement of a building then used as a furniture factory. And, finally, the Summit Mill was built on Hennepin Island in 1865. This was a merchant mill containing four run of stones. Its career was a brief one, for in the spring of 1870, the river washed away its foundations and the building was destroyed. After that, says Barnes, the millers decided to build on the mainland.

None of these had a very close connection with present day mills. The Rogers mill seems to have been burned in the panic year of 1857; the fate of the others has already been told. None of the mills destroyed by fire and flood were ever rebuilt. The firm owning the Island Mill seems to have dissolved.

(1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 31; Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 10.

(2). Ibid.

(3). Atwater, History of the City of Minneapolis, pp. 576-577.

W. W. Eastman was one of the builders of the Cataract Mill. Rollins became a member of the firm of Day, Rollins & Co. which in 1871 built the Zenith Mill on the West side of the river. Cahill organized the firm of W. F. Cahill & Co. which acquired the Holly Mill built in 1872. Stamwitz & Schober, when their mill burned, acquired an interest in the People's Mill, a small mill on the west side of the river, but being pinched for room there, moved back to the East side in 1876 and built the Phoenix Mill.

Thus there had been erected by 1870 four flour mills on the east side of the river. These four mills contained fifteen run of stones which probably meant---since only part of the stones were used to grind wheat---a capacity of 700 or 800 barrels. Today the site of these mills is an open grass-covered space from which one may gaze across the river on either side and see the towering walls of the modern mills. Of the pioneer mills which blazed the trail for these others, not a trace remains.

Meanwhile the mills on the west side, after a somewhat later start, had in the sixties, taken the lead. The Minneapolis Mill Company had followed the example of the St. Anthony Water Power Company in building a number of sawmills on the dam just above the falls. But the small head of water thus utilized could not produce much power and the building space was very limited. As soon as the dam was completed the Company began the digging of a -

(1). Minneapolis Board of Trade, Annual Report, 1876, p. 41.

(2). Ibid.

(3). Northwestern Miller, March 11, 1881, p. 147.

(4). Omitting the Rogers mill, then no longer in business.

power canal. They put in a coffer dam just above the Falls and cut into the solid rock a channel three hundred feet long, seventy feet wide, and fourteen feet deep around the falls. The course of the canal is indicated by the map. Anywhere on this canal there was a thirty or forty foot head of water, and the power obtained was vastly greater than that of the mills on the dam. The power on the dam was used by a number of sawmills, but the canal power was speedily taken up by new flour mills with a total of 40 run of stones and a daily capacity of probably 2500 barrels of flour, located there.

First of these was the City Mill. In 1857 the old government sawmill had been sold to Thomas H. Perkins and Smith Ferrand and they had turned it into a gristmill. The construction of the power canal made it necessary to remove this building, but in 1860 a new mill was built on approximately the old site and named the City Mill. This was a two run custom mill. Through various changes of ownership it did a flourishing business during the years of the War. In 1866 the mill was sold to J. C. Berry & Company and became a merchant mill. In 1879 it was destroyed by fire and the following year replaced by the present Northwestern Mill (the D mill of the N. W. Consolidated Milling Company.)

(1). Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879, p. 138.

(2). Appendix Map No. 1, 2.

(3). See above p. 6

(4). Bromley, 'Old Government Mills', Minnesota Historical Society Collections, vol. X; pt. 2, p. 641.

(5). Bromley, 'Old Government Mills', Minnesota Historical Society Collections, vol. X; pt. 2, p. 641; Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 1; Minneapolis Board of Trade, Annual Report, 1879, p. 49; Annual Report, 1880, p. 54.

After the City Mill came the Cataract, built in 1859 and still standing--the oldest of the present Minneapolis mills. For that day it was a big mill, for it was three stories high, built of stone blasted from the bed of the canal and contained four run of stones. More mill-stones and another story were added later. We need not go into the various changes of ownership from the building of the mill by Eastman and Gibson until it became the property of D. R. Barber, founder of the Barber Milling Company, the present owners. It was a merchant mill and from the first shipped most of its product to Eastern markets. It was a leader in the movement which revolutionized milling in the Seventies, and is today a leader among the independent mills at the falls. (1)

Next, in order of erection, came the Union Mill, built by Henry Gibson in 1863 -- a big stone mill containing four run of millstones. This mill, too, changed hands a number of times. Its capacity was increased until it reached 300 barrels per day. Then the competition of the later eighties forced it out of flour making, and in 1889 it became a feed and grist mill. Still later it was used as a store house, and in 1916 the Northwestern Consolidated Milling Company, who were its owners, tore it down. (2)

The Union was the only mill built during the Civil War, but in 1866--whether because of high prices due to a disordered currency, an influx of immigration, or war profits, we do not know,--came a great expansion. The Minneapolis Mill Company was forced to extend its canal to provide additional mill sites, and no less than

(1). Fieldhouse, History of the Flour Milling Industry of Minneapolis, pp. 10-12; Barnes, "Milling History of Minneapolis", Holiday Number, 1890, Northwestern Miller, p. 32.

(2). Minneapolis Chamber of Commerce, Annual Report, 1890, p. 134; Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 12.

four new mills were built. The Arctic Mill, erected as a merchant mill by Perkins & Crocker who had owned the City Mill, had three run of stones. This was later increased until there were twelve sets. There were various changes of ownership and about 1881 or 1882 the name of the Mill was changed to the St. Anthony. Still later it was acquired by the Northwestern Consolidated Milling Company, was dismantled, and in 1916 was torn down along with the Union. (1)

The Minneapolis Mill was built by Murphy and Frazee, two Indiana men who were attracted to Minneapolis by the profits of the milling business. (2) Apparently the profits were not for them, however, for in the same year, or the year following, they were forced to sell the mill. It was bought by Gardner and Crocker of which firm Charles S. Pillsbury became a member in 1870, and this was the mill in which he learned the business. (3) It was a merchant mill, a large mill for that day, for it contained six run of stones. In 1881 it was burned out rebuilt on an enlarged scale. The firm owning the mill, Crocker, Fisk, and Company, was the only one at the falls to go under during the panic of 1893. After remaining idle for some time, it was acquired by the Washburn Crosby Company and is now operated by them as Mill D. (4) Then came the Alaska or Taylor Mill, a six run mill built by Taylor Brothers, Philadelphia men. About 1870, Charles Pillsbury,

(1). Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 12; Minneapolis Chamber of Commerce, Annual Report, 1882, p. 42; Minneapolis Board of Trade, Annual Report, 1878, p. 52.

(2). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 32.

(3). 'The Early History of New Process Milling', Northwestern Miller, Aug. 24, 1883.

(4). Fieldhouse, History of the Milling Industry of Minneapolis, p. 12.

bought the mill, and it then became the Pillsbury B by which
(1)
name it is known today. And, lastly, the Washburn B Mill was built
by Governor C. C. Washburn of Wisconsin in 1866. This was the
largest mill of all--so large that for years it was referred to as
"the big mill". In it the first experiments of the "new process"
(2)
were made.

Only one more mill was built in this period, The
Dakota, a three run mill built by Russell and Huey in 1867. It is
still standing--the only wooden mill structure in the milling dis-
trict, and is now being operated by the National Milling Company.
(3)
It was never very important in the milling history of the city, but
it increased the number of mills on the West Side of the river to
nine and the total number for the city to twelve. These twelve mills
contained 59 run of stones and had a daily capacity of probably 3,000
(4)
barrels of flour per day. In 1860 four mills were producing 30,000
barrels of flour annually. In 1865 seven mills were producing 98,000
barrels, annually, in 1870 twelve mills were producing nearly
(5)
250,000 barrels. Meanwhile, the population of Minneapolis had in-
creased from 5,809 in 1860 to 8,116 in 1865, and 18,030 in 1870.
The period of rapid growth was still to come. A production of

(1). 'Early History of New Process Milling', Northwestern Miller,
Aug. 24, 1883; Northwestern Miller, Mar. 18, 1881, p. 165; Barnes,
Milling History of Minneapolis, Holiday Number, 1890, Northwestern
Miller, p. 32.

(2). Northwestern Miller, Mar. 25, 1881, p. 181.

(3). Fieldhouse, History of the Milling Industry of Minneapolis, p. 13;
Minneapolis Chamber of Commerce, Annual Report, 1919, p. 157.

(4). Daily capacity always means per day of twenty-four hours.

(5). Minneapolis Board of Trade, Annual Report, 1876, p. 42. Field-
house, History of the Milling Industry of Minneapolis, p. 13, quoted
from Minneapolis Tribune, Annual Exhibit for 1870.

250,000 barrels was small compared with the 1,351,000 barrels of Milwaukee. The growth of flour production in Minneapolis had barely kept pace with the growth of population. It was considerably less than the growth of production for the state as a whole. (1)

By 1870 the future of Minneapolis as a milling center was not yet clearly apparent. The old government mill had pointed the way. The lumbermen who established the sawmills at the falls and created the village of St. Anthony had provided a home market. Steele and Chute, Morrison and the Washburns, had developed the water power. A dozen small mills had been established, supplied with power from the falls, and with wheat from the rich farm lands to the south and east of the city. A beginning had been made in the construction of railroad lines into the wheat fields to the south and west, though it was not until the following decade that the Red River Valley was reached. But most important of all was the fact that the men who were to build up the milling supremacy of the city almost all had entered the field. After giving due weight to such advantages as the geographical location, the water power, and the aid of the railroads, one is forced to conclude that the most important single factor in the upbuilding of Minneapolis milling was the business genius of the men who organized it in the period of beginnings.

(1). See above p. 30

Chapter III. THE REVOLUTION IN MILLING PROCESSES, 1870-1891.

4. Milling Processes before 1870.

Before 1870, milling processes were so simple, the machines required so few and inexpensive, that the small-scale producer found it easy to build a mill wherever there was a local market to be supplied. Three things needed to be done: (1) the wheat as it came into the mill must be cleaned of dirt and chaff, (2) the clean wheat must be ground, and (3) the product of the grinding must be bolted through fine cloth which would allow the flour to pass through but would reject the husks or bran. "The end we have in view in grinding the grain," says Oliver Evans, the first great American mill-builder, "is to reduce it to such a degree of fineness, as is found by experience to fit it to make the best bread, and to put it in such a state that the flour may be most effectively separated from the bran, or skin of the grain, by means of sifting or bolting."⁽¹⁾

The wheat as it came into the mill was run into a slowly revolving cylinder covered with a wire screen, through which a blast of air passed. The combination of the air blast and the friction of the wire screen was supposed to clean the wheat.

From the cleaner, the wheat passed to the mill stones, the principal part of the mill machinery. These consisted of two flat, circular stones, varying from three and a half to four and a half feet in diameter, the lower fixed, the upper balanced to revolve upon the nether. The two surfaces facing each other "were grooved or

(1). Evans, The Young Millwright and Miller's Guide, p. 247.

dressed in a manner calculated to give them at once a cutting, squeezing, and crushing action. The "runner", as the upper stone was called, was set closely over the lower, so that in motion nearly its entire weight rested upon the kernels of the wheat. Upon the accuracy with which this mechanism was adjusted, as well as the condition of its parts, depended the success of the milling operation."⁽¹⁾

Before 1850 "low" or "close" grinding was the rule in all American mills. The stones were set very close together, and the wheat berry was ground at a single grinding, the object of the miller being to scrape from the bran as much of the flour-producing part of the berry as possible and to make the flour as fine as possible, at a single grinding.⁽²⁾

The percentage of flour obtained from this single grinding depended on a number of things: the dress of the millstones, the face of the grinding surface, the balance of the upper stone, or runner, and the speed of the runner.⁽³⁾ The millers of that day considered the first two of these the most important. High prices were paid for special stones imported from a certain quarry in France. Improvements were made in the adjustment of the runner and providing a perfect balance and so on. The cry was for a perfectly smooth faced stone, so just after the Civil War there were machines invented to do the stone dressing, some of them using diamond points and others using emery wheels revolving at high speed and made by the operator to pass over

(1). Merk, Economic History of Wisconsin, p. 135; Evans, The Young Millwright and Miller's Guide, pp. 256-258; Amos, Processes of Flour Manufacture, pp. 134-135.

(2). 'Milling Systems in 1881', Northwestern Miller, Feb. 18, 1881, p. 98.

(3). Dondlinger, The Book of Wheat, p. 268.

the "furrows" and "lands" of the stone. But most of the mills depended on skilled millstone dressers who went over the stone with proof staff and pick.⁽¹⁾

The wheat passed from a hopper suspended above the millstones through an opening in the upper stone into the space between the stones whence, after being ground, it dropped into another hopper beneath the stones as "meal" or "chop". The meal was then taken to the bolting apparatus. In the smaller mills, this usually consisted of a single, revolving, cylindrical reel about twenty feet long, thirty or thirty-two inches in diameter, and covered with bolting cloth. Usually, there were three different cloths of varying degree of fineness. At the head of the reel was the finest cloth, at the lower end, the coarsest. The reel was slightly tilted toward the lower end so that in revolving the meal was gradually carried through. What came through the finest cloth at the upper end was flour; what came through the medium grade cloth in the middle was called returns; the product of the coarsest cloth was called shorts, and what tailed over the end of the reel was bran. The "returns" went right back to the upper end of the reel for further separation or if the mill was a three or four run mill, there was likely to be a set of five reels, arranged 2-2-1 so that the returns could be passed through by themselves. The tailings were sent back to the millstones to be reground. Sometimes, in the larger mills, they were sent to a small "pony" millstone which ground very closely and this product in turn sent to a separate reel with finer cloth. Thus was produced a second grade of flour which varied greatly among millers, some producing a fine, others a dark, impure flour, containing a high percentage of bran.⁽²⁾

(1). Gray, 'A Quarter Century of Milling', Northwestern Miller, Oct. 25, 1899; Amos, Processes of Flour Manufacture, pp. 135-6.

(2). Neftel, 'Flour Milling Processes', U. S. Census, 1880, vol. III, p. 561.

In Oliver Evans' time it was reckoned that the best mills would produce from a bushel of well-cleaned, white wheat:

40.23 lbs. superfine flour
3.65 lbs. tail flour
2.12 lbs. ship stuff
12.00 lbs. shorts and bran (2)

Needless to say, the superfine flour was quite inferior to the highest grade flours of the present day.

Such were the milling processes from the Revolution to the Civil War. There had been no fundamental changes in processes during this time. (2) The only progress had been in the arrangement of the mills and the method of transporting the various mill products from one machine to another. In this, only the United States had made any progress. W. D. Gray in his "A Quarter Century of Milling" describes the Hungarian mills as he saw them on a visit in 1879. The middlings as they came from the reel were graded and put into sacks. So with other products of the mill. There were no elevators--the only method of transporting the sacks was on the backs of the mill hands. (3)

In the European countries where labor was cheap and plentiful this method managed to survive until recent times. But the scarcity and high cost of labor in America forced the development of a different system.

Neftel, Flour Milling Processes, U. S. Census, 1880, Vol. III. p.564

(2). Dondlinger, The Book of Wheat, p. 267.

(3). Gray, 'A Quarter Century of Milling', Northwestern Miller, Dec. 20, 1899.

In the period immediately after the Revolution, the mills on the Brandywine Creek in Pennsylvania and Delaware had developed an export business and had grown to considerable size. From this region came Oliver Evans, who in 1785, patented a series of contrivances to make possible the automatic handling of the materials of the mill by the power of the mill. By means of the elevator and conveyor, as well as other inventions, since superseded, the grain was converted into flour without the intervention of human hands. "By means of the machines;" according to Evans, may be performed "every necessary movement of the grain and meal, from one part of the mill to another, through all the various operations from the time the grain is emptied from the wagoner's bag, or from the measure on board the ship, until it be completely manufactured into flour, either superfine or of other qualities and separated, ready for packing into barrels, for sale or exportation. All which is performed by the force of the water, without the aid of manual labor, excepting to set the different machines in motion & c. This lessens the labor and expense of attendance of flour mills fully one-half. Formerly, one hand was required for every ten barrels of flour that the mill made daily; now, one for every 20 barrels is sufficient. A mill that made 40 barrels a day, required four men and a boy, two men are now sufficient."⁽³⁾

1. Neftel, Flour Milling Processes, U.S.Census, 1880, vol.III p.561
2. Evans, The Young Millwright and Millers' Guide, p. 203
3. Ibid, p. 239

The Evans automatic mill made it possible for American mills to produce flour as economically and of as good a grade as foreign mills. (1) There is no doubt a connection between these improvements in milling and the growth of American flour exports at that period. But after Evans' time there was very little progress until the introduction of the "new process" in 1870. There was some improvement in the methods of cleaning the grain. About the middle of the nineteenth century smutters were introduced, and a little later, separators. (2) Silk cloth was substituted for woolen and finer meshes were used on the bolting reels. Imported French buhr stones replaced the granite ones formerly used. There were improvements in the hanging and balancing of the stones. As the workmanship on the machines improved the quality of the flour produced was bettered. (3) But in essentials, the flour mill of 1865 was the same comparatively simple proposition of 1800. "The grain fresh from the harvest was first thoroughly cleaned and polished by machinery, then conveyed to the rapidly revolving stones where at a single grinding it was reduced to grist. When sufficiently pulverized it was automatically carried to a sifting or bolting machine where the finer particles became flour, the coarser middlings, and the husks bran." (4)

(1) Dondlinger, The Book of Wheat, p. 267.

(2) Ibid., p. 268.

(3) Neftel, 'Flour Milling Processes'; U. S. Census, 1880, Vol. III. p. 564.

(4) Merk, Economic History of Wisconsin, p. 135.

This system of milling was fundamentally wrong because it disregarded the nature of the wheat. The wheat berry is composed of four parts: the outer husk or bran, forming about five per cent of the berry, next to this, a layer of aleurone or gluten cells forming three or four per cent of the total weight; and inside of this the starchy interior or endosperm which makes up about eighty per cent of the kernel; and at the base of the kernel the (1) embryo or oily germ forming ten or eleven per cent of the berry. The mill stones in low grinding, crushed all these elements into one indiscriminate mass. The germ so crushed got into the flour and the oil in it would become rancid and so injure the keeping qualities of the flour. Portions of the bran were so pulverized that they were bolted through with the flour. This made the flour dark and "speck-y". The bran particles absorbed moisture and this, too, injured the keeping qualities of the flour. The glutinous outer portions of the kernel (the aleurone cells) were much harder than the inner cells. "It is well known that gluten gives to flour its rising power and strength; but it also imparts toughness to the endosperm in the proportion in which it is present. Under the low-milling methods the hard glutinous outer portions of the kernel were not pulverized as thoroughly as the soft inner layers and were consequently bolted out as coarse middlings product." (2) These middlings (3) could be reground into flour, but the results were not satisfactory.

(1) Figures as to relative proportions of these four elements in the wheat berry are conflicting. Cf. Dondlinger, The Book of Wheat, pp. 14-15; and Bengtson and Griffith, The Wheat Industry, pp. 12-13.

(2) Merk, Economic History of Wisconsin, p. 136.

(3) See above p. 34

Unless the greatest care was taken in dressing the mill-stones and keeping them in proper running order, part of the flour was ground so fine as to destroy its granular character so that it became "life-⁽¹⁾less" and "pasty".

Since the beginnings of modern milling, winter wheat had at all times and places commanded a higher price than spring wheat. This was because spring wheat flour was usually dark and of an inferior grade. All the difficulties we have been discussing were magnified in this case. The spring wheat kernel was rich in gluten and exceedingly hard to pulverize. To get any satisfactory results it was necessary for the spring wheat miller to run his millstones with great pressure and at high speed. The heat thus generated tended to discolor the flour and also caused chemical changes that lowered the quality of the flour.⁽²⁾ Moreover, the husk of the spring wheat was thin and brittle and difficult to grind. Because of its hardness it was longer exposed to the action of the stones, and the brittle coating was broken into many fragments, in some cases smaller than the granules of the flour itself.⁽³⁾ It was impossible to sift out these bran particles. Consequently the flour was dark, its keeping powers poor, its quality low. Winter wheat, on the contrary, had a tough thick bran which in milling was not crushed but flattened and was easily sifted out. Winter wheat was softer and yielded more readily to the action of the stones. There were not the same heating and discolorations. For these reasons the winter wheat was considered best for flour, and St. Louis, the natural market for the winter wheat region, had become in 1870 the leading milling city of the United States.

(1) 'Milling Systems in 1881', Northwestern Miller, Feb. 18, 1881, p. 98.

(2) Merk, Economic History of Wisconsin, pp. 136-137.

(3) Northwestern Miller, Oct. 7, 1881, p. 261.

(4) Historical Sketches, Northwestern Miller, Feb. 16, 1877.

5. The Middlings Purifier and the "New Process".

About the year 1870, there was a marked shift of wheat raising to a section of the country where only spring wheat was grown. The census of 1840 had shown Ohio, Pennsylvania, New York, and Virginia to be the leading wheat growing states (in the order named). In 1850, they were still the leading states but produced only 54% of the total crop as compared with 62% in the previous census. The census of 1850 showed a big increase in wheat growing in Illinois, Indiana, Michigan, and Wisconsin. By 1860 these four states had become the leading wheat growing states of the country. By 1870 the same states held the lead, with Minnesota in sixth place and Iowa in seventh.⁽¹⁾

The census of 1870 for the first time, gives separate figures for the production of spring and winter wheat. It shows that Indiana was a winter wheat state producing only 171, 991 bushels of spring wheat as against 27,585,231 bushels of winter wheat. In Illinois, winter wheat predominated--there were over nineteen million bushels of winter wheat raised as against some ten million bushels of spring. But in Wisconsin the proportion of spring wheat was enormously greater--twenty-four million bushels to one million of winter wheat; in Iowa, the preponderance of spring wheat was still greater, and in Minnesota, there was almost no winter wheat whatever. The same was true in the Dakotas where wheat raising was just beginning and in Nebraska with its crop of two million bushels. Even in Kansas the spring wheat crop exceeded that of the winter variety. So great and rapid had been the growth of the spring wheat production that it now constituted almost forty per cent of the total crop.⁽²⁾

(1) U. S. Census, 1870, vol. III pp. XXIX; Monthly Summary of Commerce and Finance, vol VII, no. 7, p. 1993.

(2) U. S. Census, 1870, vol, III p. 83.

The agricultural experts of the time looked on this development with disfavor since they regarded spring wheat as inferior to the winter variety. The writer of the census report of 1860 expresses this disapproval as follows: "In many sections of the west, spring wheat is now much more extensively grown than winter wheat, and the quality is of course, inferior to the best samples of the latter. Much can be done, and is doing, to improve the quality of our spring wheat but the same efforts would give us winter wheat of much greater excellence. With a better system of cultivation at the west, winter wheat will take the place of the spring variety."⁽¹⁾

He was mistaken, however. Climatic conditions forced the farmers of the Northwest to continue raising spring wheat. The millers of the Northwest had to take their grain as they found it. In their efforts to mill the grain to the best advantage, they initiated the revolution in milling methods which we know by the name of the "New Process."

⁽²⁾ The problem, as has been said, was to dispose of the middlings. Because of the hardness of the spring wheat, the hard glutinous outer portions of the kernel were not thoroughly pulverized and so were bolted out as middlings. Low grinding eliminated the middlings, but the heat generated discolored the flour. High grinding made a great deal of middlings which the miller did not know how to dispose of. Sometimes he ran it back to the millstones to be reground with the wheat; sometimes, as has been said before, he had special "pony" millstones for regrinding them.

(1) U. S. Census, 1860, vol. "Agriculture", p. XIV.

(2) See above p.34

Sometimes he stored them in bins until he had a large enough supply, and then took a whole day to grind them. ⁽¹⁾ Whatever the method, the product was a low grade flour. The millers knew that this flour had many good points. It was a strong flour, rich in gluten, the best bread flour in the world, if it could only be freed from the specks of bran, bits of dirt, and fluffy fibrils which darkened and be-
⁽²⁾
fouled it.

The pioneers in the development of the new process seem to have been certain country millers of Southern Minnesota. About 1865 Ames of Northfield was experimenting with various methods of purifying middlings. ⁽³⁾ As early as 1870 there were millers of Minnesota who attracted national attention because of their ability to make fine flour from spring wheat. Archibald of Dundas, Mowbray of Stockton, Gardner of Hastings, and Ames of Northfield were the leaders. Their flour was stronger than the winter wheat flour, and a given quantity of it would make more bread. ⁽⁴⁾

The question was, how was it done? These millers tried to keep their processes secret, and it was difficult to learn what they were doing. Nevertheless, C. A. Pillsbury, among others, visited some of these mills--those at Northfield, Dundas, and Hastings--and came to the conclusion that it was poor milling that kept Minneapolis from the lead. So some of the mills began to imitate Archibald's methods.

(1) Gray, 'A Quarter Century of Milling', Northwestern Miller, Oct. 25, 1899.

(2) Merk, Economic History of Wisconsin, p. 139.

(3) 'Early History of New Process Milling', Northwestern Miller, Oct. 5, 1883.

(4) 'Historical Sketches', Northwestern Miller, Feb. 16, 1877.

Stated briefly, these were:

1. He ran the stones very slowly--150 revolutions as against 200 to 310.

2. He kept both furrows and lands of the stones very smooth so as not to cut up the bran. The effort was not to grind the wheat, but to crack it and roll it apart on a smooth surface.

3. The first grinding was to give about equal proportions of flour and middlings.

4. The middlings were purified and reground, and this gave the choicest flour. Sold by itself, it obtained a higher price than the best winter wheat flour. When mixed with the flour from the first grinding, it made a "straight" flour that astonished everyone.

About this time, there came to Minnesota, as traveling representative for an eastern flour commission house, a young man named George Christian. He was a native of Georgia, a small, slender, pale faced man, quiet in manner, with sharp grey eyes. In his trips to the mills that were developing the new process, he talked with the millers and learned about their new methods of milling. He seems to have induced Archibald to show his purifier. Christian, a shrewd, farsighted man, realized at once the money-making possibilities of a new process that would purify the middlings and thus make possible a clear, white flour from them. He then determined to go into the milling business. The firm which had been running the Washburn B mill at Minneapolis had just gone into bankruptcy. Governor Washburn was looking for an experienced miller to manage it. Christian went to him, told him what he had learned of the

(1)'Early History of New Process Milling', Northwestern Miller,
Aug. 24, 1883.

(2)'Historical Sketches', Northwestern Miller, Feb. 16, 1877.

(3) Ibid.

new method of milling and induced Washburn to form a partnership and put him in charge of the mill.⁽¹⁾

One of the mills whose methods Christian studied was the "Vermillion" at Hastings. From this mill he secured George T. Smith to take charge of the stone dressing in the Washburn B.⁽²⁾ The mill was thoroughly over hauled, various changes were made to adapt it to the new process and in March, 1871, it was started up.

But the essential thing in the new process was to have a purifier to clean the middlings before they were reground. This was arranged for when Edmond La Croix was brought to Minneapolis. La Croix and his brother were Frenchmen who had been brought to Faribault, Minnesota by Alex. Faribault to run a mill he owned. In 1868 they had built a middlings purifier after the model of one patented by Perigault in France in 1860. For two years they experimented with the machine, and then a freshet swept away the mill. Edmond LaCroix then left Faribault and came to Minneapolis.⁽³⁾ Christian had been studying purifiers and had talked with LaCroix at Faribault. He realized the possibilities of such a machine; so LaCroix came to the Washburn Mill, hired to build a purifier.

LaCroix worked on the machine during the year 1870. The matter was kept secret, and much of the time he was locked in a room at the mill. He seems to have had assistance and suggestions from Christian and from George T. Smith who had become the head mill-⁽⁵⁾er. In March, 1871, the machine was completed and put in operation.

(1) 'Historical Sketches', Northwestern Miller, Feb. 16, 1877.

(2) Northwestern Miller, Aug. 10, 1883, p. 136 A.

(3) Rogers, History of Flour Manufacture in Minnesota, Minnesota Historical Society Collections, vol X, pt. 1, p. 48.

(4) Northwestern Miller, Aug. 10, 1883, p. 136 A.

(5) Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879

It was a small, crudely built arrangement of moving sieves which received the middlings and exposed them to an air blast which separated the broken starch particles from the bits of bran, dirt, and fluffy fibrils that befouled them, leaving clean, white middlings which could then be reground into flour. The device of purifying middlings was not original with La Croix; for, as has been pointed out, it had been patented in France in 1860; and La Croix had read of it in a French book on milling, according to Governor Washburn. But the method was new; for none of the European machines combined the horizontal sieve with the air blast as La Croix had done.

Apparently, the first machine was not quite satisfactory; and La Croix worked for another year perfecting it. The chief difficulty was that the cloth of the sieves was constantly getting clogged and required to be brushed by hand to keep the meshes open. Archibald's purifier, which Christian had studied, had the same weakness, and required the constant attendance of two men to keep it running. Smith finally solved the difficulty by putting in a set of travelling brushes which did the cleaning automatically as they travelled from one side of the machine to the other, sweeping the under side of the cloth.

- (1). Gray, A Quarter Century of Milling, Jan. 3, 1900; Rogers, History of Flour Manufacture in Minnesota, Minnesota Historical Society Collections, vol. X pt. 1, p. 46.
- (2). Northwestern Miller, July 20, 1877. For the disputed question of the invention of the purifier and the attempts to secure a patent on it, see the accounts of the "Purifier War", Northwestern Miller, Feb. 21, 1879, p. 119; Feb. 28, 1879, p. 130; March 21, 1879, p. 130; Feb. 20, 1880, p. 115.
- (3) Hesler, 'St. Anthony Falls', Northwestern Miller, Aug. 22, 1879.
- (4) 'Historical Sketches', Northwestern Miller, Feb. 16, 1877.
- (5) Northwestern Miller, Aug. 10, 1883, p. 136 A; Merk, (Economic History of Wisconsin), pp. 138-139, seems to have misunderstood the function of the travelling brushes.

The successful operation of the first machine caused Christian to build additional ones in which various improvements were made. The second, machine, for example, contained sieves with varying sizes of mesh so that the middlings could be graded according to size. Even then he was not satisfied, for he seems to have gone to Europe and bought machines of French make for the mill.

The success of the new process was wonderful. Archibald was the first Minnesota miller to get the new process flour on the New York market. It jumped into popular favor at once, and by May, 1872, was being quoted at \$13.50 per Barrel. Christian at first mixed the middlings flour with the straight flour with the immediate result of an advance of fifty cents per barrel in price and a largely increased demand. Then he began to sell the middlings flour separately under the name of "Patent", and price and demand advanced rapidly.

Meanwhile, the other Minneapolis millers had learned the secret. Pillsbury went to George T. Smith and engaged him at a salary of \$10,000 per year to act as head miller and to fit up the Pillsbury mill with purifiers. La Croix left the Washburn mill and went over to the Cataract where he installed a set of purifiers. In 1872 the old Island mill was remodeled, and purifiers were installed. There was a rush to the new process because profits were

(1) Ibid.

(2) Hesler, ' St. Anthony Falls', Northwestern Miller, Aug. 22, 1879

(3) Northwestern Miller, Sept. 7, 1883.

(4) Northwestern Miller, Aug. 10, 1883, p. 136 A.

(5) Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 11.

(6) Ibid., p. 9.

enormous. It is said that the Washburn A mill was built in 1873 out of the profits of the B mill. Christian himself stated "Our profits the first year of the "new process" were fifty cents a barrel, the second year they averaged a dollar a barrel, the third year two dollars, and the fourth year anywhere from four to four and a half dollars a barrel".⁽¹⁾ These very large profits could have lasted only a year or two for the total output for 1876 is estimated to be worth only fifty cents per barrel more than that of 1870.⁽²⁾ But they lasted long enough to cause a great boom in mill building and they account for the rapidity with which the purifier was adopted.

Obviously, the adoption of the purifier would fundamentally change the old processes of milling. To the three steps in use up to that time, cleaning, grinding, and bolting, were added two more: the purification and regrinding of the middlings. But some of the old steps also were radically changed. The object of the old method was to grind the wheat, the new process to granulate it. The old process sought to have as few middlings as possible, the new as many as possible. Accordingly, the old system used low, close grinding with the stones revolving rapidly. The new process set the millstones farther apart, ran them much more slowly; and where the old system tried to finish the product at a single grinding, the new process ground the wheat and reground the middlings.⁽³⁾

The very large profits of the "new process" caused a big increase in the milling capacity of Minneapolis. Of the twelve mills running in 1870, four had been destroyed by fire or flood in the next two years, causing a loss of 15 run of stone in milling cap-

(1) Barnes, 'Milling History of Minneapolis', Northwestern Miller, Holiday Number, 1890, pp. 33-34.

(2) Minneapolis Board of Trade, Annual Report, 1876, p. 41; Fieldhouse, History of the Milling Industry of Minneapolis, p. 13.

(3) 'Old Style versus New Process Milling', Northwestern Miller, Mar. 8, 1878.

acity. But this was more than made up by the building of new mills. The North Star mill with five run of stones was erected in 1870, and the Zenith with six run in 1871. In each of the next five years two new mills were built so that there were twenty mills in 1876 with 194 run of stones as compared with twelve mills with only 54 run of stones. The total annual output increased from 244,998 barrels in 1870 to (1) 1,135,160 barrels in 1876.

The new process insured the supremacy of spring wheat flour as the great bread-making flour of the world. (2) Because of its greater hardness, it yielded a greater percentage of middlings. What had formerly been its greatest disadvantage thus ensured its (3) superiority for now the middlings made the best flour. The spring wheat, rich in gluten, produced a stronger, richer flour than the winter wheat- flour better suited to bread making. It was estimated that a barrel of Minneapolis flour would make 12½% more bread than a (4) barrel of St. Louis flour. Relative positions in the market were re-

(1) Fieldhouse, History of the Flour Milling Industry of Minneapolis, p. 15 for 1870; Minneapolis Board of Trade, Annual Report, 1876, p. 41, for 1876.

Mills built 1870-1876 and date of building:

North Star 1870	Palisade 1873	Hennepin 1875
Zenith 1871	Washburn A 1873	Humboldt 1875
Holly 1872	Galaxy 1874	Phoenix 1876
Empire 1872	Anchor 1874	Pettit & Robinson 1876

(2) Commercial and Financial Chronicle, Dec. 30, 1882, p. 757. "Still another circumstance which has operated to promote the growth of our exports of flour, is the superior quality of spring wheat grown from the new lands of the extreme Northwest. This wheat makes a flour most desirable from its strength, and the millers of Minneapolis, from the advantage derived from the reputation of their brands, and having unlimited water power, are able to pay more for it than it will bring in the open market, hence they practically monopolize its use, and those who want flour made from it must buy the products of the Minneapolis mills. The high grades of flour made from the choice spring wheat bring a dollar a barrel more than corresponding grades made from winter wheat."

(3) Dondlinger, The Book of Wheat, p. 269.

(4) Northwestern Miller, Jan. 20, 1882.

versed, spring wheat flour now commanded the higher price, and from this time on Minnesota and Dakota hard spring wheat began to sell up (1) ten and fifteen cents per bushel higher than other varieties.

6. Gradual Reduction and The Roller System.

Doubtless it was the experience with the purifier that opened the eyes of the leaders of Minneapolis milling to the superiority of the foreign millers. They began to study European milling methods. It is said that Governor Washburn requested his (2) brother, Elihu B. Washburne, then minister to France, to send him all the French and German books on milling. Running them over, Christian was impressed with the fact that the German millers favored the sub- (3) stitution of rolls of chilled iron for the millstones. That led him--and other Minneapolis millers as well--to visit the European (4) milling centers and observe their methods. Hungary, with conditions not unlike those of Minnesota to contend against, had become the

(1) Northwestern Miller, Feb. 18, 1881, p. 100.

(2) Elihu B. Washburne was the one member of the family who spelled the name with a final e. The Washburn brothers were a famous group in their day. They included:

(i) Israel Washburn, lived in Maine, member of Congress, Governor of Maine, trustee of Tufts College, etc.

(ii) Elihu B. Washburne, lived in Illinois, lawyer, friend of Grant, Congressman from Illinois, Secretary of State, Minister to France during the Franco-Prussian War, trustee of the Illinois Historical Society, a writer of some ability.

(iii) Cadwallader C. Washburn, lived in Wisconsin, Congressman, general in Civil War, Governor of Wisconsin, President of the Wisconsin Historical Society.

(iiii) Charles A. Washburn, lawyer and editor, Minister to Paraguay, inventor, and writer.

(iiiii) William Drew Washburn, lawyer, lived in Minnesota, manufacturer and railroad builder, Congressman, Senator.

Three brothers were in Congress at the same time, representing three different states.---Appleton, Cyclopedia of American Biography. vol. VI, pp.370-372

(3) Barnes, Milling History of Minneapolis, Northwestern Miller,

(4) Holiday Number, 1890, American Flour,³⁴ pp. 269-270.

leader of the milling industry. Her wheat was a hard, dry wheat, with a thin, brittle husk. The long, hard grinding necessary under the old low system of milling was as unfavorable in its effects on Hungarian wheat as on that of Minnesota, so that Hungarian flour, (1) too, was dark, bran specked, and inferior. To overcome this difficulty, the Hungarians had dampened their wheat to toughen the bran, and when this did not work, when they found that their sandstone millstones wore away rapidly on the hard wheat and that their flour was ruined by the fine sand it contained, they abandoned low mill- (2) ing for high milling and the millstone for the roller.

High milling meant decreasing the speed of the millstones, setting them farther apart, and attempting a gradual reduction. Gradual reduction meant that instead of attempting to grind out all the flour in the wheat at single grinding, the wheat should go several times through the grinding machinery, at first being only crushed partially, then cleaned and reground. "The system which they employed was most elaborate. Instead of being ground at a single operation, the grain underwent a long series of gradual reductions alternated with careful siftings. In the early stages of the process the millstones were run slowly and set well apart so as merely to open the berry for the removal of "crease dirt," germ and husk. The inner starch kernel was left for a time in the state of coarse granules, which, after each breaking, were subjected to thorough sifting and purifying. The miller avoided as far as possible making flour in the first operations. Such as did appear was dirty and was sifted out to be utilized in cheap side products. Only when the starch par-

(1) 'Roller Mills in Hungary', Northwestern Miller, Oct. 7, 1882, .
p. 261.

(2) Ibid., p. 261.

ticles had been freed from their major impurities was the actual task of pulverization begun. The latter was again a process of gradual refinements, with new siftings and purifications at every turn. The method was long and expensive, but it produced a beautiful white product, pure, nutritious, and of superior bread-making quality? (1)

The roller mill, then, was established in European flour milling before it was introduced in this country. To whom the honor belongs is not very clear. E. P. Allis & Co. of Milwaukee are said to have installed a set of rollers in Mowbray's mill at Winona in 1873. (2) This experiment was to be kept a secret, but somehow it leaked out, and other millers began to investigate the merits of the roller system. Christian is said to have installed a set in the Washburn mill in the same year. Mowbray's rolls were made of marble; Christian's of cast iron. Both had this defect, that they wore down very rapidly. Various attempts were made to harden the iron ones, but there was no measurable success until Governor Washburn imported chilled-iron rolls from Europe. (3)

Meanwhile, a man named Wegmann had perfected a roller mill with porcelain rolls which was meeting with a great success in Europe. (4) In 1876 W. D. Gray who had charge of the manufacture of milling machinery for the E. P. Allis Company saw them in operation in Europe and was greatly impressed by them. They seemed to

(1) Merk, Economic History of Wisconsin, p. 138; Gray, 'A Quarter Century of Milling', Northwestern Miller, Dec. 20, 1899.

(2) Northwestern Miller, Feb. 4, 1881, p. 68.

(3) Most of the rolls used today are of the chilled-iron variety--not steel as erroneously supposed. "Cast-iron rolls, deeply case hardened by chilling in the mould,---have now become practically universal". Amos, Processes of Flour Manufacture, p. 136.

(4) Northwestern Miller, Feb. 4, 1881, p. 68.

Mr. Gray to be especially adopted to the reduction of purified middlings. They did not generate as much heat in grinding as the millstones, they required less power to operate and they did not require redressing as frequently. So the Allis company secured the American rights to Wegmann's machine and began to manufacture it in this country. They seem to have been fairly successful at first, but presently millers began to complain that the machines were too noisy because of the spur-gears which drove all the rollers in the machine but one. Moreover, it was essential that the two rollers opposite each other should be kept exactly parallel, which was difficult to do. The porcelains were expensive and easily broken. In 1879 Gray put out a new machine which was an improvement over Wegmann's. The machine was completely belt-driven, there was a device to keep the rolls exactly parallel, and the capacity of the machine was greater.

Meanwhile, there had been much controversy over the relative merits of porcelain and chilled iron rolls. For the former it was claimed that they would turn out a whiter flour and that they were cheaper. The iron rolls, it was claimed, were more durable and were easier to keep trued.

The use of rollers for regrinding the purified middlings spread so rapidly that by 1879 the Editor of the Northwestern Miller could say that "nearly every mill which makes any pretensions to doing nice work is now using rollers more or less. The problem which the progressive millers of to-day are slowly working out, is

(1) Northwestern Miller, Feb. 24, 1882, p. 119.

(2) Northwestern Miller, Feb. 4, 1881, p. 68.

(3) Northwestern Miller, Sept. 12, 1879, p. 170.

(4) Northwestern Miller, Sept. 19, 1879, p. 192.

whether rollers can not be used to the entire exclusion of millstones". That is, could not the roller be used to advantage in the granulating of the wheat as well as in the reduction of the purified middlings? The Wegmann porcelain rolls for grinding middlings were smooth faced. For the grinding of the wheat, however, rolls with corrugated faces were necessary. Various manufacturers put on the market rolls with sharp corrugations, but these proved unsatisfactory. They cut up the wheat badly so that extracting the bran was a long drawn out process. The flour was darkened and much low grade flour was produced. But in 1879 appeared a new roll with round corrugations which soon surpassed all others. These "opened out the kernel extracting the inside from the hull without intermingling the bran with the flour, leaving the bran large." ⁽²⁾ These rolls were the invention of a Wisconsin miller, John A. Stevens of Neenah, who eventually succeeded in getting a patent process covering the whole roller method of flour manufacture.

As soon as the corrugated roll was applied to granulating wheat, it was found that it was far superior to the millstones. Consequently, there was a very rapid shift from millstones to rollers. Nowhere was the change made more quickly than in Minneapolis. The Northwestern Miller of Dec. 17, 1880 notes that the Model Mill has been rebuilt and furnished with rolls, mostly of the Stevens make. The same number mentions the remodeling of the Pillsbury B. ⁽³⁾ On January 7, 1881 the Miller notes the remodeling of the Holly mill on a roller basis. ⁽⁴⁾ The number of Jan. 28th chronicles the rebuilding of the Pettit Mill. Twelve out of twenty sets of mill-

(1) Northwestern Miller, Sept. 5, 1879, p. 154.

(2) Northwestern Miller, Jan. 7, 1881, p. 3.

(3) Northwestern Miller, Dec. 17, 1880, p. 399.

(4) Northwestern Miller, Jan. 7, 1881, p. 2.

stones were thrown out and replaced by rolls. On February 11, 1881 (1)
the change of the Cataract to a roller basis was noted. On November (2)
4, 1881 the Miller notes the fact that the last merchant mill using
millstones exclusively was being rebuilt on a roller basis. (3) None
of these mills used rolls exclusively. It was felt that the mill-
stones had no advantage in converting the middlings into flour--the
purpose for which the rolls had been introduced originally--but that
the corrugated rolls excelled them in the granulation of the wheat.

The more conservative men among the millers strong-
ly opposed even the partial use of rollers. It was claimed that the
rollers were an old idea, long since discarded by everybody but the
Hungarians who adopted them chiefly because they had no satisfactory
material from which to make millstones. Most of the millers of the (5)
Northwest had come to look upon gradual reduction as the best method
of milling hard spring wheat, but they felt--the more conservative
ones--that they could do this just as well with millstones. (6)

The truth was, however, that the New Process was
but a hesitating step in the right direction. Between the low grind-
ing of the period before 1870 and the high grinding of the modern
period was the transition period of the New Process with its "half-
high" grinding. The progress of the industry now demanded that the
next step be taken. (7) The complicated processes of gradual reduction,

(1). Northwestern Miller, Jan. 28, 1881, p. 51.

(2). Northwestern Miller, Feb. 11, 1881, p. 83.

(3). Northwestern Miller, Nov. 4, 1881, p. 323.

(4). Northwestern Miller, Jan. 7, 1881, p. 3.

(5). Northwestern Miller, Jan. 28, 1881, p. 53.

(6). Northwestern Miller, Feb. 13, 1880, p. 100.

(7). Northwestern Miller, Apr. 25, 1879, p. 249; Ibid., Sept. 5, 1879,

carried out logically, demanded many more machines. The rolls met this demand, for they occupied less space and required less power to operate than the millstones. ⁽¹⁾ They required less attention for they did not need to be changed for redressing oftener than once in eight or nine months, whereas the millstones had to be changed for that purpose every three or four days. The most important of all advantages claimed for the rolls was that they gave an increased yield of flour. The Hungarian miller Haum claimed that they increased his flour yield from 76.9% to 78.9%. Another Hungarian miller estimated that the rolls did thirty percent more work and re- ⁽²⁾ quired forty-seven per cent less power.

Some of the Minneapolis millers were so impressed with the Hungarian system of milling that they were inclined to adopt it bodily. They imported Hungarian machinery, ⁽³⁾ including the Hungarian type of purifiers, re-arranged their mills after the Hungarian fashion and even imported Hungarian head millers to superintend their mills. But they soon found that they had made a mistake. The Hungarian purifiers did not work satisfactorily on Minnesota wheat; the Hungarian head millers could not manage American workmen. The Hungarian mill-owners might find it profitable to make eleven different grades of flour, but the American public could not

(1). Northwestern Miller, Jan. 7, 1881, p. 3; Ibid., May 2, 1879, p. 268.

(2). Northwestern Miller, Feb. 4, 1881, p. 70.

(3). Northwestern Miller, May 2, 1880, p. 321. Description of the new Crown Roller Mill.

(1)

be induced to buy more than three. So these millers, "in a few years were compelled to throw away some of the complex machinery with which they were loaded", and adapt their equipment and processes to American conditions. Most of the mills had, in fact, proceeded more conservatively. As late as the spring of 1884 only two mills in Minneapolis had gotten rid of all their millstones. But all were following the Hungarians in the gradual reduction system. The number of reductions varied greatly for a time, many of the mills using eight or more. Large scale producers were able to provide the numerous machines that were necessary for such a complicated process. The country millers finding it difficult to provide the necessary capital and being naturally more conservative, fought the change bitterly. The same was true of the millers in the winter wheat district. The country millers found little support in the stand of the Northwestern Miller which stated editorially (June 24, 1881): "While advising our readers among the smaller mills to go slow in the matter of changing from the new process to the gradual reduction system for fear that they might try the latter before they

(1). An English view of American milling, Northwestern Miller, Dec. 9, 1881, p. 422.

"I had a conversation with the Hon. C. A. Pillsbury of Messrs. Pillsbury & Co., Minneapolis whose mills there possess a capacity for grinding from 35,000 to 45,000 bushels of wheat per day, producing from 7,000 to 8,000 barrels of flour each weighing 196 lbs. Mr. Pillsbury says that it suits their market best to make three grades of flour and from the proportion of flour made, they usually reckon 60 per cent of the first or patent flour, 35 per cent of the second grade and 5 per cent of the third. From the ordinary commercial wheat they reckon to make 70 per cent of flour, and as a matter of fact do in practice, but were the wheat thoroughly cleaned, same as it is when it enters the rolls, the returns of flour would be from 75 to 77 per cent of the weight of the wheat ground".

(2). Pillsbury, American Flour, pp. 269-270; Gray, 'A Quarter Century of Milling', Northwestern Miller, Dec. 27, 1899.

(3). Northwestern Miller, Apr. 25, 1884, p. 389.

(4). Gray, 'A Quarter Century of Milling', Northwestern Miller, Jan.

understood enough of its workings⁽¹⁾ to make it a success, we have not lost sight of the fact that the gradual reduction system, either by rollers or otherwise, was ahead in economy of power used, that it gave good yields and that its products commanded a higher market price. We are not therefore, surprised at its rapid introduction in-
to general use."

Nevertheless, the country millers persisted in their objections to the numerous reductions required by the Hungarian system; and, as a result, there was for several years a conflict between the advocates of the "short system" and the "long system" of milling. The short system made considerable progress in the soft wheat regions to which it was better fitted; in the spring wheat regions there was a compromise which substantially maintained long system, except that the number of reductions finally was settled at five or six.⁽²⁾ The manufacturers of mill machinery helped to solve the difficulty by making machines that would combine a number of steps in the process as, for example, putting two sets of rolls in the same roll-frame, etc.⁽³⁾ It was not until 1891, however, that the last millstones were discarded by Minneapolis mills, and even later before the debate over the relative merits of long and short system subsided.⁽⁴⁾

(1). Northwestern Miller, June 24, 1881, p. 416.

(2). Gray, 'A Quarter Century of Milling', Northwestern Miller, Jan. 17, 1900; Dondlinger, The Book of Wheat, p. 271.

(3). Northwestern Miller, July 1, 1881, p. 1.

(4). Northwestern Miller, Jan. 30, 1891, p. 125.

7. Minor Improvements in Milling Machinery.

Along with the substitution of the rolls for millstones, came a series of improvements in the other departments of milling which left them substantially as they are today. We can only glance at the most important of these.

1. The Dust Collector. This was made necessary by the purifiers which filled the air of the mill with dust. The millers made some half hearted attempts at collecting this dust for they knew that to lose it meant a great waste of flour, though they did not realize the danger involved in allowing it to permeate the air of the mills. Efforts were made to draw the dust by means of a suction fan into so-called dust rooms at the top of the mill. There the dust was allowed to settle, was collected and worked over into low grade flour. The method was inefficient at best. It required a great disaster to bring the millers to a sense of the importance of this matter. On May 2nd, 1878, came the great explosion of the Washburn A mill followed by fire and explosion in four of the neighboring mills, which resulted in a loss of eighteen lives, of three quarters of a million in property, and nearly half of the milling capacity of Minneapolis. First reports spoke of an explosion of nitroglycerine, but investigation showed that the flour dust floating in

(1). Gray, 'A Quarter Century of Milling', Northwestern Miller, Jan. 10, 1900.

(2). Northwestern Miller, May 3, 1878; Ibid., May 10, 1878.
Mills destroyed--Washburn A 42 run, Diamond 6 run, Humboldt 8, Zenith 6, Galaxy 12, Pettit-Robinson 15. Rogers, History of Flour Manufacture in Minnesota, Minnesota Historical Society Collections, vol. X, pt. 1, p. 52.

the air of the mill was the real cause. The calamity attracted nation-wide attention, caused the millers to study the problem seriously, and thus resulted in a rapid improvement of the machinery for dust collection so that by the middle of the eighties they were installing machines substantially similar to those of the present day.

2. The Centrifugal Reel. In the seventies the old long hexagonal reel which had for generations been relied on for the bolting of the flour was discarded in favor of the centrifugal reel which was imported from Europe. This consisted of an outside cylinder covered with silk, running at the speed of an ordinary reel, and inside of it a fast running shaft with beaters attached. The old reels had depended on gravity to force the flour through the bolting cloth: this was a force bolter. It was only a third as long, took less power to run, and did far more work; therefore it rapidly took the place of the old style reel.

(1). W. D. Washburn to Major Hale, Washington, March 1, 1885:

"I have a letter from my son Edwin who states that he has just been down to the Palisade mill and remarks that 'it is the dirtiest and most slovenly mill he ever was in.' I have remarked the same thing and have upon two occasions spoken to Mr. Clarke the head miller, on the subject, but evidently I do not have much influence with him. If there is anything disgusting it is a dirty manufacturing establishment, especially a flour mill; beyond all that it is very dangerous. If the old A mill had been in a clean condition there never would have been the explosion." Hale Papers, Minnesota Historical Society.

(2). Northwestern Miller, June 2, 1882, p. 358; Gray, 'A Quarter Century of Milling', Northwestern Miller, Jan. 24, 1900.

3. The Tempering of the Grain. The difficulty of getting a clean separation of the bran from the wheat kernel led to the introduction of a whole new process, that of wheat tempering. Various heating and steaming devices were introduced by means of which the wheat was brought to just the right temperature and dryness and the bran was toughened so that it would come away whole from the kernel.
(1)

8. Effect of the Improvements in Milling Processes on Minneapolis Mills.

The growth of milling in Minneapolis after the introduction of the Hungarian process was just as immediate and just as marked as that which followed the introduction of the New Process. During the years 1877-1882 the average wholesale price of patent flours at Minneapolis varied from \$7.95 to \$8.12½ per barrel. During the same years the average price of the four and a half bushels of wheat necessary to make a barrel of flour, varied from \$3.78 to \$4.95.
(2)

- (1). 'The Victor Heater', Northwestern Miller, Mar. 29, 1878; 'Millers' National Association, Report of the Committee on Mill Machinery', Northwestern Miller, May 16, 1879, p. 302.
(2). Average wholesale price of patent flours and average price of wheat at Minneapolis:

Year	Patent flour	Wheat(four and a half bushels)	
1877	\$8.12½	5.40	Minneapolis Chamber of Commerce Annual Report 1896, p. 115; for flour prices. Wheat price averages have been calculated from Minneapolis Chamber of Commerce, Annual Report, 1919, p. 94. Table showing highest and lowest prices, etc.
1878	6.87½	4.17	
1879	7.22½	4.16	
1880	7.71½	4.73	
1881	7.20	4.86	
1882	7.95	4.67	
1883	6.75	4.86	
1884	5.35	4.07	

Of course not all the flour manufactured was patent flour; probably forty per cent was a fair proportion as against fifty per cent baker's flour and ten per cent low grade. However when we consider that the amount of wheat necessary to produce a barrel of flour had been reduced from $4 \frac{2}{3}$ to $4 \frac{1}{8}$ bushels, and that the mills could now manufacture patent flour from low grade wheat, and the further fact that 270 pounds of wheat could not be converted into 196 pounds of flour without leaving a considerable amount of offals from which very valuable by-products could be obtained, we are not inclined to doubt the estimate that millers during this period often averaged a profit as high as \$3.00 a barrel.

Consequently the milling capacity of the city increased very rapidly. In 1878 the Excelsior and the Model Mills were built. There was no increase in mill capacity in the following year which was devoted to the rebuilding of the mills destroyed in the disastrous explosion of May second. In 1880 were built the Standard and the Northwestern--both thousand-barrel mills, and the Trades, a

(1). 'Minneapolis and its mills'--Appletons Annual Cyclopaedia, 1881, p. 589.

(2). Gray, 'A Quarter Century of Milling', Northwestern Miller, Oct. 25, 1899; Minneapolis and its Mills, Appleton's Annual Cyclopaedia, 1881, p. 589.

(3). Flour output of Minneapolis Mills for the year:

1860--30,000 barrels	1875--843,659 barrels	1880--2,052,840 barrels
1865--98,000 "	1876--1,000,676 "	1881--3,142,970 "
1870--193,000 "	1877--935,544 "	1882--3,175,910 "
1873--585,009 "	1878--940,876 "	1883--4,046,220 "
1874--727,157 "	1879--1,551,789 "	1884--5,317,672 "

Minneapolis Board of Trade, Annual Report 1876, p. 42; Northwestern Miller, Mar. 19, 1880, p.79; Minneapolis Chamber of Commerce, Annual Report 1918, p. 120.

small mill of 100 barrels capacity; the Washburn C mill of 1650 barrels capacity was completed and the first unit of the Pillsbury A, which was destined to be the greatest mill in the world was put into operation. In 1881 the Crown Roller of 1600 barrels capacity was added to the list, and in 1883 the Columbia (1000 barrels), and the Lincoln (1300 barrels). At the same time there was a steady increase in the capacity of the older mills--altogether, a fifty per cent increase in 1880, a fifty per cent increase in 1881, a twenty per cent increase in 1882. By that time Minneapolis had passed St. Louis in her flour output and had become the leading flour-manufacturing city of the United States.

We have now reviewed the revolution in milling processes which began in the year 1870. We started in 1870 with low milling as the prevailing process, and the millstone the principal

(1). The Lincoln is at Anoka, eighteen miles north of Minneapolis, but since it is owned and operated by Minneapolis millers, it is usually reckoned as a Minneapolis mill. The same was true at this period of the Minnetonka Mill (Minnetonka, Hennepin County) which was acquired by a Minneapolis firm in 1880 and the mills at Stillwater taken over by Minneapolis millers in 1885.

(2). Capacity in barrels, per day of 24 hours, of Minneapolis mills for the years---

	Number of mills	Capacity		Number of mills	Capacity	
1877	21	4,925	(?)	1881	24	21,725
1878	19	5,625	(?)	1882	25	25,250
1879	19 (?)	8,250		1883	23	26,975
1880	26	15,025		1884	23	30,775

Minneapolis Chamber of Commerce, Annual Reports, 1877-1894.

(3). St. Louis Trade and Commerce, 1882, p. 76.

kind of machinery. Hard low grinding was the rule, and the object of the miller was to make the largest possible percentage of flour at the first grinding. There were three parts to the process, the cleaning of the wheat, the grinding and the bolting to separate the flour from the offals..The chief defect of the process was that the bran was likely to be pulverized to such an extent that it could not be separated from the flour. This was especially true of the hard spring wheat. The rapid spread of the spring wheat growing in the Northwest in the seventies forced the adoption of a new process which was known as "half high" milling or "The Patent Process". The speed of the stones was again decreased and they were set farther apart. The purifier was invented by means of which the middlings were cleaned, which, when reground, made a flour superior to the best flour known up to that time. The effort now was to secure not flour, but middlings at the first grinding. Instead of the original steps in milling there were now four: cleaning, grinding (several times), purifying, bolting. The increased number of grindings led to the substitution of the rolls for the millstones and with them we come to the third process or "high milling." The miller no longer sought to grind the wheat but rather to granulate or crack it. This was done five or six times, each time the flour and middlings were separated before the operation was repeated. Neither the purifier nor the rolls were American inventions. They were introduced to America largely to meet the demands of the spring wheat millers. Of these the Minneapolis millers were the most far-sighted and enterprising. They took the lead in introducing the new machines and reaped the greatest benefit. There were, as we shall presently see, other factors in the movement which made Minneapolis the flour center of the

world. No one factor, however, was more important than the leadership of her millers in the revolution in flour mill methods.

Chapter IV--CONCENTRATION AND LARGE SCALE PRODUCTION IN THE
MINNEAPOLIS MILLS. (1870-1891)

9. Large scale production.

In the preceding chapter, it was shown that as a result of a revolution in the methods and processes of flour-making, which Minneapolis millers led, and of which Minneapolis reaped the greatest benefit, the flour production of that city had increased very largely, so that the daily capacity of its mills had risen from less than 5,000 barrels to over 30,000 in seven years. That growth had not been brought about by any large increase in the number of the mills; for, whereas there were twenty-one mills in 1877, there were but twenty-three in 1884, and twenty-two in 1891. Nor was there any considerable enlargement of buildings or of floor space. The use of improved and condensed machinery has increased the output of the individual mill.⁽¹⁾
⁽²⁾

This increase in the size of the mills is more clearly apparent when we take their average daily capacity at various periods. Thus the twenty mills in operation in 1876 had an average daily capacity of about 242 barrels. In 1880, while the number of mills had increased to 26, the average daily capacity had almost doubled (578 barrels). By 1884 the number of mills had decreased to twenty-three but there was no decrease in total product for the average daily capacity had increased to 1,338 barrels. In 1888 there were two more mills, and the average daily capacity had risen to 1534 barrels. In 1891, twenty-two mills had an average capacity of 2,041 barrels. At the beginning of the period, a mill with a capacity of 200 barrels was a large one; in

(1.) See above Chapter III, p. 62. The figures are for 1877 to 1884; by 1891, capacity was 44,900 bbls. See appendix, for capacity of individual mills.

(2). Encyclopedia Americana, vol. XI, p. 387.

1891, only four of the twenty-two mills had less than a thousand
(1)
barrels capacity.

Up to 1870, the large mill--and in those days, that meant a mill of say 200 barrels capacity--was hardly able to compete successfully with the smaller ones. The large mill "which could run exclusively on merchant work and hold its own in competition with the smaller mills was the exception rather than the rule. The majority of the large mills were elephants on their owner's hands, while the little two and three run mills throughout the country were making
(2)
money for their owners." The difficulty which Governor Washburn encountered in getting some one to run the old Washburn A mill illustrated this truth.

The smaller mills claimed certain advantages before 1870. Being usually located right in the wheat growing region, they had an advantage in buying wheat so that they could get the choicest supplies at the lowest prices. It was claimed that they were more economical in operation than the larger ones. Since the big millers did not control the patents, the small mills were under no disadvantage in buying machinery for the new processes. Buying and selling as they did, principally in a local market, they were not exposed to price fluctuations in wheat and flour to the same extent as the larger mills. Before transportation systems were well developed, this advantage in controlling a local market both for the buying of the wheat and the selling of the flour was an important one. After considering these advantages of the smaller mills, the Northwestern Miller concluded in 1881:
(3)
(1) That there were some mills even then too

(1). Annual lists of mills in operation, Minneapolis Board of Trade, Annual Report, 1876, 1880; Minneapolis Chamber of Commerce, Annual Report, 1884, 1888, 1891.

(2). Northwestern Miller, Oct. 7, 1881, p. 252.

(3). Ibid., Aug. 18, 1882, p. 123.

large to be handled economically. (2) That the small miller had no difficulty in securing the machinery to keep abreast of the times. (3) That if the small millers would work scientifically, there was no reason why they should not be able to secure as proportionately large a profit from their mills as the big millers did.

However, there were certain advantages possessed by the big mills which began to make themselves felt after 1880. There was economy of construction and operation in a thousand-barrel mill as compared with one of only 250 barrels capacity. The large mills could more easily secure capital to buy the expensive machinery of the new process. They could buy special machines for special purposes and keep them constantly employed as the small mills could not. They could employ more skilled managers and superintendents--importing them from Europe if this was necessary. They found it easier to utilize and sell their by-products. When it came to buying the wheat, their larger capital and ability to buy in a larger area saved them from the fluctuations in the quality of their wheat supply which affected the smaller millers who bought in a local market year after year. Their larger capital enabled the big mills to experiment with new machines and new methods which was impossible to the country millers. And, finally, the larger mills were in a position to send out travelling men, to advertise on a nation-wide scale, to establish branch-houses in the leading cities of the country. Through these they could sell their flour in such a fashion as to eliminate the commission men. Selling in quantities as they did, the large mills

(1). Minneapolis Board of Trade, Annual Report, 1880, p. 53.

(2). Northwestern Miller, Oct. 7, 1881, p. 252.

(3). Ibid., Aug. 18, 1882, p. 123.

(4). See Ch. IX, p. 189.

had an advantage in securing cars for shipping and were usually able to get advantages in the matter of freight rates and transfer charges. But the biggest advantage of the large mills was in the field of export trade. So long as the local market was the thing sought after, the small mill had the advantage. But when the foreign trade became important, when the millers had all Europe for a market and orders for 10,000 or 15,000 barrels were getting fairly common, the advantage lay clearly with the large mills. The millers found that if they wanted to secure this trade they would have to control a large manufacturing capacity so that they would be able to fill large orders promptly, and be sure that their flour was uniform in quality. In all this, of course, the milling industry was merely following the general tendency of all lines of manufacturers throughout the country. For that matter, the same tendency shows itself in the census statistics for the milling industry of the country.

(1). Minneapolis Board of Trade, Annual Report, 1879, p. 50.

(2). Ibid.

Between 1870 and 1880, we have an increase, in capital invested, of 17 percent. and, in value of product, of 20 and two-tenths per cent. But the number of wage earners employed shows an actual decrease, indicating that more labor-saving machinery is being employed, while the increase in number of establishments (7.8%) is less than half as great as the increase in capital invested.⁽¹⁾

1. Summary of U.S. Flour Mills Statistics--percent. of increase--

	1850	1860	1870	1880
No. Establishments	11,891	13,868	22,573	24,338
Capital Invested	54,415,581	84,585,004	151,565,376	177,361,878
Av. No. Wage-earners	23,310	27,682	58,448	58,407
Cost of Materials	113,036,698	208,497,309	367,392,122	441,545,225
Value of Product	136,056,736	248,580,365	444,985,143	505,185,712

	1890	1900	1910
No. Establishments	18,470	25,258	23,652
Capital Invested	208,473,500	218,714,104	370,410,289
Av. No. Wage-earners	47,403	37,073	46,467
Cost of Materials	434,152,290	475,826,345	813,891,347
Value of Product	513,971,474	560,719,063	938,699,958

Percent. of increase	1850-60	1860-70	1870-80	1880-90	1890-1900	1900-10
No. of Establishments	16.6	62.8	7.8	24.1#	36.8	6.4#
Capital Invested	55.4	79.2	17.0	17.5	4.9	69.4
Av. No. Wage-earners	18.8	111.1	0.1#	18.8#	21.8#	27.4
Cost of Materials	84.5	76.2	20.2	1.7#	9.6	67.4
Value of Product	82.7	79.0	13.5	1.7	9.1	47.0

Decrease

1. U.S. Census, 1900, vol. IX p. 355; Ibid., 1910, vol. X, p. 407, vol. VIII, p. 384.

10. Concentration of Ownership.

While the mills were thus growing in size, there was going on another process of concentration, which, by 1890, had brought more than sixty per cent of the milling capacity of the city into the hands of three great corporations. This was not the result of deliberate planning--there was no effort as yet, to establish a monopoly-- but rather the natural working out of the economic forces of the period. First of these combinations was that of C. A. Pillsbury and Company-- a monument to the business ability of Charles A. Pillsbury.

Pillsbury was born at a small country village in New Hampshire in 1842. Later his family moved to Concord, and there he gained an education which was completed--with intervals of school-teaching to pay expenses--at Dartmouth College. Leaving college, he became a clerk in a produce commission business and in three years had saved enough to buy an interest in it. But the desire to go West caused him to sell out within the year. His uncle, John S. Pillsbury, (later governor of Minnesota) had moved to Minneapolis, and this induced Charles Pillsbury to go there also. Arriving in Minneapolis in 1869, he immediately purchased an interest in the firm which had just bought the Minneapolis Mill. The firm then became Gardner, Pillsbury, and Crocker, with C. A. Pillsbury as the manager. He had no milling experience, the Minneapolis Mill had been a financial failure under its former owners, the years 1867 to 1869 had been unfavorable ones for the Minneapolis flour mills, and their flour was, as Mr. Pillsbury afterwards expressed it, "down at the bottom of the heap". "The other fellows in the business," he goes on to say, "rather pitied me, and said that another poor devil had got caught in the milling business of which he would soon get enough." But Pillsbury had entered

(1). 'The Early History of New Process Milling', Northwestern Miller,

Aug. 24, 1885, p. 174.

(2). Ibid.

the business at a crucial time, and it was largely his energy and ability that started Minneapolis milling on the upward climb.

His efforts to improve milling methods have been narrated
(1)
in the previous chapter. His success with the Minneapolis Mill led Pillsbury to buy the Taylor (Alaska) Mill in 1870. George T. Smith, a co-inventor with La Croix of the purifier, was induced to leave the Washburn mills and join Pillsbury as head miller. Purifiers were installed in both mills, and the manufacture of "Patent" flour was begun.
(2)
The success of the venture was immediate. C. A. Pillsbury is
(3)
said to have received \$6,000 as his share of the first year's profits. Whether this is true or not, it is certain that profits were very large in the next few years, and that the foundation of the Pillsbury
(4)
fortune was laid at that time.

This first success led him in 1871 to organize the firm of C. A. Pillsbury and Company, which included, besides Charles A. Pillsbury, his father, George A. Pillsbury; his uncle, John S. Pills-
(5)
bury; and a little later, his brother, Fred C. Pillsbury. The new firm took over the Taylor Mill which was renamed the Pillsbury (now
(6)
Pillsbury B.) In 1875, Governor Pillsbury bought the Anchor Mill
(7)
which was thereafter operated by the firm. In the same year they leased what had been a woolen mill, equipped it with flour-milling
(8)
machinery, and renamed it the Empire. In 1878, Dorilus Morrison leased

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- (1). See above, p. 42.
(2). Northwestern Miller, Nov. 8, 1889, p. 515.
(3). Ibid., Holiday Number, 1893, p. 42.
(4). 'Early History of New Process Milling', Northwestern Miller, Aug. 24, 1883, p. 174; ibid., Nov. 8, 1889, says \$18,000. (p. 515)
(5). Northwestern Miller, Holiday Number, 1893, p. 42.
(6). Atwater, History of the City of Minneapolis, pt. II, p. 587;
Northwestern Miller, March 18, 1881, p. 165.
(7). Northwestern Miller, Nov. 8, 1889, p. 515.
(8). Atwater, History of the City of Minneapolis, pt. II, p. 613.

his newly completed Excelsior mill to the Pillsburys.

In a period of great prosperity, no milling firm had grown so fast as the Pillsburys. In four years they had acquired four mills with a daily capacity of 2,500 barrels of flour, and so became the leading millers of Minneapolis. Even then, Pillsbury's ambitions were not satisfied. For, in 1880, they put in operation the first section of the Pillsbury A--which, when completed, was (and still is) the largest flour mill in the world.

But before the Pillsbury A was completed, disaster overtook the firm. In December, 1881, fire destroyed the Pillsbury B, The Excelsior, and the Empire Mills. When the Excelsior was rebuilt, Dorilus Morrison decided to operate it himself. For a time, only the Anchor and a part of the A mill were left to uphold the Pillsbury reputation. However, the A mill was completed in 1883, the B mill was rebuilt in 1884, and in that year the firm had three mills in operation with a daily capacity of 9,950 barrels--a remarkable growth compared with its 2,500-barrel capacity in 1878.

From 1884 to 1889 there were no striking developments in the history of the Pillsbury firm. The number of mills owned remained the same, but their capacity increased steadily: to 9,950 barrels daily in 1886, to 10,250 barrels in 1887, and to 10,750 barrels in 1889. To provide a wheat supply for these mills, a terminal elevator of 500,000 bushels capacity had been built in Minneapolis and also a system of elevators and warehouses in the wheat growing territory, at first under the name of Pillsbury and Hulbert and later as the

(1). Atwater, History of the City of Minneapolis, pt. II, p. 613.
(2). Northwestern Miller, Apr. 8, 1881, p. 218.
(3). Ibid., Dec. 9, 1881, p. 418; ibid., Jan. 20, 1882, p. 40.
(4). For Morrison, see below, p. 84
(5). Minneapolis Chamber of Commerce, Annual Report, 1883, p. 63; ibid., 1884, p. 84.
(6). Ibid., 1887, p. 95; 1888, p. 104; 1890, p. 135.

(1)

Minneapolis and Northern Elevator Company. The marketing of Pillsbury's Best Flour had been pushed energetically so that by this time it had acquired a national and international reputation, and Charles Pillsbury was recognized to be the world's leading miller. (2)

Meanwhile, there had grown up another firm with which Pillsbury was in closest rivalry--the Washburn Crosby Company. We have told in Chapter II how Governor E. C. Washburn of Wisconsin became interested in the Minneapolis water power in the decade before the Civil War and how he became one of the pioneer mill builders, erecting the Washburn B in 1866, the "big mill" so it was called. Governor Washburn was not a miller, so he did not attempt to operate the mills himself. The B mill was leased to the firm of Judd and Brackett, but they could not make a success of it and gave it up in two years. It was in 1869 that George H. Christian induced Governor Washburn to let him take the mill as narrated in Chapter III. He formed the firm of Christian, Tomlinson, and Company in 1869, but in less than a year Tomlinson withdrew, and then Washburn became a partner and the firm name was changed to George H. Christian and Company. (3)

A little later, Christian's two brothers, J. A. and Llewellyn were admitted to the firm. (4) When the Washburn A mill was completed, they operated it along with the B. As we have shown, the firm was leader in the introduction of the new process milling and roller milling as well. (5)

In 1875, George Christian retired from active business, (6) and there followed a reorganization. The Christians, under the name of J. A. Christian and Company, kept control of the Washburn A until

(1). Hudson, Half Century of Minneapolis, p. 356.
(2). For marketing methods at the time, see Ch. IX. .
(3). Northeastern Miller, Aug. 10, 1883, p. 136a.
(4). Atwater, History of the City of Minneapolis, pt. II, p. 609.
(5). See Chapter III,
(6). Hudson, Half Century of Minneapolis, pp. 355-6.

it was destroyed in the great explosion of 1878. The Washburn B was given up. Governor Washburn tried for a year to operate it in partnership with a man named Hazard. Then, in 1877, he found a more (1) satisfactory partner in the person of John Crosby.

Crosby was a Maine man, a brother-in-law of William Drew Washburn. He was a man who had made a considerable fortune in a foundry and machine shop at Bangor, but was induced at the age of (2) forty-eight to move to Minneapolis and enter the milling business. To strengthen the firm where it was weak--in the technical side of (3) milling--Governor Washburn induced William Hood Dunwoody to join the firm. So there was organized in 1879 the firm of Washburn Crosby and Company, a firm destined to become famous in Minneapolis milling history. Its members were C. C. Washburn, John Crosby, W. H. Dunwoody,

(1). Atwater, History of the City of Minneapolis, pt. II, p. 538.

(2). Castle, Minnesota, Its Story and Biography, vol. III, p. 1432-3.

(3). William Hood Dunwoody was, from many points of view, a notable figure among the Minneapolis millers. He was born in Pennsylvania in 1841. His father was a farmer of Scotch Presbyterian ancestry, his mother of Quaker stock. At the age of eighteen, he entered the office of an uncle in Philadelphia who was engaged in the grain and flour trade. Five years later, he was the head of a firm. In 1869, he came to Minneapolis as a flour buyer, and the prospects which he saw there induced him to settle permanently. In 1871, he became a member of the firm of Tiffany and Dunwoody which operated the Arctic Mill. In 1878, he was induced by Governor Washburn to join the firm of Washburn Crosby and Company. He was the leader in organizing the Millers' Association (see Chapter V.) and in opening up the direct trade with the foreign markets (see Chapter IX.). When Washburn Crosby and Company were incorporated, he became a vice-president of it. He organized a number of its subsidiary companies, including the St. Anthony Elevator Company, the St. Anthony and Dakota Elevator Company, and the Duluth Elevator Company. He was interested in the Northwestern National Bank and acted as president of it for some years. He was especially interested in the technical improvement of milling. Realizing the lack of trained men in the industry and, still more, the lack of facilities for training, he determined to found a millers' school. This idea gradually broadened in scope until his projected school became a great trade school, offering instruction in every trade, for which there was any considerable demand, to the youth of Minneapolis. At his death, he left a trust fund of \$3,000,000, which Mrs. Dunwoody afterwards considerably increased, to establish the William Hood Dunwoody Industrial Institute.

Hudson, Half Century of Minneapolis, pp. 343-4; Castle, Minnesota, Its Story and Biography, vol. III, pp. 1430-32; Minneapolis Survey, pp. 3-4.

and C. J. Martin, the last being Governor Washburn's secretary. It leased from the Governor the Washburn B mill which Washburn and Crosby had been operating, and the C mill which was completed in 1879-80. When the A mill was rebuilt (1880-81) after the big explosion, they acquired that also. In 1880, these three mills were producing 6,500 barrels of flour daily; in 1887, this had grown to 7,850 barrels; in 1888, to 8,200 barrels. Next to Pillsbury's, Washburn, Crosby, and Company were the leading milling firm in the country.

In 1882, Governor Washburn died. For several years thereafter, the family was represented in the firm by W. D. Washburn, brother of the Governor, and brother-in-law to John Crosby. When Crosby died in 1887, there was another reorganization. Washburn, Crosby, and Company had for years maintained very close relations with the Philadelphia flour house of Samuel Bell and Sons. J. S. Bell, a member of this firm was induced to come West and enter the firm of Washburn, Crosby, and Company. Then in 1889 the firm was incorporated as the Washburn-Crosby Company. The directors were W. H. Dunwoody, James S. Bell, C. J. Martin, John Washburn, John Crosby, Jr., Samuel Bell, Jr., and A. V. Martin. Substantially the same interests control the company today.

(1). Hudson, Half Century of Minneapolis, p. 334;
 (2). Minneapolis Board of Trade, Annual Report, 1879, p. 49; Northwestern Miller, March 25, 1881, p. 181.
 (3). On May 2, 1878, an explosion, probably caused by the ignition of flour-dust floating in the air, wrecked the Washburn A, and also the Diamond and the Humboldt, two small mills standing back to back with the A Mill. The ruins caught fire, and the flames jumped across the canal to the Zenith, the Galaxy, and the Pettit & Robinson mills.-- Northwestern Miller, May 10, 1878.
 (4). Minneapolis Board of Trade, Annual Report, 1880, p. 54; Northwestern Miller, March 25, 1881, p. 181.
 (5). Minneapolis Board of Trade, Annual Report, 1880, p. 54; Minneapolis Chamber of Commerce, Annual Report, 1888, p. 104; Ibid., 1889, p. 112.
 (6). Atwater, History of the City of Minneapolis, pt. II, p. 610.
 (7). Hudson, Half Century of Minneapolis, p. 334; Northwestern Miller, Jan. 12, 1894, p. 48.

From 1882 to 1887, William D. Washburn was a leading figure in Minneapolis milling circles, not only because of his interest in Washburn, Crosby, and Company, but because of his own pet enterprise, the Washburn Mill Company. W. D. Washburn, famous in the political life of Minnesota in the seventies and eighties, had come to Minneapolis in 1857 as a fledgling lawyer who was glad to add to his income by acting as agent for the Minneapolis Mill Company. He had directed the building of the dam and the digging of the power canal; later, he had been appointed Surveyor General of the public lands of Minnesota. Possibly it was a knowledge of Minnesota's timber resources, gained while in this office which caused him to enter lumbering, building saw mills at Minneapolis and at Anoka. The lumber business, in turn, led to flour milling. In 1878, he purchased a small mill at Anoka, which in 1880 was replaced by the Lincoln Mill of 800 barrels capacity--said to have been the first complete roller mill in Minnesota. When this mill burned down after less than a year's service, the Palisade Mill in Minneapolis was acquired to fill its orders. The Palisade was gradually enlarged and re-equipped. By 1889, the two mills belonging to the Washburn Mill Company had a capacity of 2,800 barrels. It shared with the Washburn-Crosby Company, C. A. Pillsbury and Company, and the Christian interests the milling leadership of Minneapolis.

After the prosperous years of the introduction of the roller system, came a period of depression. From 1883 to 1887 flour

(1). Northwestern Miller, Jan. 12, 1894, p. 45-49.

(2). Ibid., Nov. 8, 1889, p. 549.

(3). Minneapolis Chamber of Commerce, Annual Report, 1890, p. 135.

prices declined steadily. Competition became more severe as output
 (1) (2) increased, more mills were built, and the millers began to compete
 (3) for a nation-wide market. Then in the fall of 1888 came a sharp rise
 in prices, the market recovered quickly, and there followed a period
 (4) in which, as one of the millers put it, "you could sell anything."
 It was in this period that an English syndicate was formed to buy up
 the leading Minneapolis flour mills. On the one hand, the severe
 competition of the preceding years had so cut the profits of milling
 that almost all the millers were willing to sell and get out of the
 business. The Northwestern Miller stated in November, 1889, that it
 was said in Minneapolis that almost every mill in the city had given
 (5) an option on its property. On the other hand, the inroads of Amer-
 ican flour in the English market, the wide publicity secured for Min-
 neapolis mills by such men as C. A. Pillsbury, the large amounts of
 capital in England seeking investments--all these combined to make a
 stock flotation scheme feasible. After some negotiation, the syndi-
 cate succeeded in purchasing the three mills of C. A. Pillsbury and
 (6) Company and the two mills of the Washburn Mill Company. This gave

(1). New Mills Built in Minneapolis, 1878-1889.

Excelsior 1878	Crown Roller 1881
Northwestern 1880	Lincoln 1883 (Anoka)
Pillsbury A 1880	Columbia 1883
Standard 1880	Stillwater Mills (Stillwater) 1885
Washburn C 1880	

(2). Flour Output of Minneapolis Mills for the years:

1883--4,046,220	barrals	1887--6,574,000	barrals
1884--5,317,672	"	1888--7,056,680	"
1885--6,221,243	"	1889--6,068,868	"
1886--6,168,000	"	1890--6,988,630	"

Minneapolis Chamber of Commerce, Annual Report, 1919, p. 155.

(3). Northwestern Miller, Nov. 29, 1884, p. 510.

(4). Conversation with a prominent citizen of Minneapolis.

(5). Northwestern Miller, Nov. 9, 1889, p. 521.

(6). Three Pillsbury Mills: A--7,200 bbls; B--2,500 bbls; Anchor--
 1,600 bbls; two Washburn Mills: Palisade--2,200 bbls; Lincoln--1,000
 bbls; total, 14,500 bbls.

them a daily capacity of 14,500 barrels. At the same time, they bought the stock of the two water-power companies, thus giving them control of practically all the water power of St. Anthony Falls, and the Minneapolis and Northern Elevator Company which gave them a line of elevators into the wheat country to the Northwest as well as a terminal elevator in Minneapolis. Having made these purchases, the syndicate then organized the Pillsbury-Washburn Flour Mills Company, Limited, and proceeded to float the stock in England. The Pillsbury family bought a large block of stock in the new corporation, and C.A. Pillsbury became its managing director.

Their plans did not stop with the purchases named above. Having secured the Pillsbury mills, the syndicate then attempted to purchase the C. C. Washburn Mills, then operated by the Washburn-Crosby Company. The latter company had a lease which had less than a year to run. The Pillsbury-Washburn Company offered to lease the mills for five years with the privilege of purchasing during that period at a fixed price. If this purchase had been consummated, the English company would have had control of two-thirds of the milling capacity of Minneapolis and would have been in a position to crush out all competition. But the pride of the stock holders in the old Washburn Mills prevented the consummation of the plan. They could not reconcile themselves to the idea of allowing their mills to go under the control of a great foreign corporation, especially if their old rival, C. A. Pillsbury, was to be at the head. So they made certain stipulations to protect the Washburn properties. (1) The Washburn Mills must be kept in steady operation and the brands and trade mark must be given the same prominence as under the former lessees.

(1). Minneapolis Chamber of Commerce, Annual Report, 1890, p. 134.
(2). Northwestern Miller, June 6, 1890, p. 597.

(2) The patent flour made at the Washburn Mills must not be sold at a lower price than Pillsbury's Best. These stipulations were unacceptable to Mr. Pillsbury, and doubtless on his advice were rejected by the Pillsbury-Washburn Company. The Washburn-Crosby Company were then given a new lease in the mills which they have controlled ever since that day.

The purchase of the Pillsbury Mills and the attempt to purchase those of Governor Washburn were not received in Minneapolis with any demonstrations of joy. The Northwestern Miller probably expressed the sentiment of the community as well as that of the milling fraternity when it said at a time when it seemed the plan would succeed: "Henceforth, the development of Minneapolis as a milling city may mean not the healthy expanding of individual effort, but the dropsical growth of a mammoth institution, listed in the London Stock exchange, the profits of which will go very largely into foreign coffers. It may gratify the ambition of Mr. Pillsbury to be placed as a representative of and executor for the English stockholders, but we do not believe that such a concentration of power in one man's hands is a good thing, no matter how well disposed he may be.

The consolidation, moreover, appeared dangerous to the smaller mills. The Northwestern Miller goes on to say: "As for the other millers in Minneapolis, they have clearly but two courses open to them, either to combine for self-protection or to get in under the wings of the English Company. If they do not fully realize this now, the time is not far off when they will be forced to do so." The combination with the Washburn-Crosby mills which so alarmed the "Miller"

(1). Northwestern Miller, July, 18, 1890, p. 59.

(2). Ibid., Aug. 1, 1890, p. 119.

(3). Ibid., June 6, 1890, p. 597.

(4). Ibid., p. 597.

was not formed. Nor is there any evidence to show that the Pillsbury-Washburn Company was guilty of unfair practices toward its competitors or that it attempted to get them "under its wings."⁽¹⁾ But the conditions of the times forced the small miller toward combination. Through 1890, there were rumors of more combinations, consolidations, and remodeling of mills. "The tendency of the hour is undoubtedly toward a centralization of capacity and a combination of forces," is the way the Northwestern Miller stated it. The large profits of the early days had been followed by over building, over production, glutted markets, sharp competition, price cutting, and the loss of profits in a familiar series. Many attempts had been made to remedy these evils, even before the Pillsbury-Washburn combination was formed by forming selling pools, etc. The Hale papers give glimpses of such efforts as early as 1884.⁽³⁾ Now the Pillsbury-Washburn combination served to push all the millers who were still independent and who aspired to a nation-wide market into a new combination.

(1). Northwestern Miller, April 24, 1891, p. 535.

(2). Ibid., July 25, 1890; p. 87.

(3). W. D. Washburn to Major Hale, June 28, 1884.

There is one of two things to do, which we will determine as soon as I reach home, first to abandon the Palisade lease and run the Lincoln Mill selling our flour in a pool; second to retain the Palisade and run both mills "red hot" and for all there is in them, and have a wide-awake aggressive organization and "carry the war in to Africa." The second as I now feel, would be my plan.

Minnesota Historical Society, Hale Papers, Case 4.

W. D. Washburn to Major Hale, June 29, 1884.

The more I consider the subject, the better I am satisfied that we should "paddle our own canoe", and sell our own goods. We might perhaps sell in a pool for a time but we would stand a chance of being left out at any time, in the meantime having lost our trade.

Minnesota Historical Society, Hale Papers, Case 4.

The leading spirit in the enterprise was A. C. Loring of the Galaxy Mill Company. ⁽¹⁾ He had no difficulty in getting some of the other mills to join. But the great inequality in equipment of the various mills was an obstacle to combination. It was hard to agree upon the relative value of the various plants, trade-marks, and brands, good will, etc. All the mill owners realized that it was impossible for them to go on as they had gone before. But ordinary human egotism made some confident that they were bound to survive though the others died out. Some believed that they had a trade to which they could cling in spite of any combination against them. Others feared that a combination which included their mills would mean that they personally would be forced to retire from the business - never a pleasant prospect to a strong and healthy man still in the prime of his powers. ⁽²⁾

The first firms to join the new combination were the Galaxy, the Columbia, and the Sidle-Fletcher-Holmes Company which owned the Zenith and the Northwestern Mills. The Galaxy had just been overhauled and was in fine shape. The other two companies agreed to put their mills in first class condition before handing them over to the combination. For some reason the framers of the new combination did not want to include the Christian brothers and yet their mills were desirable. The Crown Roller had just been remodeled. The Pettit mill was in poor shape, its machinery old and out of date, but the brands, trade-marks and good will of Pettit, Christian, and Company would be valuable to the new combination. So they decided to buy these two mills outright, with bonds of the new Corporation. ⁽³⁾

(1). Northwestern Miller, June 28, 1899, p. 1228.

(2). Ibid., Nov. 27, 1891, p. 753.

(3). Ibid., Nov. 27, 1891, p. 753.

It seems clear that the principle reason for framing the combination was that these mills were not making money under the competitive conditions of the time. When a stock-holder of the Sibley-Fletcher-Holmes Company asked for an injunction to prevent the consolidation, the officers of the company answered that it had lost \$20,000 in the previous year's business and \$150,000 the year before (September 1888 to September 1889). The company had paid no dividends since 1895, could not carry on business at a profit, and was actually insolvent, it was claimed. Therefore, there was nothing to do but sell out the new combination. (1) It was claimed at the time that the promoters were securing these mills at far less than cost. The Crown Roller, for example, was one of the largest mills at the Falls, had been newly overhauled, and was in first class condition. Yet it was purchased for \$360,000 though it had cost \$500,000. (2) Still it seems clear that, though some of the mills may have been sold for less than cost, they were not sold for less than their actual value at the time. (3) When, in 1899, the Washburn-Crosby Company bought the mills

(1). Northwestern Miller, June 5, 1891, p. 785.

(2). Ibid., May 15, 1891, p. 651.

(3). List of the mills acquired by the Northwestern Consolidated Milling Company.

Mill	Capacity (1899)	Cost to Combination
Galaxy	1,600	425,000
Columbia	2,500	450,000
Crown Roller	2,500	360,000
Zenith and Northwestern	3,200	425,000
Pettit	1,600	170,000
	<u>11,400</u>	<u>1,830,000</u>

Capacity of Mills from Minneapolis Chamber of Commerce, Annual Report, 1891, p. 140; Sale price of mills, Northwestern Miller, May 15, 1891, p. 651; July 24, 1891, p. 103; June 19, 1891, p. ; June 26, 1891, p. 861.

which they had been operating under lease for so long a time, it was estimated that they had paid about \$100 per barrel of capacity. It is true that the years 1891 to 1899 were poor years in the milling business--years of very rapid increase of production, and steady decline of flour prices. But allowing for the more advantageous position of the Washburn-Crosby mills in the world's markets, the \$100 per barrel of capacity does not seem an unfair standard to apply to the new combination. On that basis, they were paying far more for the properties than they were worth.

The new company, called the Northwestern Consolidated Milling Company, was organized in the fore part of 1891 and formally began business on July 4th of that year. Its officers were the men who had managed the individual mills before. There does not seem to have been any promoter sharing in the undertaking, and the financing was all done by the local banks. The total capitalization, including \$900,000 in bonds, was to be \$2,250,000. Since \$1,830,000 had been paid for the properties, that left \$420,000 for working capital. The Crown Roller and Pettit were purchased with the proceeds of the bonds. The other mills were acquired by an exchange of stocks. The president of the new corporation was John Martin, a prominent and wealthy lumberman who had been interested in the Sidle-Fletcher-Holmes Company since its reorganization some years ago. The vice-president was J. B. Bassett, another wealthy lumberman who was the chief stockholder in the Columbia Mill Company. The actual management of the mills was to be in the hands of three managing directors: F. C. Pillsbury

(1). Northwestern Miller, May 31, 1899, p. 1027.

(2). 11,400 barrels capacity at \$100 per barrel would equal \$1,140,000. They paid \$1,830,000.

(3). Northwestern Miller, Nov. 27, 1891, p. 753.

(4). Ibid., June 28, 1899, p. 1227.

of the Northwestern Mill; E. Zeidler of the Columbia, and A. C. Loring of the Galaxy. With a daily capacity of over eleven thousand barrels, surpassing Washburn-Crosby and only exceeded by Pillsbury-Washburn, the "Ceresota" flour, (the new brand adopted by the Consolidated) was soon almost as widely known as its older competitors.

One other combination formed at this period may be disposed of very briefly. This was the Minneapolis Flour Manufacturing Company which acquired the Excelsior, the Standard, and the St. Anthony Mills. This corporation was the creation of Dorilus Morrison. Morrison was another Maine man, related by marriage to the Washburns. He had come to Minneapolis in 1854, had engaged in lumbering and then owned a sawmill at the falls. He had been one of the organizers of the Minneapolis Mill Company and was its treasurer. When others grew discouraged, in the days of financial strain when the dam was building, and dropped out, Morrison bought up their shares. Thus, he became the largest owner of water-power stocks. Then he began to build mills so as to utilize the power--both saw-and flour-mills. In 1878, he built the Excelsior Mill which he leased to C. A. Pillsbury and Company. In 1879, he built the Standard Mill and formed a partnership with a La Crosse miller named E. V. White to operate it. When, in 1881, The Excelsior was burned and had to be rebuilt, the Pillsbury lease was cancelled and the mill taken over by the new firm. After a year or two, Mr. White retired, and then the business was conducted under the firm name of D. Morrison and Company. For the next seven years the firm continued to operate the two mills. How

(1). Northwestern Miller, Nov. 27, 1891, p. 753.

(2). Hudson, Half Century of Minneapolis, p. 311-312.

(3). Shutter and Mc Lain, Progressive Men of Minneapolis, p. 458.

(4). Atwater, History of the City of Minneapolis, pt. II, p. 618.

they prospered, we do not know. It is significant that in a period of great expansion of milling capacity, these two mills remained practically at a standstill, with a capacity of 2,300 barrels in 1882 and of only 2,400 in 1888.⁽¹⁾

The third member of the new combination was the old Arctic Mill, built in 1861, and after many vicissitudes, remodeled and named the St. Anthony in 1881.⁽²⁾ It had been one of the very small mills. Even in 1881 its capacity was only 500 barrels a day. In 1883 or 1884, it was acquired by the firm of Morse and Sammis who ran it until 1889, with indifferent success, it would seem, for they increased its capacity only 150 barrels in that time.⁽³⁾ For two or three years (1884-1886) they operated the old Union Mill as well, but could not make a success of it.

The same conditions and tendencies that forced the establishment of the Northwestern Consolidated Milling Company were responsible for this ~~also~~^{new combination.} In 1889, soon after the purchase by the Pillsbury-Wahburn syndicate, came the announcement of the formation of the Minneapolis Flour Manufacturing Company with Mr. Morrison as the leading stock holder and Samuel Morse as active manager.⁽⁴⁾ The three mills which they operated, had, in 1890, a capacity of 3,500 barrels, so that this was the smallest of the four great corporations.

II. Growth of Minneapolis as a Milling Center-Rivalry with St. Louis.

During the years that these great corporations were being built up, Minneapolis and St. Louis were fighting for the milling

(1). See table of Milling Capacity, Appendix.

(2). Barnes, 'Milling History of Minneapolis', Northwestern Miller, Holiday Number, 1890, p. 32.

(3). Minneapolis Chamber of Commerce, Annual Report, 1890, p. 134-5.

(4). Ibid.

supremacy of the country. The leadership of St. Louis in the period following the Civil War has been referred to before. In those days the best known flour in America was "Plant's Extra", made by George P. Plant and Company of St. Louis. It was the general impression that the company purchased only the best wheat, employed only the highest-skilled millers, and gave careful inspection to their product before they shipped it. (1) "It was considered a wonderful improvement in Minnesota milling when a flour could be made from spring wheat equal to St. Louis flour. All persons who were able to buy St. Louis flour, used it--. Even the best Minnesota millers ate bread made from St. Louis flour, usually Geo. P. Plant's Flour." (2) (3)

St. Louis had many advantages as a milling center. Her transportation facilities, both by river and railroad, were unrivalled in the West. In the territory round about, comprising the states of Missouri, Illinois, and Indiana, was grown the soft, red, winter wheat which was considered the finest wheat in the world. Flour made from this wheat was said to bear transportation to hot climates bet-

(1). St. Louis Flour Output, by Calendar years, in barrels-Millers* Almanack, 1919-1920, p. 146.

1867	765,298	1875	1,484,821	1883	1,892,633	1893	1,699,048
1868	895,154	1876	1,441,944	1884	1,960,737	1894	1,054,875
1869	1,066,592	1877	1,517,921	1885	1,841,529	1903	1,112,316
1870	1,351,773	1878	1,916,290	1886	1,807,956	1908	968,000
1871	1,507,915	1879	2,142,949	1887	1,988,717	1913	1,038,761
1872	1,894,798	1880	2,077,625	1888	2,016,619	1918	1,318,283
1873	1,420,287	1881	1,718,429	1889	2,066,442		
1874	1,573,202	1882	1,850,215	1890	1,872,005		

(2). Milling, vol. IV, pp. 222-223.

(3). Ibid., vol. II, pp. 217-218.

ter than any other, and for the trade with the South and with Spanish
America, St. Louis was most fortunately situated. (1)

The city was an important milling center as early as 1850,
when it contested the flour trade of the South with Cincinnati. The
Civil War gave St. Louis a set-back, but after the War, its flour
trade grew rapidly. (2) By 1869, St. Louis was producing over a million
barrels of flour, besides which twelve hundred-thousand barrels were
shipped into the city for sale there by country mills in the district. (3)
The grain exchange, known as the Merchant's Exchange, was organized
in 1849. It supplied wheat not only to the St. Louis mills but to
those of southern Illinois, Kentucky, and Tennessee as well. (4)

From 1869 to 1879, St. Louis flour production doubled and
receipts from the interior mills grew steadily also. But meantime,
the development of the new process of milling at Minneapolis had
made that city a rival. The new spring-wheat patent flours command-
ed the highest prices in the New York market, and St. Louis flour was
displaced. The St. Louis millers were at first unwilling to try the
new process. They insisted that their flour was the best that could
be made and that it was nonsense to say that the patent flour made
from hard spring wheat was superior. When they found that these flours
continued to receive the highest prices, the St. Louis mills put in
purifiers and adopted the new process. They found, however, that
machinery used on hard spring wheat was not necessarily adapted to
soft winter wheat. The first flours made by the patent process were
not a success, but by 1882 it was claimed that St. Louis patents were

(1). Northwestern Miller, Jan. 6, 1892, p. 486; American Miller, vol. XI, pp. 542-3.

(2). American Miller, vol. XI, pp. 542-3.

(3). St. Louis Trade and Commerce, 1880, p. 67.

(4). Smith, Wheat Fields and Markets of the World, pp. 334-340;

Huebner, American Produce Exchange Market, pp. 222-226.

better than those made from spring wheat, though the percentage of yield was not as great. ⁽¹⁾ Whether that was true, may be doubted; the eastern markets continued to favor spring wheat flours, and while Minneapolis production increased rapidly, that of St. Louis remained about the same. In 1880, the two cities were about equal; three years later, Minneapolis' production was more than double that of St. Louis, and by 1891, more than four times as great.

Searching for a cause of this condition of things, St. Louis discovered that she was being discriminated against in the matter of freight-rates. In 1885, the shippers of the city complained to the Illinois Railroad and Warehouse Commission that flour rates from East St. Louis to Chicago were thirteen cents per hundred pounds as against a former rate of eight cents. This unduly favored Minneapolis which had a fifteen cent rate to Chicago though the distance was twice as great. The complaint was resultless, however, as the Commission took no action. ⁽²⁾ In the same year, the millers appealed to the Central Traffic Association for relief. ⁽³⁾ They had been "shut out virtually from the trade of the East and of Europe on account of the discrimination in freight-rates in favor of Minneapolis". Therefore, they appealed to the Association for relief, saying: "We can only work our mills to full capacity on as cheap freights per mile as competing centers pay." ⁽⁴⁾

Here, again, they gained no relief, and they had to comfort themselves with the hope that the new Inter-State Commerce Law would remedy these evils. Then St. Louis would again be placed in her pro-

(1). St. Louis Trade and Commerce, 1882, p. 76.

(2). American Miller, vol. XIII, p. 401.

(3). St. Louis Trade and Commerce, 1886, p. 117.

(4). Ibid., p. 117.

per position as the great manufacturing and distributing point in the Mississippi valley. In 1888 and 1889, St. Louis' output exceeded two million barrels, but after that date, it declined somewhat and has never since reached that high point. In the nineties, Toledo, Indianapolis, and Chicago were building mills to use the soft winter wheat, and St. Louis found it more and more difficult to buy wheat in Indiana and Illinois and then ship the flour back over the same route. In that decade, the hard winter wheat belt of the Southwest was developed, consequently, St. Louis turned to it for a supply. The annual review of the city's trade and commerce for 1899 notes the fact that part of the mills have adapted their machinery to the grinding of hard winter wheat and claims that the flour so made "competed successfully, not only in domestic, but in foreign markets with the best spring wheat brands from the Northwest." In 1903, it was stated that most of the flour manufactured after harvest was from the hard winter wheat, the price being relatively lower than soft, enabling the millers to better compete with other milling points. This flour was not equal to that made from the soft winter wheat it was claimed, but was being blended with the latter and was accepted by the trade because of its lower price. From then on, almost every annual report notes the increased production of hard winter wheat flour. Had it not been for the rise of Kansas City, St. Louis might have become the center of manufacture for this kind of flour. Kansas City, however, was the natural market for the wheat fields of Kansas, Nebraska, and Oklahoma; and, just as Minneapolis cut off the supply of wheat to Milwaukee and blighted that city's hope of milling supremacy, so Kansas

(1). St. Louis Trade and Commerce, 1886, p. 117.

(2). Ibid. , 1903, p.

(3). Ibid., 1903, p.

City, beginning about 1900, intercepted the supplies of hard winter wheat needed by the St. Louis mills and ruined that city's chances of becoming again the milling center of the United States.

In the two decades from 1870 to 1891, there was a process of consolidation going on in the mills. Small-scale production gave way to large --the two hundred barrel mill to the five thousand barrel one. Partnerships gave way to corporations in the operation of the mills, and , by a process of integration, practically all the mills of the city were concentrated under the management of four great corporations. The increased growth that followed brought Minneapolis to the leadership of flour-milling cities and displaced St. Louis which had been leading up to this point. St. Louis was inclined to attribute the victory of Minneapolis to railroad discrimination in favor of that city, but her complaints against these discriminations proved without avail. While there can be little doubt that Minneapolis millers were favored, in the matter of freight-rates, it is also quite clear that the decline of St. Louis as a flour-milling center was due, primarily, to changes in the wheat growing areas of the country; and that the leadership of Minneapolis was the result of the working of the same natural forces.

Chapter V. The Economic Foundations of Minneapolis Milling
Supremacy.

12. The Influx of Capital to the Industry.

The rapid growth of the Minneapolis mills between 1870 and 1891, which has just been described, could not have been permanent had it not been built on solid foundations. If the city was to be permanently a great milling center, three things, at least, must be secured: (1) a supply of capital to build and operate the mills, (2) an assured supply of the necessary raw material, hard spring wheat, and (3) a network of railroads reaching westward and northward into the wheat fields and eastward to the great markets of the country.

Whatever the causes of its later growth, milling in Minneapolis assuredly owes its start in life to the lumbermen. It was they who first settled the village of St. Anthony. This village together with its tributary logging camps and agricultural villages, provided a home market for the first flour mills, and many, if not most of the pioneer lumbermen, after building up that industry, invested their accumulations of capital in the flour mills.

During the early years of the city there was a close physical connection between flour-milling and lumbering. Saw-mills and flour-mills were side by side on "the platform", both driven by the water power of the dams, largely under common ownership and mutually supplementing each other. At that time John Berry who had come to St. Anthony in 1851 was in the lumber business. In 1866 his firm (J. C. Berry and Company) bought the old City Mill and operated it for some ten years. Leonard Day who came to the city in 1851 had a long career as a lumberman before he built the Zenith Mill in 1871,

(Day, Rollins, and Company), and the Palisade Mill in 1873, (Leonard, Day, and Company). John Rollins was another pioneer lumbermen. He came to St. Anthony in 1848, joined in founding the Island Mill in 1854, and later, as a partner of Day, built the Zenith Mill. All of these men started as lumbermen, then built flour mills, and undoubtedly carried over a great deal of capital from one industry to the other.⁽¹⁾

When in 1875 the Minneapolis Mill Company refused to renew the leases of the saw-mills located on the west side dam and forced them to move, there came a new era in lumbering. New methods were adopted; steam replaced water power; the railroads began to carry the lumber to market, and the old methods of rafting the lumber down the river was discontinued. Improvements in saw-mill machinery caused great changes in manufacturing methods. Whether because of these changes or for other reasons, the new saw-mills in the northern part of the city were largely built by new men, and the older men turned,⁽²⁾ to a considerable extent, to flour-milling. R. P. Russell who had come to the city and engaged in lumbering as early as 1847 formed a company which built the Model flour-mill in the seventies. J. B. Bassett, who had operated saw-mills in St. Anthony as early as 1850, formed the Columbia Mill Company which built the Columbia flour-mill in 1883. John S. Pillsbury, who had come to the city of Minneapolis in 1855, engaged in the steamboat traffic and then in lumbering and later became interested in the flour-milling firm of Sidle, Fletcher, and Holmes and still later was the first president of the Northwestern

(1). The names of these pioneer lumbermen, with the dates of their arrival at the falls, are given in Stanchfield, History of Pioneer Lumbering on the Upper Mississippi, Minnesota Historical Society Collections, vol. IX, pp. 348-350; the flour-milling firms are from Minneapolis Board of Trade, Annual Reports, and Minneapolis Chamber of Commerce, Annual Reports.

(2). Hudson, Half Century of Minneapolis, pp. 288-289.

Consolidated Milling Company. Dorilus Morrison came to Minneapolis at the same time as John S. Pillsbury and John Martin. It was his lumber enterprises which led him to invest in the Minneapolis Mill Company which owned the west side water power, and this in turn to his building the Excelsior (1878) and the Standard (1880) flour mills. (1) As for W. D. Washburn, his Lincoln Mill enterprise grew out of his lumber business; the two were in fact, operated by the same firm.

Many other millers and milling firms of the early days were interested in lumbering. Governor Washburn's enterprises in that field were confined to Wisconsin. In Minnesota, among others might be mentioned C. H. Pettit of Pettit and Robinson flour mills, William F. Ankeny of the Galaxy flour mill, and many others. Enough has been said on this point to show that a great deal of the capital invested in milling must have come originally from the lumber business. (2)

It seems clear that there was no migration of capital from older milling centers to Minneapolis, such as there was in the lumber business. There would be no such exhaustion of the supply of raw materials in the milling business, and the investment in buildings and equipment that would have to be abandoned would be very much larger in milling than in lumbering. (3)

The mills once started, it would seem that most of the capital that went into them represented profits re-invested. There seems to be only one case of a miller moving into Minneapolis from another city, bringing capital with him. That was E. V. White who had owned mills at La Crosse, and in several smaller towns in Minne-

(1). See above, Chapter IV.

(2). Conversation with a prominent citizen of Minneapolis.

(3). See above, Chapter IV.

ata, and in 1878 became a partner of Darfus Harrison in the Excelsior and Standard mills. There are a number of examples of men who had formerly been engaged in the selling of flour on the eastern markets, coming into the milling industry. George H. Christian and W. R. Darwoody had both sold flour in this way before becoming millers, and doubtless brought some capital to Minneapolis. A clearer case is that of James S. Bell who was head of the important Philadelphia flour-house of Samuel Bell and Sons, when he was induced to come west to (1) join the firm of Washburn Crosby and Company.

Up to 1889 there was no considerable amount of foreign capital invested in the mills. If we except Governor Washburn of Wisconsin, all the men with large interests were Minneapolis men. When the Pillsbury-Washburn company was formed in 1889, its stock was floated in England. Considerable amounts of stock were held by the American managers, however, and, at the time of the fight against the "milling trust", (2) it was asserted that a controlling interest in the company had been bought by the Minneapolis men. It seems hardly probable that this was true, but undoubtedly a large proportion of this stock is owned in Minneapolis today. Again, when the United States Milling Company acquired the Northwestern Consolidated Mills, they sold their stock very widely, and control over these mills was eventually transferred from Minneapolis to New York. (3) With these exceptions, control of the mills remained with Minneapolis men, and this is the condition today. The Pillsbury mills are still owned by the English

(1). For all the men mentioned above, see Chapter IV.

(2). See Chapter X, pp. 218-219

(3). Conversation with a member of a prominent milling company; Moody's Manual, Railroad and Corporation Securities, 1914, p.

corporation, but the operating company (Pillsbury Flour Mills Company) is a purely Minneapolis affair. The Washburn-Crosby Company has a list of directors living in other cities, but these are believed to be employees of the company with only minor stock holdings. The control of the company remains with Minneapolis men. The same is true of the independent mills. Only the Consolidated mills are both owned and operated by an outside corporation. It was characteristic of the times, however, that business was done on credit to a much greater extent than it is today. For this reason, the millers early found it to their interest to organize and control the banks of the city. The first banks in Minneapolis were private banking houses. Among the first to be established were those of G. H. Pettit, who came to Minneapolis in 1855, and J. K. Sidle, who came in 1857. This was in the days just before the great panic when Indiana "wild cat" currency was the chief medium of exchange. There was a great lack of currency, exchange rates and interest rates were high, and banking was carried on under great difficulties.

When the National Banking Act was passed in 1863, some of these private banks were incorporated. Sidle's bank, after having been for a time a state bank, was incorporated in 1864 as the First National Bank. On its original board of directors, besides Sidle, who was a member of the milling firm of Sidle, Fletcher, and Holmes, we find the names of Loren Fletcher of Cahill, Fletcher, and Company.

- (1). Conversation with a prominent Minneapolis banker.
- (2). Conversation with a pioneer miller and lumberman.
- (3). Atwater, History of Minneapolis, pt. I, p. 485; Atwater's chapter on 'History and Incidents of Banking', Ch. XIX, was written by R. J. Baldwin, who was himself a pioneer banker.
- (4). Patchin, 'Development of Banking in Minnesota', Minnesota History Bulletin, vol. II, p. 125.

and later of Loring and Fletcher and John Martin, who became president of the Northwestern Consolidated Milling Company. A little later (1) George A. Pillsbury became president of the bank. In May, 1918, the list of its board of directors contained the names of John Washburn and F. M. Crosby of the Washburn-Crosby Company, A. C. Loring, A. F. Pillsbury and C. S. Pillsbury of the Pillsbury Flour Mills Company, (2) and H. P. Gallaher of the Northwestern Consolidated.

Sharing banking supremacy with the First National, is the Northwestern National Bank which was organized in 1872. Of the eight directors on the original board, Dorilus Morrison who was chosen president of the bank, C. M. Loring, and C. H. Pettit all played (3) prominent parts in the milling industry of the city. In the nineties, George A. Pillsbury became the president of the bank, and, a decade later, W. H. Dunwoody held the same position. In 1918, the board of directors consisted, among others, of J. F. Bell and John Crosby, of the Washburn-Crosby Company and J. S. Pillsbury of the Pillsbury Flour Mills Company. (4)

In 1874 the Farmers' and Mechanics' Savings Bank was established. Of its original board of directors, Clinton Morrison, Charles Mc. Reeve, and Paris Gibson were more or less closely connected with milling. (5) On its board of trustees in 1918, were A. F. Pillsbury, (6) John Crosby, and John Washburn.

These were the principal banks established before 1875. It would seem that from the time of their first organization the millers have been in control. Hence, there was little difficulty

- (1). Holcombe and Bingham, Compendium of History and Biography, p.
- (2). Minneapolis Journal, Statements of Minneapolis Banks, p. 33.
- (3). Holcombe and Bingham, Compendium of History and Biography, p.
- (4). Minneapolis Journal, Statements of Minneapolis Banks, p. 33.
- (5). Holcombe and Bingham, Compendium of History and Biography, p.
- (6). Minneapolis Journal, Statements of Minneapolis Banks, p. 35.

getting the banks to lend money and credit to the mills to help them float their commercial paper in the great financial centers of the country, and, generally, to act as their financial agents. But the other banks of the city could usually be counted on to assist with their credit enterprises, so powerful and so essential to the life of the city as the mills. When the millers had exhausted their credit with the local banks, they usually appealed to eastern dealers in commercial paper to whom they gave their notes which these firms in turn sold to the eastern banks. In the eighties, the Washburn Mill Company, as well as other mills, secured much of its funds in this way from Fogg Brothers, dealers in commercial paper at Boston. This method of handling the business is clearly shown in the letters given below.

(1). Security Bank of Minnesota, W. M. Tenney, Cashier, to Major Hale, Nov. 30, 1885. The letter calls the Major's attention to the fact that the Washburn Milling Company's account has been overdrawn for two weeks and now stands \$44,000 overdrawn. Minnesota Historical Society, Hale Papers, Case 5.

(2). W. D. Washburn to Major Hale--Washington, Dec. 7, 1884. Mr. Washburn has a note for \$15,000 coming due in New York on the 22d. "To provide for this I see no way but to send some paper to Fogg." Hale Papers, Minnesota Historical Society, Hale Papers, Case 5.

W. D. Washburn to Major Hale--Washington, Feb. 6, 1885. "As soon as you reach Boston you must arrange to place \$10,000 to my credit at the Am. Ex. Nat. Bank, New York--which amount I can return as soon as I get my dividend from W. C. & Co., March 1st." Minnesota Historical Society, Hale Papers, Case 5.

Telegram-Fogg Bros. & Co., to Washburn Mill Company--Boston, December 5, 1885.--Never mind last telegram draw for balance last lot will advise you when to send more. Minnesota Historical Society, Hale Papers, Case 5.

Fogg Bros. & Co. to Washburn Mill Company--Dec. 5, 1885. On account of tightness of the money market W. M. Co. paper has sold very slowly so were obliged to wire not to draw but on receiving your favor exerted ourselves and sold a small line. Then sent wire above. Will advise you when to draw again and will do our best to sell your paper but at present Banks are buying very little if any paper. Minnesota Historical Society, Hale Papers, Case 5.

The need of money and credit was greatest in the fall when great quantities of wheat had to be bought and paid for, though this buying would often run over into the New Year. At that season their notes were being sold in all parts of the country, even the Dakota banks buying them. The system of crop-financing which was thus built up will be described in the chapter following.

(1). Morgan Bartlett & Co. to Washburn Mill Company Jan. 18, 1889

Letter inquiring whether Washburn Mill Co. ever has occasion to borrow money in the East. Would be glad to serve them as we have served Washburn & Co., Pettit, Christian & Co. Minnesota Historical Society Collections, Hale Papers, Case 6.

Rice Quinby & Co. (E.C. Rice) to Major Hale, New York, Feb. 8, 1881. "Dear Sir, Yours at hand enclosing notes of Washburn Mill Co. for \$25,000--four months. The same has been discounted at the Importers & Traders National Bank and they are instructed to deposit funds with the Third National Bank & advise you of same. The rate 6%--which I have no doubt will prove very satisfactory." Hale Papers. Case 3.

Budd Reeve to Major Hale, Grand Forks, Oct. 7, 1887. "If you want \$25,000.00 to use in your business, just give me the tip and I will make the Paper in my own name and upon your acceptance, with a payment of one percent. per month, I will send it to you for ninety days-----I did not know from the way those banks are belly-aching around down there but they may think there is nothing to be had. I told the cashier here I was picking up considerable wheat now and might want some money. He said I could have it on the name of the W. Mill Co. and he would be glad to have me take it."----- Minnesota Historical Society, Hale Papers, Case 6.

13. The Millers and their Wheat Supply.

We have seen in our account of the old Island Mill that this first merchant mill was obliged to bring in from other states much of its wheat supply in the first years of operation. ⁽¹⁾ This condition of things could not have lasted more than two or three years. As the farming region of southern Minnesota settled up rapidly in the late fifties, the farmers began to haul their wheat to the Minneapolis mills so that by 1860 these mills were able to grind only about ⁽²⁾ one-seventh of the total Minnesota production.

Most of the wheat in those early days came by wagon to the mill for lack of other transportation facilities. In the fifties, the wheat must have come mainly from within Hennepin County. But as early as 1860 the millers of Minneapolis were using twice as much wheat as the county raised; by 1870, they were using nearly three ⁽³⁾ times as much, and by 1880, fifteen times as much. Necessarily, the area from which the wheat was secured steadily widened, especially to the West and South. There was not much wheat obtained from south eastern Minnesota, because of the competition of the strong country mills in that region and of the Milwaukee and Chicago buyers. Had there not been a great development of the railroads leading to Minneapolis, as we shall see presently, the milling growth of the city would have been impossible.

As the mills increased in capacity during the seventies,

(1). See above, Chapter II.

(2). Capacity of Minneapolis mills, Dondlinger, Book of Wheat, p. 279; Minnesota wheat production, Robinson, Development of Agriculture in Minnesota, p. 261.

(3). Consumption of wheat by Minneapolis mills and Production of Wheat in Minnesota and Hennepin County.

	Flour Prod.	Wheat consumed	Hennepin Prod.	Minn. Prod.
1860-	60,000 bbls.	270,000 bus.	135,000 bus.	2,186,000 bus.
1870-	193,000 "	868,500 "	379,000 "	18,866,000 "
1880-	2,000,000 "	9,000,000 "	671,000 "	34,601,000 "

Wheat prod. figures from Robinson, Development of Agriculture in

Minnesota, p. 261; Flour prod. from Chapter III. p. 45, Above.

the millers found it more and more of a problem to secure sufficient wheat for their needs at reasonable prices. Up to 1879, there were only two elevators built in Minneapolis with a total of 215,000

(1)

bushels capacity. At that time, the mills were grinding 6,750,000 bushels in a season. Owing to the limited amount of space available

for building at the Falls, none of the mills could provide much space for storing wheat. The Anchor Mill, for example, had in 1876 a stor-

age capacity of 9500 bushels which was only sufficient to supply the

(2)

mill for perhaps seven or eight days. The Washburn A, in the same year, could store 75,000 bushels of wheat; enough to last them for

(3)

sixteen or seventeen days.

It was necessary therefore, for the millers to send out their buyers into the country at all seasons of the year to buy the wheat as they needed it, for there were few elevators at the country stations such as there are now. Even if there had been more, the millers had not yet developed their credit, and banking facilities had not yet been developed, to such an extent as would have made it possible for them to buy all the wheat in the fall.

The situation was unsatisfactory both for the farmers and the millers. The farmer had a lot of wheat to seal in the fall and was in need of money. But the millers were ready to buy only a limited amount at that time, and the oversupply caused low prices. The farmer would often haul his grain long distances to the railroad station and find on arriving that there were no buyers to take his grain. He often found it impossible to provide storage facilities on the farm so that his grain deteriorated through the winter. On

(1). Hudson, *Half Century of Minneapolis*, p. 356.

(2). Northwestern Miller, Jan. 7, 1876, "Charley Pillsbury's Anchor Mills."

(3). Northwestern Miller, March 10, 1876, Description of the Washburn A mill.

the other hand, the miller found it difficult to keep up a steady supply of grain for the mills. When seventeen or eighteen firms were bidding for grain in the same territory, it often happened that they paid more for the wheat than it was worth. This was especially true when the Minneapolis millers came into competition with the local mills and with Milwaukee and Chicago buyers.

But the friction between the millers and the farmers was chiefly due to some thing over which the millers had no control-- the wheat grades. In the early days, wheat had been sold by sample or as it was offered in the farmers' wagons. Buyer and seller could then agree on a fair price. When grain began to be shipped long distances to Eastern markets so that buyer and seller could not meet face to face, a system of grades became necessary. The foundation for these grades was laid by the Chicago Board of Trade in 1858; by 1870 the system they had worked out was substantially adopted throughout the country. The grades which they established varied somewhat from season to season, and in different markets where different varieties of wheat predominated. But in all cases the wheat was graded partly on its general appearance, but mainly on its weight per bushel. At first, they weighed a sample half bushel of wheat on a pair of scales, but as this method proved too slow, there came into use a smaller and handier instrument, the brass tester, which measured and weighed two quarts of the grain and thus fixed the weight of the whole load.

(1). Barnes, 'Milling History of Minneapolis', Holiday Number, 1890, Northwestern Miller, p. 35.

(2). Pioneer Press, Oct. 1, 1878.

(3). The Co-operative Manager and Farmer, March 1920, p. 45, Address of the Hon. Charles Adkins.

In the early seventies, Milwaukee was the greatest primary wheat market of the West. Much of the Minnesota wheat was sent to that market, and all was graded by the rules laid down by the Milwaukee Board of Trade. ⁽¹⁾ The Minneapolis millers, who, in 1870, consumed scarcely one-twentieth of all the wheat produced in Minnesota, were not in a position to dictate what the grades should be, nor was Minneapolis as yet an important wheat market.

The millers were, however, determined to eliminate the waste due to competitive buying. For this purpose, they organized, in 1875, the Miller's Association to co-operate in the buying of wheat to supply the mills. The plan was to put the whole matter of purchasing wheat for the mills into the hands of a general agent who was to have sole supervision of the local buyers at all interior points and was to see that the wheat upon its arrival in Minneapolis was distributed among the members of the Association, according to the capacities of their respective mills. The mills were bound to take the wheat allotted to them at the price fixed by the Association and to pay for it ⁽²⁾ as called upon by the agent.

At first, the organization was only a temporary one; but in September, 1876, it was incorporated with a capital of \$35,000 which was later increased to \$75,000. Of the twenty mills with 194 run of stones in the city, eighteen with 169 run became members of the Association. Any mill owner in Hennepin County could become a member on subscribing to at least six hundred worth of stock. Each share of a par value of fifty dollars had one vote, and each member mill was

(1). Pioneer Press, Oct. 1, 1878, Special Correspondence, Kasson, Minn.
(2). Northwestern Miller, Dec. 31, 1880, p. 434.
(3). Ibid.

entitled to a director for four run of stones and an additional director for each twenty run.
(1).

The territory covered by the Association was that most directly tributary to Minneapolis. It consisted, (1) of the main and branch lines of the St. Paul and Pacific, which by 1869 had its western terminus at Cokato, and by 1871 had reached Breckenridge as the St. Paul, Minneapolis, and Manitoba; (2) the Minneapolis and St. Louis which then had built only from Minneapolis to Merriam Junction; (3) the St. Paul and Sioux City, running south through Mankato to St. James; (4) the Hastings and Dakota (now belonging to the Chicago, Milwaukee, and St. Paul), as far west as Glencoe, and the Iowa and Minnesota division of the Milwaukee and St. Paul, running down through Owatonna and Austin to the State line. Outside of this territory, the millers might purchase as they pleased; in it they were bound to buy only through the Association.
(2)

W. H. Dunwoody was the first agent of the Association. Under his efficient management, it prospered and began to extend its territory. When the Minneapolis and St. Louis built to the south, the Association buyers followed it as far as Albert Lea; on the west, they followed the St. Paul and Sioux City as far as Sioux City, and when the St. Paul, Minneapolis, and Manitoba was built from St. Cloud to Clyndon, they entered that territory also. In fact, they covered just about all the wheat-growing area of Minnesota except for a little corner to the South East and the Red River valley to the Northwest. By 1880, Mr. Dunwoody commanded a force of 182 local buyers, besides traveling agents, inspectors at the mills, etc.
(3)

(1). Northwestern Miller, Dec. 31, 1880, p. 434.

(2). Ibid.

(3). Ibid.

By that time, although elevator facilities were still insufficient for the needs of the country, they were much improved over the previous decades. A number of "line elevator" companies had been formed to build elevators throughout the wheat growing country. Some of these were controlled by millers, but most of them were not. As a result of the building of the "line elevators", the following procedure had become the usual one: the farmer sold his wheat to the Association wheat buyer at an agreed price for a given grade. He did not deliver to the Association, but, instead, took the wheat to the elevator where it was inspected and graded and was given a receipt calling for a certain number of bushels of a given grade. This receipt he delivered to the Association buyer and received the agreed price per bushel. The buyer, who then had the receipts, could claim the wheat from the elevator. (1)

Not only did this system eliminate competition between the Minneapolis millers, but there seems to have been at least a tacit agreement for a division of territory with the Milwaukee and Chicago buyers as well. (2) Within the territory allotted to them, the millers (3) had a monopoly and were determined to crush out all competition. The correspondent of the Pioneer Press was expressing the general belief when he wrote: "It is well understood--that the Millers' Association will not let any outside buyers come in to compete with them, that they will run up the prices on them so as to drive them out, and at any rate, that they have a practical monopoly of the wheat traffic along this line (the St. Paul, Minneapolis, and Manitoba R. R.)." (4)

(1). Pioneer Press, Oct. 17, 1878.

(2). Pioneer Press, Oct. 17, 1878, Debate in St. Paul Chamber of Commerce.

(3). At least the Pioneer Press admitted it, and it was consistently friendly to the millers.

(4). Pioneer Press, Oct. 5, 1878, Wheat Grades and Prices.

Or, as Ignatius Donnelly expressed it, when the millers were acting separately and a farmer brought in a load of grain, the various buyers would climb on his wagon, examine the wheat and bid against each other. So the farmer got the top price. Then the millers formed the Association and eliminated competition, and prices went down. If outsiders tried to buy, they boosted the price on him until he was willing to quit; then prices went down again. (1)

While the millers could hardly deny that they were monopolizing the territory, they denied that this kept prices unreasonably low. They claimed that prices of wheat were largely determined by the Milwaukee and Chicago markets. While they were forced to regulate prices by the ruling prices in those markets, they were, as a matter of fact, usually paying higher prices than the farmer could secure at those points. (2) This was probably true as regards the higher grades of wheat. The millers claimed that they were paying on the average from five to eight cents per bushel more than the Milwaukee and Chicago buyers could afford to pay. (3) Thus, the Pioneer Press, on October 6th, 1878, claimed that the millers were paying eighty cents for "No.2" wheat the day before, when the same grade was bringing eighty-four cents in Milwaukee and eighty-two and a half in Chicago. The cost of shipping wheat to those points from Minneapolis was about fifteen cents per bushel. Therefore, the Minneapolis millers were paying from eleven to twelve and a half cents more than shipping value for their wheat. (4)

For two year the Millers' Association had things pretty

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- (1). Pioneer Press, Oct. 8, 1878, Donnelly's Speech at Wayzata.
 - (2). Pioneer Press, Oct. 5, 1878, Editorial, Number Three Wheat; Ibid., Oct. 15, 1878, Washburn's First Gun.
 - (3). Pioneer Press, Oct. 5, 1878.
 - (4). Pioneer Press, Oct. 6, 1878, Minneapolis as a Wheat Market.

much its own way in wheat buying. Then they got into difficulties with the Milwaukee and St. Paul railroad because they were not sending as large a proportion of their flour over its lines as the railroad thought they should. The railroad showed its displeasure by sending out wheat buyers along the line of the St. Paul and Pacific, in the heart of the territory which the millers were attempting to monopolize. Differences were soon compromised, however, and the railroad withdrew its buyers.

But more serious difficulties were even then brewing. The Republicans that year had nominated for Congressman from the Minneapolis district, Mr. W. D. Washburn. His opponent was Ignatius Donnelly, a brilliant, free-lance who had been a Republican, but because of his feud with the Washburns, had dropped out of that party and was running for Congress at this time as a candidate of the Greenback party with a tacit Democratic endorsement. Washburn was not at that time a miller, but Donnelly chose to identify him with the milling interests, and, through him, to attack the Millers' Association. This was the famous "brass kettle campaign" of 1878. The crop that year had been a very poor one. There was comparatively little high grade wheat such as the millers wanted, but a great over-production of "No. 3" and "No. 4" wheat which the millers did not want. Consequently, prices went away down on these lower grades until there was a difference of fifteen cents a bushel between "No. 2" and "No. 3" wheat.

The grievances of the farmers were expressed by the resolutions of a convention of Hennepin County farmers who met in Minnea-

(1). Pioneer Press, Oct. 4, 1878; Ibid., Oct. 8, 1878; Donnelly's speech at Wayzata.

(2). Folwell, Minnesota, pp. 315-316.

polis on October 14th. They resolved:

(1) That the brass tester was unjust and that only sealed half bushel measures should be used for weighing and grading wheat.

(2) That the difference in price between "No.2" and "No.3" wheat was too great considering their slight difference in value for milling purposes.

(3) That the millers ought not to be governed by Milwaukee grades but should pay for wheat according to the milling value of the grain, and by that the inspectors who did the grading ought to be independent of the Millers' Association.⁽¹⁾

It seems probable that the farmers were being unfairly treated in some cases because the brass tester could be manipulated⁽²⁾ so as to make a difference in the grading of the grain. But the millers claimed that, except for the grain hauled directly to the mill, they were not responsible for the grading which was done by the elevators. The principal complaint seems to have been made against the Davidson elevators on the line of the St. Paul and Pacific railroad. In October, the superintendent of those elevators issued a statement showing that since the first of September they had received from the farmers the following amounts of wheat: "No.1"-16,000 bushels; "No.2" 150,000 bushels; "No.3" 29,000, and "No.4"-760. This, it was claimed disposed of the accusation that all the high grade wheat was being graded down to "No.3" or "No.4" wheat.⁽³⁾ The Millers' Association issued a statement along the same lines. At the same time, they were making

(1). Pioneer Press, Oct. 14, 1878.

(2). Ibid., Oct. 18, 1878.

(3). Northwestern Miller, Jan. 10, 1879, Wheat Grading Legislation in Minnesota.

daily comparisons of the prices they paid with those of Milwaukee and Chicago in an effort to show that they were paying the farmer better prices than he could get in those markets. (1)

(2)
These tactics were successful, and Donnelly was defeated. For two or three years longer the Millers' Association monopolized the wheat supply of Minnesota. Mindful of the fact that the misdeeds of the elevator men were attributed to them they now began to build or buy line and terminal elevators for themselves. In 1879, Elevator A. of the Minnesota Elevator Company was built in Minneapolis by a combination of millers, of whom Loren Fletcher, C. H. Pettit, and F. S. Hinkle were the leaders. This elevator had a capacity of 780,000 bushels and was the first of a group of terminal elevators designed to largely increase the storage capacity of the city. (3) In 1882, the Minnesota and Dakota Elevator Company purchased the Davidson line of elevators and a number of independent interior houses as well. The officers of this company were E. V. White of the Standard Mill, J. A. Christian of the Crown Roller, William Pettit of the Pettit Mill, John Crosby, C. A. Pillsbury, W. F. Cahill, H. W. Holmes, W. H. Hinkle, G. W. Moore, H. R. Barber, and F. H. Greenleaf. (4) Apparently, most of the Minneapolis mills were thus represented in the new corporation.

The domination of the Millers' Association was soon to be ended, however. In the first place, they found it necessary to buy wheat over a larger area. The Minnesota wheats were deteriorating because of the constant cropping without fertilization and the introduction of softer wheats. (5) As early as 1881, the Northwestern Miller

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- (1). Pioneer Press, Oct. 6, 1878.
(2). Folwell, Minnesota, p. 317.
(3). Hudson, Half Century of Minneapolis, p. 356.
(4). Northwestern Miller, Mar. 10, 1882, p. 155.
(5). Ibid., June 5, 1879, p. 347.

was calling attention to the deterioration of Minnesota wheat and urging that something must be done to build up its quality if Minnesota patent flours were to retain their prestige. The millers tried to help matters out by offering a higher price for the Red Fife and other hard wheats as against the softer varieties. But the advance of milling technique had taught them to blend wheats rather than to make all the flour solely from hard spring wheat. On March 31st, 1882, the Northwestern Miller contained an article on milling Canadian wheat in bond, on April 7th, there was a note of a trainload of Californian wheat being brought to Minneapolis to be ground, and in the same number there was an editorial referring to attempts to buy wheat for Minneapolis mills from Nebraska. Moreover, the opening up of the railroads to the Red River Valley and westward into the Dakotas was bringing to the Minneapolis market much more wheat than the millers could make use of; and as the area from which they secured their supply widened, they found it more and more difficult to preserve their monopoly.

In the second place, the business interests of Minneapolis itself were rebelling against the Association. Since 1870 there had grown up a class of commission men who were anxious to handle this surplus wheat. The country millers of southern Minnesota, Iowa, and Wisconsin found it necessary to secure more of the hard winter wheat from the region north of Minneapolis so as to keep up their flour grades, for the quality of the wheat in those regions was deteriorating while the supply was diminishing. When the commission men attempted

(1). Northwestern Miller, Mar. 10, 1882, p. 155.

(2). Ibid., Mar. 31, 1882, p. 208; Ibid., Apr. 7, 1882, pp. 226, 233.

(3). Chamber of Commerce, Annual Report, 1883, pp. 27-28.

to secure this business they got into difficulties. It was hard to secure orders because there was no organized market in Minneapolis. It was hard to get the wheat because of the Association's monopoly. When the wheat had been secured and they had brought it to Minneapolis to sell, the millers who controlled the terminal elevators, forced the commission men to sell to them at their own price or pay ruinous demurrage charges on the loaded cars. (1)

Thus, the commission men did very little wheat business in the seventies. Since the "foreign" millers could not get their orders filled in Minneapolis, they sent their buyers out to the wheat regions, but they made little progress because the Millers' Association controlled the local elevators also. (2)

These conditions caused the commission men to organize the Chamber of Commerce. At first, the millers were strongly opposed to it. But as the grain men began to get orders from the country millers and the advantages of the Exchange became apparent, their opposition began to weaken. By 1883, four of the millers had withdrawn from the Association and were buying all their wheat on the Exchange. Two years later, the Millers' Association was abandoned, and the millers from that time on bought their wheat on the Exchange. (3) (4) (5)

Up to 1881, practically all the wheat shipped to Minneapolis was milled there. In no year did the amount forwarded exceed 200,000 bushels. In 1881 the shipments of wheat exceeded 500,000 bushels, in 1882, two million, in 1884, four million, in 1886, six million, (6)

(1). Chamber of Commerce, Annual Report, 1883, pp. 27-8.

(2). Ibid., pp. 27-8.

(3). Chamber of Commerce, Historical Sketch, p. 8.

(4). Chamber of Commerce, Annual Report, 1883, p. 32.

(5). Chamber of Commerce, Historical Sketch, p. 8.

(6). Chamber of Commerce, Annual Report, 1883, p. 34.

Railroads Operated In Minnesota January 1, 1869
 From report of Railroad Commissioner



MAP BY ARTHUR NORMAN
 Robinson, Development of Agriculture

Railroads Operated in Minnesota June 30, 1875
From report of Railroad Commissioner



BY ARTHUR NORMAN
U.S. DEPARTMENT OF AGRICULTURE

(1)

in 1888, twelve million, in 1891, twenty-one million bushels. The elevator capacity of the city which up to 1880 had been relatively small, increased with great rapidity. There was an increase of two and a half million bushels from 1880 to 1883; by 1885, the total capacity had reached 9,515,000 bushels, and by 1890 it was 16,315,000 bushels. By 1887, Minneapolis had become the greatest primary wheat market in the world.

(2)

By this time, the millers, originally enemies, had become the Chamber's warmest supporters. E. V. White was its president in 1883, George A. Pillsbury in 1884 and 1885, C. M. Loring from 1886 to 1889, F. L. Greenleaf from 1890 to 1892, and Charles A. Pillsbury in 1893 and 1894. All of these men were prominent millers. Only an institution such as the Chamber could furnish a wheat supply to fulfill the enormous requirements of the mills--a supply that was drawn in some years from as many as twenty states.

(4)

44. The Millers and the Growth of Minneapolis as a Railway Center.

In the days when the first mills were being built, there was no transportation problem, as far as the wheat supply was concerned. That supply was close enough to the mills so it could all be hauled by wagon. The difficulty was to get the finished product to the eastern market.

Up to 1867, these shipments had to be made by steamboat down the Mississippi river, to St. Louis at first, then to Dunleith, Illinois, from whence they were carried by rail to Chicago, and still later to Prairie du Chien, and thence by rail to Milwaukee. Prairie

(1). Chamber of Commerce, Annual Report, 1883, p. 34.

(2). Chamber of Commerce, Historical Sketch, p. 33.

(3). Ibid., 1887, p. 12.

(4). Magnuson, Chamber of Commerce, Minneapolis Golden Jubilee, p. 20.

du Chien was the chief port of shipment from 1857 to 1867--at least (1) during the winter. In summer, it was cheaper to ship by water, and so ^{From} April to November the steamers raced by laden with merchandise for the up-river towns and settlers with their household goods, and hurried south piled to the smokestacks with wheat and flour." During the summer, commission men preferred St. Louis as a market to Milwaukee and Chicago. But when the ice had driven the boats to harbor, Prairie du Chien came to its own. The season's wheat crop was still mostly on the farms and hundreds of mills in Iowa, Wisconsin, and Minnesota were grinding flour. Some of this wheat and flour could be held over for spring navigation, but the greater part had to be marketed at once for lack of storage facilities. As soon as the ice could bear the weight of a team and lead, the great river annually was seamed with roads all converging at Prairie Chien. From 150 and 200 miles back on the prairies, teamsters made the journey of many days to the river towns when commission and "forwarding men" bought their produce and freighted it by wagon to Prairie du Chien whence it was carried by railroad to Milwaukee.

The steamboats at first stopped at St. Paul, and all freight had to be hauled by team to Minneapolis. Through the fifties, the Minneapolis and St. Anthony business men were constantly working for better steamboat service to the Falls. In 1852, the steamer, Dr. Franklin No. 2, came up almost to Hennepin Island, thus demonstrat- (2) ing the feasibility of steamboat navigation above St. Paul. Thus encouraged, the citizens of Minneapolis and St. Anthony organized in 1854 a company which bought the steamer "Falls City" at Pittsburgh, brought it west, and started a regular line from St. Anthony to the

(1). Clark, "A Great Flour Port of Early Days", Northwestern Miller, Nov. 12, 1919, p. 734.

(2). Hudson, Half Century of Minneapolis, pp. 463-4.

lower river. In the following years, four other steamers were put into this trade. But the panic of 1857 and the Civil War following, crippled the business, and the opening up of direct railroad connections with the east finished it.⁽¹⁾

Turning now to the railroads, we note that the first railroad to be built in Minnesota was the line connecting St. Paul and St. Anthony, finished in 1862. In the following years, it was extended up the east bank of the Mississippi to Anoka and Sauk Rapids, and in the next decade to the Canadian border. Meanwhile, the Minnesota Central had been built from Minneapolis to Faribault in 1865,⁽²⁾ and then by 1867 to Owatonna, Austin, and the Iowa state line. In that year, the Milwaukee and St. Paul secured control of the Minnesota Central, connected it up with its line from Milwaukee to Prairie du Chien, and thus established the first through railroad line from Minneapolis to Lake Michigan. By 1871, direct railroad communication with Chicago was established by way of Tomah, Wisconsin. After that date, the traffic to Milwaukee and Chicago and the East was well provided for.

This, however, was not the shortest route to the eastern market. The distance to Buffalo is about the same from Duluth as from Chicago. The distance from Minneapolis to Duluth is far less than to Chicago. Hence, the desire for a railroad connection to the head of Lake Superior. Just before 1870, the Lake Superior and Mississippi Railroad was given a grant of swamp lands to build a line to Duluth from St. Paul, which line was completed in that year. The people of Minneapolis tried ineffectually to get the southern terminus moved to Minneapolis, and when this failed, they organized the

(1). Hudson, Half Century of Minneapolis, pp. 463-4.

(2). Atwater, History of the City of Minneapolis, pt. 1, p. 329.

Minneapolis and St. Louis railroad which had for its first purpose the building of a line from Minneapolis to connect with the Lake Superior and Mississippi at White Bear. This line was finished in 1873, and then the millers were in a position to take advantage of the competing Lake Superior rates. Then in 1879, the Northern Pacific, having built its line from Duluth westward to the Dakotas, ran a line southward from Brainerd to Minneapolis and this gave a second line to the head of the Lakes. (1)

However, the competition of the Lake Superior steamers was available for only part of the year. As early as 1873, Governor Israel Washburn of Maine, brother of C. C. Washburn and W. D. Washburn, had addressed the Minneapolis Board of Trade in the desirability of a direct railroad connection to the east via Sault Sainte Marie. It would not only free them from the dominance of railroad centering in Chicago and hostile to their milling interest, but would give them a much shorter route to the seacoast and would open up a vast region in Northern Wisconsin and Michigan which ought to be commercially tributary to Minneapolis. It was not until 1883, however, that the project took shape. In that year the Minneapolis, Sault Sainte Marie, and Atlantic Railroad was organized. W. D. Washburn was president, and C. A. Pillsbury vice-president. Its first board of directors included J. K. Sidle, John Martin, C. M. Loring, W. W. Eastman, W. D. Hale, and C. J. Martin, all prominent millers. They began building in 1885 and by the end of 1887 had completed their line to Sault Sainte Marie. Meanwhile, the Canadian Pacific Railway had built a branch line from Sudbury, Ontario, to the "Soo", and, beginning in January, 1888, through train service was established between Minneapolis and Montreal and Boston. The importance of the line to the

(1). Atwater, History of the City of Minneapolis, p. 330.

(2). Ibid., pt. 1, pp. 555-6.

Minneapolis milling interests is apparent from the fact that in its first year of operation the road hauled 931,500 barrels of flour. In the second year, the millers shipped 1,367,000 barrels over this line--455,000 barrels more than over any other road. (1)

So much for the routes to the eastern markets. What were the millers doing to provide routes to the wheat fields? To a large extent, these were established without any efforts on their part. The St. Paul and Pacific, after going through bankruptcy proceedings, was bought by James J. Hill and his associates, reorganized as the St. Paul, Minneapolis, and Manitoba, and extended through Glyndon and Crookston to the Canadian border. A branch line crossing the river at Minneapolis was extended westward through Cokato to Breckenridge. These lines, completed before 1880; brought down the wheat from the Red River valley. The Hastings and Dakota division of the Milwaukee and St. Paul Railway brought in the wheat of the Upper Minnesota valley, and the same company's line through Owatonna not only gave the first railroad connection to the east, but it brought to Minneapolis much of the wheat of Southern Minnesota. These lines, too, were complete before 1880. (2)

But there was a large territory in Southern Minnesota which had no direct railroad connection with Minneapolis and continued in the seventies to ship its wheat eastward. Moreover, the St. Paul and Sioux City railroad which tapped the lower Minnesota valley ran into St. Paul, and it refused to build a branch line to Minneapolis. (3)

(1). Chamber of Commerce, Annual Report, 1889, p. 157; ibid., 1890, p. 191.

(2). Atwater, History of the City of Minneapolis, pp. 329-330; Robinson, Development of Agriculture in Minnesota, p. 38.

(3). Atwater, History of the City of Minneapolis, p. 330.

So, in 1870, the Minneapolis and St. Louis railroad was organized with H. T. Welles as president, W. D. Washburn as vice-president, and J. S. Pillsbury, W. W. Eastman, J. K. Sidle, R. P. Russell, W. P. Anthony, John Martin, and Paris Gibson among the directors. When Welles retired from the presidency, W. D. Washburn succeeded him. It was purely a Minneapolis concern, and the list of directors given above shows that it was primarily a millers' proposition, although the desire of the lumbermen to find an outlet to the South undoubtedly was also a motive for building. Having finished their line, mentioned above, to White Bear in 1873, the Minneapolis and St. Louis, with the help of a bonus of \$150,000 in city bonds, was extended in 1877 through Albert Lea to the Iowa state line and afterwards to Fort Dodge. Having completed the line that far, its promoters then sold it to the Rock Island system which then established through service to Chicago.

We have now considered the economic foundations upon which the structure of Minneapolis Milling supremacy was built. From the lumber industry which founded Minneapolis and gave the milling industry its initial impetus, from the banks which were largely organized by the pioneer millers, from the eastern financial connections built up by the millers, but chiefly from the profits of the business itself, came the capital with which the mills were built. In the nineties, it seemed for a time as if English capital might absorb them all, but the developments of the end of that decade brought them back under Minneapolis control, and today, with a single exception, the mills are not only operated, but mainly owned, by Minneapolis men.

While securing the capital to build the mills, the millers

were also confronted with the problem of securing a wheat supply. Considering the conditions of the time, we cannot blame them for trying monopolistic methods through their Millers' Association. But the building of line and terminal elevators, the tremendous extension of the area of wheat growing, brought about by the growth of the railroads, and the breaking away from the complete specialization in spring wheat flour made such monopolization ultimately impossible. Then came the establishment of an open market through the formation of the Chamber of Commerce. The millers came to support it loyally, and its growth to leadership of the world's wheat markets assured them of a supply of wheat that would be unailing.

And, finally, when the capital to build the mills had been secured, and an available supply of wheat to feed them, it was still essential to have the railroads to carry the wheat to Minneapolis, and to carry the flour to the world's markets. The creation of this transportation system was mainly a natural development with which the millers had nothing to do. But in a number of cases, and especially in the building of the Minneapolis and St. Louis and of the "Soo" Line, they showed that highest order of business ability which not only deserves success, but also commands it.

Number and Distribution of Flour and Grist Mills
 in Minnesota in 1880 by Counties.
 U.S. Census of 1880



MAP BY ARTHUR NORMAN

ONE DOT REPRESENTS ONE MILL

Chapter VI.

THE MINNEAPOLIS MILLS AND THE DEVELOPMENT OF MINNEAPOLIS AND MINNESOTA.

-15. The Interior Mills.

In the preceding chapter was discussed the principle economic factors affecting the development of milling in Minneapolis. We now turn to the industries and institutions whose development was affected by the mills. In a larger sense, the whole economic development of Minnesota and the Northwest since 1870 has been influenced by the concentration of milling in Minneapolis. From that point of view, a history of milling in Minneapolis ought to be an economic history of the whole Northwest. But the present discussion will be confined to those industries or economic groups most directly affected by the mills; that is, the country mills, the Minneapolis grain market, and the subsidiary industries.

One might have expected, after studying the rapid development of the Minneapolis mills in the two decades from 1870 to 1890, to find the country mills decaying, if not disappearing, because unable to compete with those of the metropolis. The census returns show the contrary to be true. The number of mills fluctuated, and at times decreased greatly, but every census since 1870 has shown an increase for the country mills in capital invested, in cost of raw materials, and in the value of the product.⁽¹⁾

From 1880 on, the growth of the country mills fairly kept pace with the metropolitan mills. But during the years from 1870 to 1880, when the Minneapolis millers were making such revolutionary changes in milling processes, they outdistanced their country compet-

(1). See Table 3 p.257 Growth of Milling, 1870-1910, Minnesota and Minneapolis compared.

itors. The country mills tripled their capital in that decade, but the city mills multiplied theirs by seven. The country mills' product was six times as valuable in 1880 as in 1870; the Minneapolis mills' product twenty times as valuable. In 1870, the country mills' product was six times as great as that of the city mills; in 1880, the values were about equal. In 1870, Minneapolis was, in capital and output, the leading milling city of the state, but it was not until about 1880 that she attained the unchallenged supremacy that has since been hers.

After 1880, the country mills adopted the new milling methods, put in the new machinery, and were soon in position to compete with the city mills on fairly equal terms. As a result, their growth since that time has kept even pace with them. Moreover, the same tendencies showed themselves as in the development of the city mills. There was a concentration of milling in certain counties of southern Minnesota. The average size of the mills had increased greatly, for the value of the product of the average establishment more than doubled between 1880 and 1890. Many of the smaller cities of Minnesota now have mills with capacities ranging from one to three thousand barrels--mills which compare favorably in buildings and

(1). In 1880, Fillmore County had twenty-seven mills, Goodhue and Houston twenty-two each, Winona twenty, Blue Earth and Rice eighteen each. All of these, except Rice county, had a larger proportionate share of mills in 1880 than in 1870-- U. S. Census, vol. p.

(2). Average annual product per establishment. Based on Table p.
 1870--\$31,729. 1880--\$51,638 1890 --\$104,433 1900--\$68,408
 1910--\$175,683.

(1)
equipment as well as output with the city mills. In the last decade, there has been a tendency toward concentration of ownership as well. One might name a half dozen or more milling firms which own more than one interior mill. The tendency has not, of course, developed as far as in Minneapolis.

(2)
Within the last few years, there has been a movement of country mills to establish offices in Minneapolis. In some cases, the owners reside there and operate their mills from that city. In others, the Minneapolis office is simply a convenience for the buying of the wheat and, to a less extent, for the selling of the flour. The southern Minnesota mills, lying south of a line drawn due west through Minneapolis get their main supplies of wheat from the railroad lines northwest of the city. Some of them may own elevators in that territory, but the great majority buy their supplies on the Minneapolis Exchange. For this purpose, they find it desirable to have a Minneapolis office. In selling their flour, there is probably some advantage in being free to use the Minneapolis address on their letter heads and flour brands. In addition to that, the country miller

(1). A recent number of the Northwestern Miller contained advertisements of the following interior mills with capacities above 1,000 barrels per day: Bay State Milling Co., Winona, 6,000 barrels; Marshall Milling Co., Marshall, 3,000 barrels; Commander Mill Co., Montgomery, 3,000 barrels; Hubbard Milling Co., Mankato, 2,500 barrels; Tennant and Hoyt, Lake City, 1,400 barrels; Cannon Valley Milling Co., Cannon Falls, 1,200 barrels. The Eagle Roller Mills Co. of New Ulm claims a capacity of 6,000 barrels, and the New Prague Flouring Mill Co., of New Prague, a capacity of 10,000 barrels. This includes several mills.

(2). The Everett Aughenbaugh & Co. mills at Waseca and New Richland; L. G. Campbell Milling Co. mills at Northfield and Blooming Prairie; Shaw Brothers and Wilson, mills at Hastings and Shakopee; St. James Milling Co., mills at St. James and Amboy, etc. Millers' Almanack, 1919-1920, pp. 156-157.

(3). The millers north and west of Minneapolis buy their wheat directly from the farmers or from the country elevators.

feels that in Minneapolis he is at the center of things so that he is in a better position to secure information and to form a correct judgement of trade tendencies and market conditions. In some cases, undoubtedly, the country miller has moved to Minneapolis for purely personal reasons--the desire to secure superior educational facilities for his children, for example. In other cases, the miller owns several widely separated mills, and Minneapolis is a convenient place to establish headquarters because of its central location. There is nothing to indicate that the Minneapolis millers have made any efforts to buy up the country mills, nor are the millers and mills named above in any way connected with the Minneapolis mills. The country millers seem to be in competition with those of the metropolis, not only in their own local market, but in the great markets of the east as well. They do not complain of any unfair competition from the city mills, but insist that there is no division of territory nor any trade agreements to restrict competition either with the big mills or among themselves. They do not want any agreement. They are inclined to think that the city mills have been favored by current economic conditions and also by the Food Administration regulations, but, nevertheless, feel that under normal conditions they can hold their own.

The country mills claim certain advantages over those of the city. Those located in the wheat belt can buy the wheat directly from the farmers and probably get it at lower prices than those at which the city mills buy theirs. On the other hand, the city mills

- (1). Conversation with an owner of a small mill.
- (2). The Big Diamond Mills Co., Morristown; Northwestern Milling Co., Little Falls; Sheffield-King Milling Co., Faribault; Shans Brother and Wilson, Hastings and Shakopee; Cannon Valley Milling Co., Cannon Falls; and Commander Milling Co., Montgomery, are some of the prominent interior millers having headquarters in Minneapolis.
- (3). Conversation with a man connected with a small milling company.

and those buying on the Exchange probably have a larger selection of wheat to buy from and may secure wheat of a higher quality. The interior or country mills claim to have almost a monopoly of their local markets. Local pride should induce the millers' fellow townsmen to buy a home product in preference to the more advertised brand of the big mill. This does not amount to a great deal. A town of even five thousand population could consume only a small proportion of the product of a thousand-barrel mill. Undoubtedly, the interior mill does not have the burden of as large fixed charges as its city competitor, for land values are lower and so are costs of construction. (1) Wages are lower, mills usually run on a twelve hour shift, and labor conditions generally are more satisfactory for the miller in the small town. (2) The local railroad agent in the small town is more likely to be influenced by local pride and personal friendship, and, therefore, may provide better railroad service for the country mills. At least the country miller complains less of inability to get cars, delays in forwarding, etc. And, while they are not advertising the claim because they want to be known as spring wheat millers, the mills of southern Minnesota claim an advantage in being nearer the source of supply for the hard winter wheats which they buy to a considerable extent to mix with the spring variety. (3)

There are, today, more than fifty mills in the territory, directly tributary to Minneapolis, roughly, the central one-third of the State. (4) As long as they are granted the milling-in-transit pri-

(1). But some of the interior mills have already given the eight-hour shift.

(2). Conversation with an owner of a small mill.

(3). It is said that many of them were using as high as seventy per cent of winter wheat at the beginning of the present crop year. But this was an abnormal season because of the poor spring wheat crop.

(4). Minneapolis Civic and Commerce Association, Minneapolis, the Market of the Northwest, p. 67.

privilege, there seems no reason to doubt the continuance of their prosperity. As to the mills of southern Minnesota, the case is more doubtful. The westward and northward shift of the wheat belt has interposed Minneapolis between those mills and the main source of their wheat supply. Their local wheat supply is steadily diminishing as the region turns more and more to diversified agriculture. They are forced to buy their wheat in the Minneapolis Chamber of Commerce in competition with the Minneapolis mills. The same conditions have caused a decline of milling in Milwaukee, and a similar fate would seem to await the mills of southeastern Minnesota.

16. The Millers and the Minneapolis Grain Market.

In the early days when all the mills depended on a local supply, wheat was practically the only crop grown. With continuous wheat-growing without fertilization, the soil became exhausted, production declined, and the quality of the wheat degenerated. The farmers then introduced new varieties of wheat which gave larger yields but were softer and less valuable for flour making than the old reliable Red Fife. Moreover, as competition among the millers became more strenuous and profits came to be figured in cents instead of in dollars, they began to realize the need of finding a market for the offals which had so far largely gone to waste. To do this, it was necessary to encourage stock-raising at home, for the bulk and low value of the offals forbade their transportation to any great distance. On the other hand, the millers wanted to encourage wheat-growing as much as possible. Thus, they stood for two contradictory

(1). Compare the maps in Robinson, Development of Agriculture in Minnesota, showing wheat production in 1869 and 1909 (pp. 65 and 183).

(2). Smith, Wheat Fields and Markets of the World, p. 171.

(3). Northwestern Miller, June 6, 1879, p. 327; *Ibid.*, Jan. 21, 1881.

The reports of the Chief Grain Inspector showed only 5.74% of the wheat to be No. 1 Hard as compared with 41.46% in 1887. Minneapolis Chamber of Commerce, Annual Report, 1889, p. 48.

ideas. There was a distinct growth in stock-raising and diversified farming in Minnesota after 1880. The slight evidence on the subject seems to show that the miller helped rather than hindered its growth because they needed to sell feed as well as flour.

In general, the attitude of the millers toward the farmers, as shown by the editorials in the Northwestern Miller in the early eighties, was entirely conciliatory. Having dissolved the Millers' Association, they were anxious to show the farmers their identity of interests. They bought their wheat on the Exchange and took no more responsibility for grades and prices to the farmer. The Chamber of Commerce made the rules for grading and appointed the inspectors, but that organization, the farmers said, was dominated by the millers. The farmers complained continually of the grading, of the weighing of the grain, and of the dockages. In January of 1883, Governor Hubbard recommended that a state system of grading and inspection be established in the terminal cities. In spite of vigorous opposition by the millers, the law was passed and went into effect March 5th, 1885. The system then established has been in continuous operation ever since.

The State Grain Inspection Department is supervised by a chief inspector, appointed by the Railroad and Warehouse Commission.

(1). Robinson, Development of Agriculture in Minnesota, pp. 111-113.

(2). Northwestern Miller, Feb. 1, 1878, supplement; ibid., June 6, 1879, p. 347, etc. Editorials urging the farmers to go in for stock-raising. Diversified farming did not necessarily mean a smaller wheat crop, since the farmer might get larger yields with a smaller acreage by better farming methods. As a matter of fact, wheat production steadily increased in Minnesota to 1900. Robinson, Development of Agriculture in Minnesota, p. 261.

(3). Baker, Lives of the Governors, Minnesota Historical Society Collections, vol. p.

(4). Northwestern Miller, Jan. 14, 1881, p. 18; ibid., Sept. 17, 1880, p. 178; ibid., Feb. 11, 1882, p. 82, etc.

(5). Weld, Marketing of Farm Products, pp. 370-374.

Inspection and grading takes place usually at the terminal markets, although there are quite a number of other places at which grain is weighed or inspected or both. Formerly, all grain was inspected on cars, as it came into the Minneapolis yards, but at present the cars are "sampled", and the sampled are carried to the Grain Inspection office where the inspectors examine them and fix the grade according to the rules laid down for them. They also determine the dockage for dirt, foul seed, etc. The weighing is done when the car is delivered at the mill.

If the shipper is dissatisfied with the grade assigned, he may appeal for a second inspection, and, if still dissatisfied, may go to the Board of Appeals with his case. There are two such boards, one at Minneapolis and the other at Duluth. These boards not only hear appeals, but they determine the grading rules in the first instance.

The system is far from perfect even now. In 1913, more than one-fourth of the inspections were appealed, and of these cases, one-fourth of the grades given by the inspectors were raised by the Appeals board. ⁽¹⁾ The farmer is inclined to think that the inspectors generally give him a poorer grade than he is entitled to; the millers insist that the grades given to them run too high. But, in spite of these complaints, everybody seems to recognize the superiority of the new system over the old, and there seems no doubt that it will be a permanent institution. ⁽²⁾

From the time of the passage of the state inspection law, relations between farmers and millers tended to become more friendly.

(1). Weld, Marketing of Farm Products, p. 373. The Report of the Chief Grain Inspector for 1918 (p. 20) shows No. of cars inspected, 250,475; re-inspected, 22,345; no. appealed, 11,931; sustained on appeal, 84472.

(2). Complaints also that Duluth inspection is less rigid than Minneapolis. See Minneapolis Chamber of Commerce, Annual Report, 1901, p. 27.

Or, perhaps, it would be more accurate to say that there were no longer any relations between them, friendly or unfriendly, since they no longer had any direct dealings with each other. The enmity of the farmer was transferred from the millers to the elevator men and the Chamber of Commerce.

There were, at this time, as there are now, three types of country elevators, i. e., independent houses, line elevators, and farmers' elevators. The first of these were owned by individuals or firms owning only one, or at most, only a few elevators. The farmers' elevators were those whose stock was owned by the farmers of the neighborhood--usually on a co-operative basis. The line elevators were so called because a number of them, located usually on a single line of railroad, were operated by one corporation.

The country elevator may receive the grain from the farmer for storage. But usually it buys from him and ships to the primary market where it is sold on the exchange. The line elevators have exchange memberships and do their own selling; the others must rely on commission men. The grain is sold on the exchange to the millers, (1) to the terminal elevators, or to other commission men.

Purchasers buy the grain "to arrive" or "on track". The former are large sales to be delivered in installments at specified times. In the case of "on track" sales, the grain is shipped from the country elevators unsold. At the primary market, it is inspected, samples are taken to the floor of the exchange, and the grain is sold while right on the car. The person buying it is given the car numbers, the railroad is ordered to switch it to the designated ware-

(1). Refsell, Farmers' Elevator Movement, Journal of Political Economy, 1914, vol. 22, pp. 872-873.

house, and the grain is unloaded and weighed under supervision of a state official. Payment is made on a basis of these weights. (1)

If the country elevator does not choose to sell immediately, it can store the grain in a public elevator. Public elevators are those licensed by the state and bound to take anyone's grain, without discrimination, up to the limit of their capacity. One stores one's grain and is given a receipt, specifying the amount, kind, and quality of grain stored. The owner may then, at his pleasure, sell his grain "in store", delivering the elevator receipts to the buyer. The buyer does not, of course, get the identical grain but only the equivalent. (2)

In the eighties, as a result of the difficulties with the Millers' Association, there had been built many farmers' elevators. (3) Most of them were poorly organized and badly managed and became financial failures. This left the field open to the independents for a time. Among these, there was keen competition at many points in the wheat regions, so that there arose a class called "scoopers" or track buyers, who owned no elevators but loaded the purchased grain directly into the cars. Because of this competition, the grain buyers often paid more for the grain than it was worth. In addition, they often lost money through dealings with dishonest commission men and through leaky cars. Many were forced out of business, and the remainder began to combine for the purpose of overcoming these evils. They formed state associations and worked through them. They eliminated the "scoopers" by compelling the commission men to refuse to deal with

(1). Refsell, 'Farmers' Elevator Movement', Journal of Political Economy, 1914, vol. 22, p. 873; Weld, Marketing of Farm Products, pp. 50-1.

(2). Refsell, 'Farmers' Elevator Movement', Journal of Political Economy, 1914, vol. 22, pp. 873-4.

(3). For the Millers' Association, see Chapter V, sec. 13.

them. They also induced the railroads to make rules to the effect that no cars would be provided for shipping grain until it was at the right-of-way ready for shipping. The Association was strong enough to compel the railroads to give better service to its members as well. Then, having eliminated competition among their own members by a division of territory, the Association settled back to enjoy the fruits of their labors.⁽¹⁾

In the late eighties, the first line-elevator companies⁽²⁾ were formed. Having large capital, they could own terminal elevators so that they were in a better position to store grain than the independents. They owned seats on the Exchange so that they dispensed with the services of commission men. Usually, they were financially connected with the railroad on whose lines they operated, and sometimes the largest stockholders were railroad officials. Thus, they were in a position to get special favors from the railroads.

Just as the Associations eliminated the "scoopers", the line elevators now drove out the independents. Usually the independent was offered the choice of selling his elevator to the line company or being driven from the field by cut-throat competition. In many of the towns, one or more nominally independent dealers were left in the field on condition that they obeyed the orders of the line companies. The state Associations of grain men had gained control of the business; now the line companies gained control of the Associations.

The control of the terminal elevators gave the line com-

(1). Refsell, 'Farmers' Elevator Movement', Journal of Political Economy, 1914, vol. 22, p. 874-6.

(2). The Annual Report of the Chamber of Commerce for 1891 states (p. 53) that nearly all the elevator lines in Iowa, Nebraska, Missouri, and Kansas are owned and operated by Minneapolis firms.

panies an advantage also. Through their monopoly at the source of supply, they could buy the wheat under very rigid grading and then, at the terminal elevator, sell under distinctly lower standards. Or they would mix good grain with inferior and thus reap large profits from "skin" grades. But the main advantage was that, having eliminated competition in buying, they could fix prices as they pleased. The farmers were in the grip of a monopoly. When they tried to build their own elevators, the railroad officials, in sympathy with the elevator companies, refused permission to erect them on the right-of-way. If the farmers did get a car through to the terminal market, they could find no commission men who dared to buy. (1)

These conditions were common to the whole Northwest. In Minnesota, matters came to a head in the fall of 1892 when the Chicago Herald and the St. Paul Globe started an agitation against the elevator men of Minneapolis, and especially against C. A. Pillsbury; charging systematic and long continued cheating of the farmers in prices of wheat, dockages for dirt, etc. The Chamber of Commerce answered these attacks by electing Mr. Pillsbury president of the body. (2) But the agitation continued and resulted in the passage of a drastic regulatory act. All country elevators on railroad rights-of-way were declared public warehouses and placed under the supervision of the State Railroad and Warehouse Commission. In all cases of dispute between buyer and seller, relating to grades, etc., samples of the grain were to be forwarded to the state grain inspector, and his

(1). Refsell, 'Farmers' Elevator Movement', Journal of Political Economy, 1914, vol. 22, pp. 876-878., pp. 886-888.

(2). U. S. Miller, Oct. 1892, p. 231.

(3). Ibid., p. 233.

decision was to be final. Arrangements were made by which the farmer could store his grain at the country elevator and then sell "in store" at the terminal elevators at Minneapolis or Duluth by paying the transportation and reasonable storage charges. Thus, he was given the choice of two markets. Pooling of profits and agreements to fix prices among country elevators was forbidden. The railroads were compelled to allow the erection of elevators on their rights of way. (1)

This law remedied some of the abuses of which the farmers complained. They had, meanwhile, organized farmers' elevator companies on a new plan which proved more successful than the earlier attempts. Within recent years the line elevators and independents have steadily declined in numbers while the farmers' elevators have increased. Today, the latter are handling nearly forty per cent of all the grain shipped in the state of Minnesota. The farmers have no difficulty in getting commission merchants to sell their grain and make comparatively few complaints about their treatment at the terminal elevators. Many of them now "hedge" on the Exchange against their grain purchases in the country, and this has brought them closer to the Chamber of Commerce. In recent railroad rate controversies, the representatives of the farmers' elevators and the members of the Chamber have shown a commendable desire to work together for their common good. (2) (3) (4)

The farmer and the Minneapolis millers are no longer in conflict, since the millers no longer buy their grain directly, but

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- (1). U. S. Miller, Apr. 1893, p. 58.
(2). Minneapolis Journal, Jan. 26, 1920, p. 8. Abstract of the report of the supervisor of local warehouses for the Minnesota R. R. and Warehouse Commission.
(3). Weld, Marketing of Farm Products, p. 265.
(4). Harper's Weekly, June 14, 1913, p. 19.

(1)
depend on the Chamber of Commerce for a supply. Complaints that are made against the millers today are based on the assumption that they control the Chamber of Commerce. While there is no evidence to prove such a contention, it is true that the miller has found that he must act in harmony with the Chamber. It is doubtful if he has benefited financially by the change in the method of wheat buying. He must buy on the Exchange because nowhere else is grain sold. In that market, he has to meet the competition of the outside millers, and the grain shippers as well. (2) There are, of course, some advantages in the open market. The miller now has a wider range of choice in buying. In the olden days when he had his own line of elevators, he had to buy his grain on that line whether the crop in that particular region was good or bad. Now some of the largest milling companies have sold their elevators and buy only on the Exchange so as not to be tied down in that way. (3) When they buy on the Exchange, they know they are dealing with responsible people and that the grain is not encumbered with a chattel mortgage. (4). But the main thing is that, by buying through the commission men, they eliminate the chances for friction with the farmers who make up, to such a large extent, the ultimate consumers on whose good will they are dependent. Moreover, with the advance in milling technique, the millers are less and less willing to confine themselves to a single variety of wheat. The tendency is for them to gather the wheat from many regions and blend them as the English millers do. Buying directly from the producers is impractical

(1). "The Mills are always buying in the open market; they never buy in the country." Smith, Wheat Fields and Markets of the World, p. 313.

(2). Ibid., p. 255.

(3). Conversation with a prominent Minneapolis miller.

(4). Smith, Wheat Fields and Markets of the World, p. 255.

under those conditions. As the sources of the wheat supply widen, therefore, the millers will become more and more dependent on the Chamber of Commerce.

The co-operation of the millers and the line elevators assured the position of Minneapolis as the great wheat market of the United States, for not only were the greatest mills located in the city, but most of the great line elevator companies--not only those operating in Minnesota and the Dakotas, but those of Nebraska, Kansas, and Iowa--made their headquarters in Minneapolis. Up to about 1888, the dealings were almost all in cash wheat. Hedge sales or purchases by elevators or millers were all made in Chicago. In that year, the Chicago Board of Trade, in making war on bucket shops, excluded all telegraph lines from their Exchange. Reports which came through after that were by private wires and were not always reliable. This handicapped the dealers in futures residing in Minneapolis so that they turned to their own Exchange. Some rather disastrous experiences with May wheat on the Chicago Exchange in 1891 may have helped to bring about the decision. At any rate, the future market of Minneapolis has grown steadily since that date. About the same time the trade in coarse grains began to be important. Minneapolis was presently known as the greatest barley market of the country. The development of the linseed oil business made it an important flax market also. By 1901, it was, in volume of business, second in rank of all the grain exchanges of the country.

(1). Minneapolis Chamber of Commerce, Annual Report, 1891, p. 53. This does not mean that the wheat of those states was brought to Minneapolis for sale. But considerable corn, oats, and barley was brought to Minneapolis to be sold and that market financed the movement of the crops.

(2). Ibid., 1890, p. 48.

(3). Ibid., 1890, p. 48.

(4). The Miller, vol. I, p. 348.

The change in the method of marketing the wheat which was involved in the development of the Exchange was also a prime factor in making Minneapolis the financial center of the Northwest. The mills grind in an ordinary year seventy-five or eighty million bushels of wheat. The elevators receive and ship about forty million bushels additional. Under the old system, the millers could buy the wheat, in the main, as they needed it. Now, the farmer rushes the bulk of the crop to market in the four months from September to December. To keep the grain from being drawn to other markets, Minneapolis must purchase it as offered and store either in the interior or at the terminals until it is needed for grinding. The grain must be paid for in cash and must be carried for several months. The millers and the elevator men must, therefore, provide in a normal year from fifty to seventy-five million dollars to finance the operation. Naturally, they turn first of all to the Minneapolis banks. As early as 1883 the Minneapolis Clearing House reports showed clearings for the last four months of the year running four or five million dollars above the normal for the rest of the year. By 1913, this increase had jumped to ten million dollars a week. Most of this increase was due to the grain crop movement. The millers and elevator men sell their grain paper to the banks and receive credit or currency with

- (1). Minneapolis Civic and Commerce Association, Minneapolis: Financial Center and Gateway of the Northwest, pp. 48-49.
- (2). Smith, 'Minneapolis and the Northwest', Harper's Weekly, Apr. 26, 1913, p. 14.
- (3). Ibid., p. 14. Article by one of the editorial staff of the Northwestern Miller.
- (4). Minneapolis Chamber of Commerce, Annual Report, 1883, p. 120.
- (5). Minneapolis Civic and Commerce Association, Minneapolis: Financial Center and Gateway of the Northwest, Table 12.

which to purchase grain. The bank, in turn, rediscounts with eastern banks and draws money to Minneapolis in that way. Or the grain paper is sold to commercial paper brokers who scatter it throughout the country, selling not only in New York and Chicago, but to Canadian banks, to the country banks of Minnesota, and the Dakotas. (1)

Many of the banks in the east and in eastern Canada have habitually purchased Minneapolis grain paper in large quantities in the fall. In one way or another financial resources on an enormous scale are concentrated in Minneapolis during the fall months for the movement of the crop. (2) As early as 1889 the Chamber of Commerce could say: "Nearly all the money paid for grain in the interior is sent from the city by elevator companies and millers to their agents in the country. Thus, Minneapolis is not only the market to which the grain is shipped, and where it is sold, but the financial center from which the money is sent out to purchase and move the grain crops of the Northwest." (3)

17. Subsidiary Industries.

When any industry develops to the size and importance reached by the Minneapolis flour mills, it is bound to affect, to a greater or less degree, the other industries of the city. Minneapolis is the jobbing center of the Northwest, primarily, because the Northwest's wheat is sold there. Though the Minneapolis saw-mills no longer operate, she remains the lumber center of the Northwest

(1). Smith, 'Minneapolis and the Northwest', Harper's Weekly, Apr. 26, 1913, p. 14.

(2). The increase in wheat prices and the transportation difficulties of the war period have aggravated the situation. The Minneapolis Journal, April 25, 1920, (p. 1, City Section), estimates more than \$50,000,000 of wheat in the Minneapolis terminal elevators at that date.

(3). Minneapolis Chamber of Commerce, Annual Report, 1889, pp. 48-49.

, not primarily because of its former eminence as a lumber manufacturing city, but because the Northwest must buy where it sells. The railroad concentration which has made Minneapolis the traffic center of the Northwest is both a result and a cause of her milling activities.

Certain industries, however, are more directly the creation of the milling industry, either because they supply the needs of that industry or use its products as raw materials. Of these, the earliest developed was the making of barrels. Almost from the start, barrel-making was a co-operative industry, the first co-operative shop being organized in 1869. This enterprise was short-lived, but in 1874, after a period of labor troubles, The Co-operative Barrel Company was organized. By 1884, it had one hundred twenty-five members and \$50,000 capital. C. A. Pillsbury seems to have interested himself in the company and helped organize it. In 1877, there were more labor difficulties out of which grew the North Star Barrel Company, also a co-operative shop. In 1884, it employed one hundred and twenty men, and had a capital of \$100,000. The organization of the companies is not very clear. The mens' stock holdings varied from a few dollars to several hundred. In the election of officers and in determining the general policy of the company, each had one vote. The president of the company acted as manager.

At that time, six of the eleven cooper shops of the city were co-operative, and they did the bulk of the business. Its magnitude may be estimated from the statement that they employed 742 coop-

(1). Northwestern Miller, Holiday Number, 1884, p. 59.

(2). Ibid.

ern and 142 other employees. The coopers had always successfully opposed the introduction of machinery so that all the work was hand labor. Since 1884, the use of barrels has decreased, and the cooper shops have declined in importance. The co-operative shops still exist, however, and are interesting as an early and successful example of co-operative enterprises. (1)

Of the non-co-operative or "boss cooper" shops, forty years ago, the most important was that of Hall and Dann. In 1883, (2) the principal stockholder of this company was George H. Christian. When, with the development of the direct export trade, bags began to be demanded rather than barrels, this company began to make them. Gradually, this became the principal part of their business, and coopership was dropped. In 1881, they had adopted the name of The Hardwood Manufacturing Company. Presently, they saw that this was a (3) misnomer and so changed it to the Northern Bag Company. This company, together with a branch house of the St. Louis firm of Bemis Brothers, (4) controls the bulk of the bag business in Minneapolis. It is in a real sense a subsidiary industry to flour milling, for the flour mills take between two-thirds and three-fourths of the product.

For the export trade, the mills demanded a jute bag the (5) materials of which had to be imported from India. At first, as has been said, they were used for the export trade only, but in later years they have been used to a considerable extent for the bakery trade at home. Cotton and paper bags were not used in this section

(1). Northwestern Miller, March 15, 1905, p. 61R.

(2). Ibid., Aug. 10, 1883.

(3). Conversation with a bag manufacturer.

(4). Bemis Brothers started their bag factory in St. Louis in 1858.

There is an account of Judson Bemis, the founder, in the Northwestern Miller, Oct. 1, 1919, p. 41.

(5). American Miller, vol. X, p. 522.

of the country until much later than in other sections. The Western miller often shipped his flour east in barrels, and the grocer or the merchant repacked it in bags under their own brands. Before the Civil War, cotton bags were used, but the inability to get the raw materials during the war set certain bag makers to experimenting with paper bags. The tendency is toward an increased use of bags rather than barrels, and of paper rather than cloth bags. The industry has grown in Minneapolis to such an extent that a thousand or twelve hundred hands are employed as against, perhaps, a hundred, twenty-five years ago. Next to St. Louis, Minneapolis is now the leading city.

Still another industry, subsidiary to flour milling, was the manufacture of flour mill machinery. The pioneer in this line was O. A. Pray, who had come to Minneapolis in 1857, worked on the building of the dam, and the building of the Cataract Mill, and in 1866 organized the firm of Webster and Pray which built the Washburn B mill for Governor Washburn. In 1868, Pray bought the Minneapolis Iron Works which specialized in repairs and mill building. At that time, the building of mill machinery was mainly in the hands of older firms in older milling centers, chiefly John T. Noye of Buffalo, E. P. Allis of Milwaukee, and the Nordyke and Marmon Company of Indianapolis. But when Geo. T. Smith patented his purifier, Pray formed an alliance with him and began to manufacture it. This led to the manufacture of other machines as well. Various other firms, especially the Union Iron Works, and the Minnesota Iron Works, came into being to meet the same

- (1). Millers' Journal, May 19, 1880, p. 462. Discussion of the relative merits of bags and barrels, American Miller, vol. IX, p. 275.
- (2). Conversation with a Minneapolis bag manufacturer.
- (3). 'Early History of New Process Milling', Northwestern Miller, Sept. 14, 1883.

needs. In the eighties, the firm of Wilford and Northway began in a small way to manufacture purifiers. This firm passed through various changes of ownership before becoming the Strong-Scott Manufacturing Company, by which name it is known today. It is the only firm in Minneapolis in this line of business. ⁽¹⁾ The old centers of manufacture were too firmly established and they control the bulk of the business today.

We turn now to the industries of which flour is the raw material. Bread baking, in the nature of things, can not be concentrated to a high degree, but certain kinds of baking, such as biscuits and "cracker" readily adapt themselves to large scale production. One might expect to find them highly developed at Minneapolis, but this is not the case. Only two firms, the National Biscuit Company and the Loose-Wiles Biscuit Company, and these branch establishments, located here for distribution rather than manufacturing advantages, are located in Minneapolis. Spring wheat flour is a bread flour, it is not well suited for making cakes, biscuits and "crackers". Consequently, these two firms are obliged to bring in their flour supply from St. Louis and Kansas City. ⁽²⁾

One other industry shows a degree of concentration in Minneapolis which we can say is due to the city's being a milling center. This is the manufacture of breakfast foods and other cereal products.

In the early days, oatmeal was the only breakfast food used, and even that was little used in the United States before the Civil War period. Ferdinand Schumaker^{ch} of Akron, Ohio, is said to

(1). Conversation with a representative of Strong-Scott Manufacturing Co.

(2). Conversation with a representative of a biscuit company.

have started the industry west of the Alleghenies and, up to 1873, he was about the only manufacturer of oatmeal of any prominence in that section. After that date, there was a rapid growth in oatmeal-milling throughout the West. One might have expected to see it started at an early date in Minneapolis, since Minnesota in 1870 raised over ten million bushels of oats. The profits of flour milling were too great, however, to induce the millers to go into any such side-line. It was not until about 1890 that we hear of oatmeal being manufactured in Minneapolis.

(1). American Miller, vol. XIII, p. 74.

(2). That some of the millers were thinking of going into the business at an earlier date, is shown by the following letter:
C. C. Stetson & Co. Mdse. Brokers, Minneapolis to Major Hale, Minneapolis. Jan. 14, 1889.---It occurs to me to suggest some of the particulars regarding the prospects of our oatmeal enterprise and why it should be a success.

1st. There is a liberal market for the goods in these two cities from the local consumption and the much larger quantity shipped to the country retail stores, averaging over 60 barrels per day (our wholesale grocers have a large steady trade, and have to obtain their product from six mills in Iowa and four or five other points.)

2nd. We are almost if not quite as well situated as any other place in the country to get the first quality oats, that are required, at moderate prices; and it must improve rather than otherwise.

3rd. The facility and rates for shipping the manufactured product east and west are considerably superior to most of the interior Iowa points (where three-fourths of all the oatmeal is now made.) Oatmeal obtains flour freight rates.

4th. The hulls and refuse from process of manufacture could all be utilized in horse feed, of which about ten carloads daily are handled by the feed dealers in these two cities. The Iowa mills have, of course, only a limited local demand for feed and lose the great item of freight on all they send to Chicago, these points, or other markets.

5th. There is a large profit over the cost of manufacture and but little competition as the prices are uniformly maintained by agreement of all the manufacturers in this line.

Although I have little practical experience as to the actual process of manufacturing, I am very familiar with the goods required, the consumption demand, and the method of selling the product, and feel confident there would be no trouble in showing handsome returns. It is safe to say a conservative estimate of the profit would be 50 cents per barrel on the present prices, which have been maintained for some two years past.

The goods actually show, estimated liberally, about as follows:

By that time, there had been a great development in the processes of the industry. The old steel-cut oatmeal was unsatisfac-⁽¹⁾tory because it took so long to cook and was never perfectly clean.

Someone now worked out a process by which the oats were first cleaned and husked, then cooked by steam, and then rolled out into large flakes. This produced the rolled oats with which we are familiar to-

day. At about the same time there began, in the newspapers and mag-azines of the country, an attack on the patent flour and the bread make from them. Physicians started it, writers in womens' magazines⁽²⁾ and cooking-school experts took it up. Erastus Wiman summed up the criticism of white bread by saying, in 1892, that "while the present roller process closely approaches perfection as far as goes color, fineness and evenness of flour, it attains these results at the sac-

rifice of the kernel and bran, of the phosphoric acid, the cerealine and fat, which nature has supplied in these parts of the berry in the precise proportions that science considers best suited to sustain life and health." He went on to say that "as long as the public will continue to demand white flour, the millers will, and are bound to, comply with the prevailing taste or fashion. The reform, therefore,⁽³⁾ must come from an enlightened public opinion."

(cont'd. From preceding page)

Cost of a barrel of Oatmeal or Rolled Oats	
12 bushels oats at 30 cents-----	\$3.60
Manufacturing -----	.50
Barrel or Package-----	.27
Selling-----	.25
	Total, \$4.62.

The present uniform selling price in carlots is \$5.85, les 3%, \$5.67. Of course the freight to seaboard or other points, must be added to costs to such markets, as prices are uniform.

Hale Papers, Case 6, Minnesota Historical Society Collections.

(1) Northwestern Miller, Oct. 21, 1898, p. 695.

(2) Ibid., Oct. 28, 1898, p. 740.

(3) The Miller, vol. I, p. 622.

The physicians then began to agitate against white flour as injurious to health. As a result of their efforts, a great variety of health flours under a variety of names, such as Graham flour, whole wheat flour, entire wheat flour, etc. began to be manufactured. This, in spite of the protests of the millers and the milling journals, such as the Northwestern Miller. Meanwhile, the cooking-schools and womens' magazines were carrying on a campaign to reform the American breakfast. They advocated the substitution of cereals for the pie of New England and the fried bacon and eggs of the Southern breakfast table. (1)

The increased demand which these efforts inspired caused a remarkable growth of the cereal industry of America. Breakfast foods increased to a bewildering number and variety, helped no doubt, by some exceedingly clever advertising. The rolled oats process was adapted to wheat and then to barley, rye and other grains. The shredded wheat biscuit was developed. Various grains were prepared in a granulated form similar to the old time corn meal. Then came the ready cooked breakfast foods. We have today many varieties of breakfast foods which, however, fall into three main groups: (1) those prepared by grinding the grain only, (2) those steamed or partly or wholly cooked and then rolled into flakes, and (3) those containing malted grains in which the malt is supposed to effect a chemical change in the starch which the food contains, thus making it more digestible. (2)

From the first, the making of these breakfast foods was closely allied to the making of whole wheat flours. The conflict with the millers which this involved will be taken up in a later chapter.

(1). Northwestern Miller, Oct. 21, 1898, p. 695.

(2). Woods and Snyder, Cereal Breakfast Foods, p. 1.

Our present purpose is to show the growth of the industry in Minneapolis. Three names are associated with that development--those of Pettijohn, Fruen, and Cream of Wheat.

W. A. Pettijohn was the son of a pioneer Minnesota miller. It is claimed that he originated many of the present-day cereal foods as a result of association with the Indians, watching them crack the grains and parch them over their camp fires. It is claimed that he made the first rolled wheat, eliminating the husks by rubbing the grain in his hands, steaming the grains, and then rolling them into flakes with an ordinary kitchen rolling-pin. In 1890, he organized the Pettijohn Breakfast Food Company in Minneapolis. Their first mill was on Nicollet Island, but in 1892 they purchased the old Model Mill and moved into the milling district. The rolled wheat, made from a soft, yellow wheat raised on the Pacific Coast, was a great success. But friction within the company forced Pettijohn's withdrawal, and then in 1893 the company sold its brands and trademarks and leased its plant to a new cereal combine, called the American Cereal Company. The later history of the plant is obscure, but, apparently, it was not operated very long. The brands and trademarks were in 1906 acquired by the Quaker Oats Company, and since that time that Company has been making and advertising Pettijohn's Rolled Wheat. Mr. Pettijohn, after some years of obscurity, came back into the business about two years ago when the Pettijohn Pure Products Company was organized. The company makes various cereal products

- (1). Pettijohn Pure Products Co., The Pettijohn Profit Book, pp. 10-11.
- (2). Northwestern Miller, Nov. 17, 1893, p. 711.
- (3). Conversation with a member of a cereal firm.
- (4). Moody's Manual, 1919, p. 1688.

such as parched wheat, corn meal, and pancake flour, but not rolled wheat. Any effort to do so would presumably provoke an interesting lawsuit for the possession of the Pettijohn brand.

Another pioneer in the cereal business of Minneapolis is William Henry Fruen who started his factory in 1894 and has operated it continuously since that time. The Fruen Cereal Company makes breakfast foods both of the granulated and the rolled varieties, using not only wheat but barley, rye, and corn meal as well. All of these cereals are the home grown varieties except the wheat. For rolled wheat, it is said the very best variety is the Sonora of the Pacific coast. In addition to the breakfast foods, the Fruen company also produces a great deal of whole wheat flour.

So far as these companies were making products such as pancake flour, for which they secured the raw materials from the flour mills, Minneapolis was a natural center for the industry. But most of their products are such as rolled wheat, pearled barley, etc., in which the grain itself is the raw material and the machinery and processes are quite different from flour milling. Since most of the companies make whole wheat flour, they come into direct conflict with the flour mills. There is only one company which is completely dependent on the flour mills for the materials for its only product. This is the Cream of Wheat Company.

This company originated in Grand Forks; but, after a brief experience there, came to Minneapolis in 1897. Since then, with the help of a great advertising campaign, it has built up a nation-wide

(1). The Country Grain Shipper, April, 1918, History of the Fruen Cereal Company.

(2). Conversation with a member of the Pettijohn Pure Products Co.

(1)
market for its product. The Cream of Wheat Company has no mills but
buys its product from the flour mills of the city. (1)

These three companies are the only companies in Minneapolis who manufacture cereals as their principal business. As we shall see in a later chapter, the demand for cereals other than wheat, which was an outgrowth of war conditions, caused many of the flour mills to go into this line of business. The growth in the future is more than likely to be in that direction rather than in the development of new breakfast food companies.

Summing it up, one is surprised to find that there has been so little direct influence of flour-milling on the manufacturing growth of Minneapolis. It was inevitable that the requirements of the mills in the matter of flour containers should be met by local factories. One would have expected, also, to see the production of flour-milling machinery concentrated in Minneapolis, but milling supremacy came at a date when the manufacture of flour-milling machinery was already firmly established elsewhere. Again, one might have expected the city to be a great center for the manufacture of farm machinery, but early attempts to establish such industries ended in failure. (2) In the last twenty years, more progress has been made. The brief prepared for the Federal Farm Loan Board lists fifty-one manufacturing firms, twenty-one wholesalers, thirty-nine Northwestern distributors, and nine Minnesota distributors of farm implements in Minneapolis. (3) How far this concentration is due to the

- (1). Conversation with a member of the Cream of Wheat Company.
(2). For example, the Minneapolis Harvester Works, Hudson, Half Century of Minneapolis, p. 252.
(3). Minneapolis Civic and Commerce Association, Minneapolis: The Market of the Northwest, p. 93.

presence of the mills and how far to other causes, it is difficult to say. At any rate, there is no evidence that the millers as a group have made much effort to bring other manufacturing plants to the city. It has been alleged by Minneapolis business men, in other lines of business, that the millers as a group refused to support their efforts to bring industries to Minneapolis because they were too self-centered to see the desirability of building up these industries. It is more probable that they realized the lack of mechanical ability in the city and knew the difficulties which such enterprises would encounter in getting a labor supply.

Conclusions from this part of our study must be mainly negative. The millers and the mills did not build up the manufacturing industries of the city directly, except in the case of the bag and barrel factories, the milling machinery firms, and the cereal products companies. The growth of the grain market ^{not} came because of the mills, but, to a considerable extent, in spite of the millers. It was only as members of the Chamber of Commerce that they helped build that structure. The concentration of milling in Minneapolis seems to have arrested the growth of the country mills during the decade of the seventies, but it has not sufficed to stop their growth since that time.

Chapter VII. DEVELOPMENT OF THE MINNEAPOLIS MILLS AFTER 1891.

18. Improvements in Machinery.

After 1891, there are no such great changes in the internal economy of the flour mills as took place in the previous twenty years. The most important and striking developments have to do rather with the question of markets and the competition with other milling centers. Nevertheless, there were a number of important changes in milling methods and tendencies which deserve study.

First of all, the improvements in milling machinery should be considered. The gradual reduction process, which had come into general use in the Minneapolis mills by 1891, involved a complication of the bolting machinery of the mill. The meal or chop coming from a set of rolls contains a mixture of bran, middlings, and flour particles of varying sizes. If, after the bran has been separated, this stock is sent through the next set of rolls, the results will not be satisfactory. The particles smaller in size than the distance between the rolls, will pass through untouched. Or, if the rolls be set close enough to catch everything, the larger particles will be broken down too violently, thus injuring the quality of the flour and also consuming^s great deal of power because great pressure is made necessary. Thus, sifting and bolting are necessary, not only to separate the bran and flour from the rest of the meal, but to grade the particles of the chop according to size. Hence, the modern mill is distinguished from the older one chiefly by the much larger proportion of bolting machinery that it contains.

(1). Kozmin, Flour Milling, pp. 316-317.

It has been shown that the introduction of the middlings purifier found the old hexagonal and cylindrical reels quite unequal to this task; and that, therefore, the centrifugal reel was introduced. The older reels had relied on gravity to force the flour particles through the bolting cloth; the centrifugal used beaters to force them through. On the older reels, ⁽¹⁾ only part of the surface was in use at a time while the centrifugal utilized the whole working surface all the time. In consequence, the centrifugal reel was smaller and occupied less space, used less power to operate, and still had a capacity of five times the ordinary reel. ⁽²⁾ For the separations following the first three breaks, the centrifugal, in one form or another, is still in common use.

For the separations following the use of smooth or reduction rolls, that is, the reduction of the middlings, the centrifugal has been largely replaced by a new type of bolter called the plansifter. The machines now in use trace their origin back to a flat sieve bolter invented by Karl Haggemacher in 1888; ⁽³⁾ plansifters seem to have been in common use in the United States in the early nineties and to have attained their present form after the introduction of Wilson's machine, patented in 1900. ⁽⁴⁾ In these plansifters, square or cylindrical boxes containing a series of sieves are given a gyratory motion while various arrangements of "tappers" or brushes assist the bolting by keeping the meshes of the cloth open.

For the reduction of middlings and the final bolting of

(1). See above, Chapter III, p. 51

(2). Kozmin, Flour Milling, pp. 342-343.

(3). Ibid., p. 68; Modern Miller, Jan. 5, 1903, p. 3, advertisement by Barnard and Leas.

(4). Ladd, Patents in Relation to Manufactures, U. S. Census, 1900, vol. X, p. 771.

the flour, the plansifter has several advantages over the reel. It occupies less space, has greater capacity, and does better work. Experiments of German millers as early as 1889 indicated that the plansifter was fully fifty per cent more efficient than the reel in separating flour from the middlings. The plansifter is now made in a great variety of forms and sizes, but its advantages over the cylindrical bolter for this type of work has brought it into common use in all the larger mills.

19. Changes in Milling Technique. Testing the Flour.

Even more important than these changes in milling machinery was the development of scientific milling methods as represented in wheat and flour testing. The old time miller had no scientific training. He brought the dryest, hardest, and plumpest wheat he could get at the lowest price. Then he ground out of it the largest possible quantity of flour. If his product varied greatly in strength and quality at different times, he did not analyze the situation any farther than to blame it on the wheat.

The multiple reduction system forced the miller to study, not only his methods of manufacture, but his product and his raw materials as well. Thus, scientific milling had its beginning. C. A. Pillsbury seems to have been a pioneer in adopting the new methods, especially in the case of wheat testing. In 1889, it was said that he had two men constantly employed in testing wheat as it came into his mills. By means of these tests, he was able to determine what percentage of the lower grades of wheat might be mixed with the higher to attain a certain standard of strength.

(1). Kozmin, Flour Milling, p. 390.

(2). Northwestern Miller, Nov. 8, 1889, p. 515.

Now strength and quality of flour are not synonymous. A flour of high quality for pastry and cakes is a low-strength flour, while a flour to be used to make bread or to mix with other flours must be of high strength or it is not of high quality. For bread-making, a strong flour is needed because it will give a light bread and absorb much water. This is a special advantage to the baker who sells his bread by weight. For household purposes, where only one kind of flour is used, one of medium strength is preferred, a flour which will make good bread and can also be used for biscuits and pastry. Very strong flour makes these tough and indigestible, consequently, bakers who specialize in pastry prefer a flour of very low strength. For cereals, a wheat with round, plump kernels, which will make large flakes, and which contains much gluten, is preferred; for macaroni, a hard, glutinous wheat is demanded.

The country buyers of wheat judge it by external appearance only. Wheat grades are, therefore, established in which the wheat is ranked according to its hardness, the plumpness of the kernels, and the color. The limitations of such grading are obvious, but it was not until the Howard Wheat and Flour Testing Laboratory was established in Minneapolis that the mills began to test their wheat as it was delivered to them, to determine the percentage of moisture and acidity, of carbohydrates and nitrogenous compounds, which it contained.

Their work did not end at that point. Flour buyers also judged flour by external appearance, estimating the value by its

(1). Saunders, Quality in Wheat, p. 8.

(2). Ibid., pp. 8-9.

(3). Millers' Almanack, 1919-20, pp. 176-177. 'The Chemistry of Wheat and Flour at a Glance': Minneapolis Chamber of Commerce, Historical Sketch, p. 26.

(1)

granularity or softness, its color and odor. But these tests are of slight value in comparison with those worked out in the laboratory.

(2)

In every mill the miller now makes an hourly "Pekar" test. In this, a quantity of flour is placed on a glass plate beside a type sample of flour furnished by the laboratory. The miller smooths the flour

with his spatula, dips it into water, and then bakes it in an electric oven.

(3)

By close observation, he is able to distinguish comparatively slight differences in color and texture and thus determine

whether or not the flour he is making is up to the standard. The

large mills now have their own flour-testers, bakers, and chemists,

(4)

and a complete laboratory and bakery. Their expert flour-testers

collect samples of the day's run and test the flour as to its color, doughing properties, texture, volume, and water absorption, and com*

pare the results with those of the previous day or week. They keep

(5)

a daily record of these tests. Various delicate instruments have

been invented to facilitate this work, such as the aleurometer which

(6)

measures the expansive force of the gluten. The chemists supervise

the work of the flour-testers and work out the special problems hav-

ing to do with the improvement of the quality of the product. The

laboratory also includes a complete bakery, for each lot of flour must

be tested as to its baking qualities; and the color of the loaf, its

shape, texture, odor, volume, and weight must be noted, as well as the

(7)

number of loaves it will yield per barrel. At least one of the mills

- (1). Saunders, Quality in Wheat, p. 10.
- (2). So called after the inventor, a Hungarian scientist.
- (3). Milling, vol. V, pp. 124-127.
- (4). Washburn-Crosby Co., Wheat and Flour Primer, p. 11.
- (5). Minneapolis Survey, p. 333.
- (6). Saunders, Quality in Wheat, p. 10.
- (7). Millers' Almanack, 1919-20, pp. 176-177.

has gone still farther and erected a six-hundred barrel experimental mill to be used by the testing department.⁽¹⁾

20. Flour Bleaching.

Probably the most important change in flour-making processes was the development of flour bleaching. In the early days, the flour, when finished, was stored for three or four months. This "was believed to mature the gluten in some way so that its bread-making qualities were enhanced," but, in addition, the flour lost, during the process, its natural yellow color and became pure white.⁽²⁾ Gradually, the public became so accustomed to the color that they judged the quality of the flour by it. By the time the roller process was introduced, the flour dealers were demanding the whitest possible flour for their best trade.

For some years the millers continued to store their flour to age and to whiten. This required large warehouses and tied up a great deal of capital in the manufactured product. As large-scale production, strong competition, and price-cutting increased, the millers found this more and more of a burden. The remedy for this state of things was found in the artificial bleaching of the flour.

In England, a patent for a bleaching process was issued as early as 1879.⁽³⁾ There are reports of the use of artificial bleaching apparatus in the United States as early as 1884.⁽⁴⁾ But the practice did not become important in this country until after the issuing of

(1). Washburn-Crosby Co., Wheat and Flour Primer, p. 10.

(2). Hale, The Bleaching of Flour, p. 5.

(3). Ibid., p. 5.

(4). American Miller, vol. XII, p. 21.- "The Millers' Review says its knowledge is positive that one mill bleaches its flour by passing a strong vapor over it."

(1)

the Alsop patent in 1904. The economies resulting from its use, in lessened expense of storage, together with the public demand for a pure, white flour, resulted in its almost universal adoption in a few years. Only recently the Alsop Process Company, in an advertisement, claimed that their process is "almost universally recognized as being indispensable to good milling."⁽²⁾

The essential feature of this process is an air-pump arrangement, in which electric sparks, generated within a glass tube, form nitrogen dioxide out of the air in the tube. This, mixed with an excess of air, is then pumped into an oblong drum, within which the flour is kept in constant motion, by a system of beaters. Thus, the flour is so stirred that every particle comes into contact with the nitrogen dioxide which is said to decolorize the coloring substance contained in the fat of the wheat. The flour does not remain in the drum more than perhaps ninety seconds, but it comes out whiter than any naturally bleached flour.⁽³⁾

Except as regards whiteness, the process did not alter the physical properties of the flour. The general public used the artificially bleached product without suspecting the change. But, as has been pointed out, there had developed in this period some vigorous critics of patent flour.⁽⁴⁾ These men were alert to take advantage of any opening for attack. In 1906, Messrs. E. F. Ladd and R. E. Stallings, food commissioners of North Dakota, published what the North-

(1). Northwestern Miller, Dec. 24, 1919, p. 1375. Advertisement of the Alsop Company. But, as a fact, the largest Minneapolis mills have discarded the Alsop for the Chlorine process which is cheaper and just as effective. Conversation with an expert baker.

(2). Advertisements of the Alsop Process Co., Northwestern Miller,

(3). Kozmin, Flour Milling, pp. 480-482. (1915-16-17, etc.)

(4). See above, Chapter. VII, p.

(1)

western Miller called "a vicious attack" on white flour. Their experiments were followed by others. It was claimed that the acidity of the flour was increased, its bread-making qualities lessened, and the digestibility of the glutens and starches decreased by artificial bleaching. Experiments on animals, it was claimed, showed that the artificially bleached flours, especially if they were slightly over-

(2)

bleached, had a markedly toxic effect. From these facts, it was argued that the artificially bleached flour was unfit for human consumption. On the other hand, there were investigators, both in this country and in Europe, who denied these contentions and claimed that

(3)

no injurious consequences resulted from artificial bleaching.

Sufficient sentiment had been stirred up so that Congress, in 1906, was induced to put into the Pure Food And Drugs Act certain provisions for the regulation of flour-milling and flour-selling. Artificially bleached flours must be labelled to show that they were bleached, and the bleaching agency must be printed on the label. If this agency was likely to prove harmful or injurious, the flour so bleached might be barred from interstate commerce altogether. Blended flours must hereafter be marked "blended" or be barred from interstate trade. Blended flours must also show the proportions of the various ingredients, for example, "self-raising" or "pancake" flour must show just what proportions of wheat flour, baking-powder, and powdered buttermilk they contain. Imitations must show not only

(4)

(1). Northwestern Miller, Dec. 28, 1906; Ladd and Stallings, 'Bleaching of Flour', No. Dak. Agr. Exp. Station, Bulletin 72, pp. 219-236.
 (2). Hale, The Bleaching of Flour, p. 7.
 (3). Snyder, 'Flour Bleaching', Minn. Agr. Exp. Station Bulletin, 111, pp. 101-143; Kozmin, Flour Milling, pp. 486-488.
 (4). Northwestern Miller, Oct. 31, 1906, p. 290.

the character of the ingredients and also that they were put up to imitate flour.

Certain clauses of the law were quite acceptable to the millers, as, for example, the clause forbidding false labelling. A flour could no longer be labelled Minnesota Spring Wheat Flour unless actually made from ⁽¹⁾spring wheat grown in Minnesota. But, on the whole, they were much dissatisfied. They felt that the law placed too much power in the hands of the Secretary of Agriculture and his Chief Chemist. The latter office was held by Dr. Wiley, whom the millers considered unfriendly because he had publicly expressed a prejudice against white flour. They contended that artificial bleaching was not harmful, that they had invested a great deal of money in bleaching apparatus because the public demanded white flour, and that there should be the clearest and most convincing scientific proof of the harmfulness of the process before the artificially bleached flours ⁽²⁾were condemned.

Various other studies were made after 1906 which tended to show that the artificially bleached flours were harmful. The most notable was that of Hale of the Hygienic Laboratory, Public Health Service of the Treasury Department, made in 1910. His conclusion, as the result of a number of experiments, was that a deleterious action resulted from artificial bleaching "because of the lessened digestibility of the gluten of such flour, and possibly also because of the ⁽³⁾presence in bleached flours of small amounts of nitrites. The agitation against the white flours increased; and, as a result, many of

(1). Northwestern Miller, Oct. 31, 1906, p. 298.

(2). Ibid., Nov. 7, 1906, p. 368.

(3). Hale, The Bleaching of Flour, p. 39.

the states passed laws regarding the sale of the flour. North Dakota, Wisconsin, and Pennsylvania forbade the sale of the bleached product altogether; most of the states confined themselves to applying the provisions of the national law to commodities within the state not subject to national jurisdiction. In six states, there is no law on the subject in the statute-books; in three, as we have said, the bleached flour is barred out altogether; in all the rest, the bleached flour can be transported and sold only when labelled "bleached."⁽¹⁾

Matters ran along until 1910 at which time the government undertook to prevent interstate commerce in bleached flour altogether. A shipment of flour from the Lexington Mill Company of Lexington, Nebraska, was seized in Missouri by government inspectors on the ground that the flour was adulterated and misbranded in violation of the Pure Food and Drugs Act. The case came to trial before Judge McPherson in the United States court at Kansas City. The millers admitted that nitrites were added to the flour as a result of artificial bleaching but claimed that there was no reasonable probability of their being injurious to health. The trial judge ruled, however, that the government needed only to show the presence of poisonous substances resulting from the bleaching, no matter how minute the quantities. Accordingly, the case was decided against the defendants. The millers, through their national association, then carried the case into the higher courts, and in 1914 the Supreme Court finally gave a decision in their favor. The Court upheld their contention that no injurious effects from the use of the bleached flours had

(1). Millers' Almanack, 1919-20, pp. 68-69.

been proven; and, therefore, bleached flours could not be barred from interstate commerce. (1)

There remained only the law compelling bleached flours to be so labelled on the sack, and this soon became a dead letter. Some of the mills have endeavored faithfully to observe it, which meant, practically, to refrain from bleaching; others paid no attention to the law. Those who obeyed found that their customers insisted on a whiter flour than they could produce by natural bleaching; willingly or unwillingly, most of them fell in line, and today it is safe to say that practically all the Minneapolis mills bleach their flour by some artificial means. As a matter of fact, there seems no reason why they should not. The public demands a whiter flour than anything but artificial bleaching will produce. Bleaching eliminates a long drawn out and expensive aging process. The deleterious effects, if any exist, are too slight to deserve special mention or to make any impression on the consumers. (2)

21. Specialized Products.

We turn now from milling methods to milling products. In 1884, the editor of the American Miller criticized American millers for their concentration on wheat milling to the exclusion of the milling of other grains. He believed that there was money to be made from grinding oatmeal, buckwheat flour, rye flour, and corn meal. (3) Such concentration on wheat milling undoubtedly existed at Minneapolis.

(1). Northwestern Miller, Feb. 25, 1914, p. 447; Bengtson and Griffith, The Wheat Industry, pp. 161-163.

(2). Conversation with an expert baker of Minneapolis.

(3). American Miller, vol. XII, p. 361.

lis then. As late as 1896, the Annual list of mills does not contain the name of a single rye, corn, or cereal mill. ⁽¹⁾ There were probably some mills manufacturing such products at that time, but apparently they were of too slight importance to deserve mention, possibly, because they produced only for the local market. Certainly, none of the great companies had mills especially devoted to grinding such products.

The Pillsbury mills seem to have been the first in Minneapolis to break away from straight wheat milling. In 1900, the Northwestern Miller described the new oatmeal mill which they had just installed and which was said to be a new departure for Minneapolis. ⁽²⁾ There were then three mills in the city grinding some cornmeal, rye, flour, and kindred products. Soon after this, the Pillsbury company seems to have gone into the breakfast food field with a product called Vitos.

The enterprise was short-lived and gained no imitators among the millers of the city. In the year following, the oatmeal and Vitos plants were put into a combination known as the Great Western Cereal Company. ⁽³⁾ One difficulty was that the millers were at this time at war with the breakfast food people. The latter were putting out advertising in which they claimed that the new cereals were taking the place of bread and flour and that, therefore, the latter would soon cease to exist. ⁽⁴⁾ The millers retaliated by getting men of scientific reputation to analyze the breakfast foods and expose the exaggerations

(1). Minneapolis Chamber of Commerce, Annual Report, 1896, p. 113.

(2). Northwestern Miller, Sept. 26, 1900, p. 635.

(3). Modern Miller, Apr. 20, 1901, p. 14. Both the Great Western Cereal Company and the American Cereal Company which bought out the Pettijohn factory (see Chapter VI, p. 142) were later absorbed by the Quaker Oats Company. Moody's Manual, 1919, p. 1688.

(4). Northwestern Miller, Sept. 30, 1902, p. 473.

and falsehoods in their claims. They, in turn, were confident that the new health foods would soon cease to exist. Under the circumstances, to put out cereal foods was, for the millers, to put themselves in a false position. Possibly, too, they found it more profitable to sell the products which would ordinarily have gone into cereal foods, to such companies as the Cream of Wheat. At any rate, none of the flour mills followed Pillsbury into that field. It is only recently that a number of new mills have been erected that combine the two businesses; since then, all the larger mills have begun to diversify their products.

Why the millers did not manufacture flours other than wheat is not clear. It was not until 1909 that the Washburn-Crosby Company began the manufacture of rye flour, and their rye mill was the only one in the field for seven years. But the great War brought about new conditions. The increase in wheat-flour prices, and the foreign demand, encouraged the manufacture of corn, rye, and barley flour, as well as graham and whole-wheat. The Food Administration regulations of January, 1918, which compelled the purchase of a pound of "substitute" for every pound of wheat flour, increased this demand still more. As a result, there was a large increase in the milling capacity devoted to other ^{than} wheat flours. From 1891 to 1907 there had been enlargements and extensions of the old mills but only one new mill--that of the George C. Christian Company, built in 1900. In 1907 the Russell-Miller Company, a corporation owning several interior or country mills, and also a mill at Duluth, had invaded the Minneapolis territory and built a 2,500 barrel mill. Then there was no more mill building until 1914. In that year, the Yerxa, Andrews and Thurston Company built the Nokomis mill which is exclusively devoted

(1)

to the milling of durum wheat. These mills, it should be noted in passing, are outside of the old milling district. The supply of water power and sites there seem to be exhausted.

The war years brought several new mills. In 1916, the Washburn-Crosby Company refitted the old North Star Mill to grind rye flour. In the same year, the Pillsbury company acquired the Phoenix Mill on the east side and turned it into a rye mill. In 1917, the Clark Milling Company built a 1500-barrel mill devoted to the manufacture of whole-wheat, graham flour, rye, corn meal, and other cereals. In 1915, the Atkinson Milling Company added a 1000-barrel mill to the list of wheat flour producers. In five years the daily capacity of the mills of the city was increased from 80,460 barrels to 97,460.

(2)

Thus, a certain specialization in milling products has begun, although patent flour still is the most important product. Some companies have gone still farther. The Pillsbury Company advertises a "Family of Foods" which includes their Health Bran, Pancake Flour, Wheat Cereal, their Pillsbury's Best Wheat flour, and Rye, Graham, and Macaroni flours. In addition to these foods, the sale of the offals as food for animals is constantly increasing in importance. It would seem that at this point there is room for considerable improvement. The millers are probably getting from the wheat all that is fit for human food. But they have not made any efforts to develop commercial products from the offals. Snyder suggested some years ago that a valuable oil could be obtained from the germ of the wheat,

(1). For new mills, see List of Minneapolis Mills, Appendix, . . . for the Food Administration regulations, pp. 16-5 of this chapter.

(2). See List of Minneapolis Mill, Appendix.

and also that the offals could be economically used for the production
(1)
of starch. But, as yet, nothing has been done to follow up these
suggestions.

Nor have the millers pushed the sale of their products as
stock food as much as they should, so that special stock foods have,
to a considerable extent, displaced their shorts and bran on the mar-
ket, although sold at higher prices. The miller should be more care-
ful about packing, should try to establish the quality of his bran
and shorts in the public mind just as he did his flour. He should
urge the farmers in the wheat-growing district to buy mill-feeds so
that their products will go back to the land as fertilizer. Thus,
the decline of wheat growing will be arrested, for wheat is not a
soil-exhausting crop under proper conditions.

22. The War and the Mills.

The years 1914 to 1917 were prosperous ones for the Min-
neapolis millers. There was, as we have shown, a great increase in
milling capacity and a diversification of milling as well. The
price of patent flour more than doubled, crops were good, and in 1916
(2)
the wheat receipts at Minneapolis broke all records.

(1) Snyder, 'The By-Products of Flour', Northwestern Miller, June 8, 1904,
p. 535.
(2). Minneapolis Milling Statistics, 1914-1919, Minneapolis Chamber
of Commerce, Annual Reports.

Year	Daily Capacity	Annual Output	Av. Price Patent Flour	Wheat Receipts (Crop of Preceding Year).
1914	80,460 bbls.	17,769,280	5.10 per bbl.	106,006,610 bus.
1915	79,260	18,089,195	6.66	109,981,320
1916	91,560	18,541,650	7.09	170,208,650
1917	93,160	17,610,845	11.34	111,097,230
1918	93,610	14,413,830	11.11½*	90,827,180
1919	97,460	17,500,890	12.	118,034,130

* Standard Victory Flour.

In April, 1917, the United States entered the war. Prices, already high, soared still higher. In May, wheat was \$3.25 a bushel (1) in New York City and flour \$14.00 a barrel. The government decided to take matters in hand, and in June a committee of the Millers' National Federation was called to Washington to confer with Mr. Hoover, already (unofficially) designated as Food Administrator. Of (2) this committee, J. F. Bell of the Washburn-Crosby was chairman and Mr. A. C. Loring of the Pillsbury Company was a member. At this conference, it was agreed that the millers of the country were to become members of the Food Administration and to co-operate with, rather than be regulated by it. Thus, the industry was to be largely self controlled and still responsive to the country's needs. In August, the Milling Division of the Food Administration was established. Mr. Bell was made chairman and the millers' committee, considerably enlarged, constituted its membership. In September, general food conservation was begun. In October, all persons engaged in the manufacture, storage, or distribution of foodstuffs were required to take out a federal license. In December, the Food Administration ordered a single grade or standard flour to be manufactured. The millers were to use not more than two hundred and sixty-four pounds of wheat for a barrel of flour. Five per cent of the product might be separated and sold as low grade; they were forbidden to separate or grade the rest.

All these regulations were made necessary by the need of

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- (1). Millers' Almanack, 1919-20, p. 10.
 - (2). Northwestern Miller, July 3, 1918, p. 35.
 - (3). Ibid., July 3, 1918, p. 35.

finding an exportable surplus to supply the Allied nations. The crop of 1917 was a failure in large sections of the country, but especially in the spring wheat territory; and this made more restric-

(1)

tions necessary. In January, 1918, the President called on all the mills to furnish thirty per cent of their output to the Government.

All purchasers of wheat flour were required to buy substitutes with their wheat flour in a proportionate amount. In February, the price of wheat for the 1918 crop was fixed by presidential proclamation on

(2)

a basis of \$2.20 per bushel at Chicago.

From then on, the Northwestern millers have been working under adverse conditions. The 1916 crop was much smaller than that of the preceding year so that Minneapolis flour production dropped off nearly a million barrels in 1917. The 1917 crop was not only smaller in quantity but decidedly poorer in quality. The milling regulation requiring a barrel of flour from each 264 pounds of wheat was, therefore, doubly hard on the Northwestern millers; and, in consequence, Minneapolis production dropped off over three million barrels

(3)

in 1918.

As the full extent of the emergency became clearer, the

(4)

Food Administration regulations became more severe. In January, 1918, as has been said, the substitute rule was made. The retailer and consumer were required to buy a pound of substitutes with every pound of wheat flour. Millers were forbidden to sell to any customer more than seventy per cent of the amount sold him the previous year, and the soliciting of new business was practically prohibited. In February, the Food Administration inaugurated a system of bread ration-

(1). Northwestern Miller, June 12, 1918, p. 851.

(2). Millers' Almanack, 1912-13, pp. 32-33.

(3). Ibid., pp. 32-33; see above, p. 161 for the receipts at Minneapolis; no figures for the total spring wheat crop are available.

(4). Millers' Almanack, 1919-20, pp. 32-33.

ing for hotels, restaurants, and dining-cars. In March, the privilege of separating five per cent of the flour as low grade was withdrawn, and all millers were required to produce a "100 per cent flour", which meant an actual extraction of about 74 per cent of the wheat-berry. In the same month, the milling division announced that efforts must be made to cut in half the home consumption of wheat for the rest of the crop year. When the new crop began to come onto the market, there was less than ten days supply of wheat in the country, so close had been the figuring. But the Food Administration could announce that instead of the 20,000,000 bushels which we had promised our Allies, over 120,000,000 had actually been shipped. (1)

The 1918 crop was large enough to relieve the strain of the situation. The Milling Division, which was, as we have seen, a committee of the leading millers of the country, now resigned in a body; and the regulation of the mills was transferred to the United States Grain Corporation of which Mr. Julius H. Barnes of Duluth was the head. (2) New regulations for the flour trade were issued in July. (3) The main changes were in the establishment of a schedule of "fair prices" for flour, whereas, up to this time, the millers had been allowed to fix their own prices with but the one limitation that their profits must not exceed twenty-five cents per barrel.

On the whole, the millers have been more dissatisfied since the change was made. At first, the Grain Corporation exported wheat instead of flour, but the complaints of the millers forced them to

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- (1). Millers' Almanack, 1919-20, pp. 33-34.
 - (2). Northwestern Miller, July 3, 1918, p. 35.
 - (3). Millers' Almanack, 1919-20, pp. 32-33.

change this policy; and, in November, 1918, the Corporation announced that it had bought 1,500,000 barrels of flour for export in a single day. The substitute rule did not prove a success, so that in August the Food Administration proposed that Congress be asked to suspend the Mixed Flour Law for the duration of the war so that the millers could mix the substitutes into the wheat flour at the mill. This met with the strongest opposition on the part of the millers and was finally dropped.

In November, the signing of the Armistice caused a relaxation of regulations. The substitute rule was dropped, and most of the regulations were cancelled in the following months. But the activities of the Grain Corporation as a buyer and seller of flour continued. The winter wheat crop of 1918 was enormous; the spring wheat crop only fairly good. Consequently, there was a large difference in the price of the two wheats and the corresponding flours. The Grain Corporation thought this difference too great, and, having large stocks of winter wheat flour on hand, began a campaign of advertising and special offers to sell this flour, not only to sell the extensive stocks of flour on hand, but, according to the spring wheat millers, to send down the price of spring wheat flour.

(1). The public did not take kindly to the substitute rule, and a good deal of the substitute flour was wasted. Moreover, they deteriorated rapidly so that the millers soon accumulated "a vast quantity of unmarketable substitutes." Millers' Almanack, 1919-20, p. 35.

(2). Coe, 'What is the Matter with Wheat', Minneapolis Tribune, Feb. 26, 1920. Mr. Coe is a miller of Kensington, Minn.

(3). Northwestern Miller, Sept. 18, 1918, p. 977.

(4). Ibid.; Minneapolis Journal, Mar. 9, 1920, Interview with Julius H. Barnes.

The millers had obtained good prices for their product during 1919, but in the spring of 1920, due to these activities of the Grain Corporation, it was claimed, prices dropped; and many mills were forced to shut down or run part time. Undoubtedly, there were other causes for this. The spring wheat crop of 1919 was again poor in quality, and many of the mills were forced to bring in large quantities of hard winter wheat to keep up the standard of their flour. The derangement of the transportation system made it difficult to get cars. But, admitting these things, the spring wheat millers still feel that they have been discriminated against by the Grain Corporation and that this is the principal cause of their troubles.

The Minneapolis mills have shared in the general depression of the spring wheat mills. In 1919, they operated to about sixty per cent of their capacity. Even more than the interior mills, they found difficulty in getting a wheat supply from the 1919 crop so that it is said they were using at the beginning of the new crop fully seventy per cent of winter wheat in their flour. But their production in 1919 once more exceeded seventeen million barrels. Millers, newspaper men, and bankers are all urging the planting of an increased acreage of spring wheat in 1920, and a bumper crop may enable the Minneapolis mills to set a new record of production.

These, with a single exception to be taken up later, have been the important developments since 1891. There have been few changes in the outward appearance of the milling district. The machinery in the mills, excepting on the bolting floors, is much the same. There have been refinements, of course, such as an increased

(1). Coe, 'What is the Matter with Wheat', Minneapolis Tribune, Feb. 26, 1920.

use of ball-bearings in the rolls, but in the main the machinery of the mills is not so very different from what it was in 1891. Even on the packing and loading floors where one might expect to find great changes, little has been done. The packers are almost unchanged. Sack sewers have been introduced for the smaller packages, but the larger ones are still sewed by hand. An automatic packer which weighs the flour has been tried in some of the mills but with indifferent success. The loading of the cars--the transporting of the flour from the packers to the cars--is still purely hand labor. The power plant has changed somewhat because all the large mills have been forced to supplement their water power with steam. --in one case, (1) at least, with electric power generated at Coon Creek, just north of Minneapolis on the Mississippi river, or at St. Croix Falls on the St. Croix River. (2) The products of the mill are still such the same, though the best patent flours may be somewhat finer and whiter because of the use of artificial bleaching. The miller no longer confines himself to the one product, but sells a considerable variety of other-than-wheat flours.

Perhaps the greatest change is in the miller himself. The "dusty miller" of olden times exists no more. The miller of today spends very little time at the mill. He may not even have a very thorough knowledge of milling processes. He is a merchant selling flour, and the whole trend of modern business development tends to emphasize marketing rather than manufacturing.

(1). Minneapolis Chamber of Commerce, Annual Report, 1898, p. 103, notes the fact that several mills have put in steam plants as supplementary power.
(2). "All the mills---are operated wholly or in part by the water power of the St. Anthony Falls, plus the electric power of St. Croix and Coon Creek." Minneapolis Civic and Commerce Association, Rail-Lake-Rail Rates, p. 12.

Chapter VIII. THE LABOR SITUATION IN THE MINNEAPOLIS MILLS.

27. The Labor Force of the Mills.

Flour-milling is exceptional in that it gives employment to a comparatively small number of men who produce a very valuable product. In 1914 the flour-mills ranked second among all the industries of the United States in cost of materials, and third in the value of the product, but only forty-second in the average number of wage-earners. ⁽¹⁾ In Minneapolis, the flour-mill product far exceeded that of every other industry in value, but in the number of wage-earners it ranked second. ⁽²⁾ Flour-milling processes have become so nearly automatic that but a comparatively small number of men are required for operation. Under the circumstances, labor and its problems must necessarily play a minor part in the development of Minneapolis milling.

After the revolution in milling methods in the period 1870-1891, there was but little increase in the labor force of the mills. The Northwestern Miller estimated that there were over two thousand employed in the mills in 1877. At the time of the strike ⁽³⁾ of 1903, the number of men employed in the mills was given as 2,193. ⁽⁴⁾

(1). Abstract of the Census of Manufactures, 1914, p. 26.
 (2). U. S. Census of Manufacturers, 1914, vol. I, pp. 750-753.

Statistics of Minneapolis Flour- and Grist- mills.

	No. of Estab.	Capital Invested	Av. No. of Wage-earners	Wages Paid	Raw Cost of Material	Val. of Product.
1914	19	\$25,557,000	2580	\$2,026,000	\$73,079,000	\$85,132,000
1909	13	19,869,000	2279	1,530,000	70,079,000	78,670,000
1904	12	19,489,000	2227	1,404,000	56,358,000	62,754,000
1899	11	14,306,000	2066	1,322,000	45,215,000	49,670,000

(3). Northwestern Miller, May 25, 1877.
 (4). Northwestern Miller, Oct. 14, 1903, p. 837.

These figures may have included office help and others who are excluded from the census figures given above. But even so, it is clear that there was little, if any, increase in the number of wage-earners in the mills from 1877 down to 1914. Since then, it seems, there has been a considerable increase, but there are no reliable figures available. Almost all of them are adult male workers, reflecting in this, the situation in the industry for the country as a whole.⁽¹⁾

The conditions of labor in the mills are fairly good. The machines are fed automatically, and the worker need only keep watch to see that they are properly adjusted. This work he can usually do without hurry or strain of any kind. It is only in the packing and loading of flour that one sees much hurry or any evidence of nervous tension. The noise of the machinery, particularly on the grinding floor, is apt to affect a visitor, but the men soon get used to it. In the wheat-storing and cleaning departments, there is a good deal of dust in the air, so that only men with strong, healthy lungs can work there, but these seem to thrive. While the machinery seems crowded into a very narrow space, it is, in all the mills, well protected, as a result of which, the mills make a very favorable showing in the accident statistics.⁽²⁾

The Minneapolis mills have been more progressive than the great majority of the country mills, in that they have adopted the eight-hour day. Three shifts are operated at the mills, the first working from 4:00 P. M. to midnight, the second from midnight to 8:00 A. M., and the third from 8:00 to 4:00 P. M. As in the country as a

(1). Abstract of the Census of Manufactures, 1914.

Out of the 41,736 wage earners only 533 were women, and only 80 were under sixteen years of age.

(2). Minneapolis Survey, p. 322.

(1)

whole, there is strikingly little seasonal variation. This is partly due to the nature of the business and partly due to a conscious effort on the part of the Minneapolis millers to carry as many of their men as possible through the slack season and so to decrease the labor turnover.

(2)

When men are discharged during the slack months, May, August, January, and February, every effort is made to retain the skilled laborers; the unskilled men, such as the coal passers, loaders,

(3)

being laid off.

A plant of several thousand barrels capacity consists of several "mills" or independent productive units, even tho housed in one building. These productive units are divided into (1) wheat storage, (2) wheat cleaning, (3) purifying, (4) testing, (5) packing, and (6) shipping departments. In addition to these, there are (7) the power and (8) maintenance and repair departments which do not differ essentially from similar departments in other lines of manufacture.

The relative number of men employed in each department may be gauged by the figures given below.

(4)

The wheat storage department unloads its wheat from the cars and stores it in the elevator. It employs sweepers, loaders, a loader forman, and an elevator foreman, the last-named being in charge.

- (1). Abstract of the Census of Manufactures, 1914, p.
- (2). Conversation with a journalist of the milling trade.
- (3). The Minneapolis Survey, p. 323.
- (4). The Minneapolis Survey (p.321) gives an estimate of the distribution of the men by occupations in the Minneapolis mills, based on a total of 1,941 men as follows:

Sweepers-142	Flour testers-7	Coal Passers-51
Loaders -466	Chemists-10	Millwright Helpers-59
Oilers-123	Bakers-2	Millwrights-12
Elevator Men-25	Packers-515	Machinists-20
Elevator foremen-50	Firemen 70	Plumbers and Steamfitters-24
Smitters-37	Engineers-37	Second Millers-15
Bolters and Grinders-181	Electricians-17	Head Millers-17
General Laborers-61 *		

*General Laborers include carpenters, plasters, etc.

The sweepers go about with brooms and brushes to sweep up the scattered grain, the loaders manipulate the wooden scoop which, drawn by cables, scoops the wheat from the car into the bins. The elevator man must have some mechanical skill because he looks after the machinery at the top of the elevator, and the loader foreman must have some of the qualities of leadership to boss a gang of six to ten men. But only the elevator foreman is really a skilled workman. To run the elevator properly, he must know the wheat grades, must have executive ability, and some mechanical ability as well. (1)

From the wheat storage department, the wheat goes to the wheat cleaning department. Here, besides sweepers, we find wheat cleaners or smutters and their helpers as the principal employees. In this department, the wheat passes automatically through a series of machines of varying types designed to remove different kinds of foreign matter. The smutter must inspect the wheat stock, as it passes through the machines. If any thing is seriously wrong, he calls the millwright. He must have a good deal of sense and judgement for this work but no particular skill. (2)

We come then to the most important department of all, the purifying or "bolting and grinding" department. Here, we find sweepers, oilers, heapers, grinders, and bolters as well as a second miller and a head miller. The oilers go about continually oiling the numerous bearings in the machinery of the mill. The grinder has charge of the rolls in which the wheat berry is reduced or crushed. He sets the rolls so that they will be just the right distance apart. If they are too close, the stock is ruined. If too far apart, the stock is too coarse and has to be ground over again. The grinder must see

(1). Minneapolis Survey, pp. 325-329.

(2). Ibid., pp. 329-330.

that the "head of wheat" in his mill is such as to provide an even flow; he must be able to inspect the stock and tell immediately whether anything is wrong. The bolter has charge of the sifting machines (1) in which the flour is sifted from the wheat stock after each reduction. He must see that the wheat stock comes to his machine in proper shape, that his bolting machine is working properly. The grinders and bolters are the most skilled and highest paid of the ordinary workmen of the mills.

The work of the smutters, grinders, and bolters is supervised by the second millers. The second miller must have a thorough knowledge of the processes and machinery of milling and must be able to instruct the men under him in their duties as well as manage them successfully. He must be able to keep records of the day's run, to figure up the amount of wheat used per barrel, etc. As his title indicates, he stands next to the head miller. The latter supervises the work of the mill, makes flour tests, etc. The position of head miller is the prize for which the most ambitious of the mill workers strive; and only long years of service, a thorough knowledge of the mill and its processes, and a demonstrated ability as a leader and as an executive, will enable a man to obtain it. (2)

From the bolters, the flour goes to the packers who fill the barrels and bags and transfer them to the truckers and loaders who load it into cars. Neither packers nor loaders require much special skill. However, these are about the only positions in the mill that test the physical strength and energy of the workers. Wages,

(1). Minneapolis Survey, pp. 330-331.

(2). Minneapolis Survey, pp. 332-333.

therefore, are relatively high. Before the flour has reached the packing floor, however, samples of it have been carried to the testing laboratory where the flour testers, the chemists, and the bakers have tried it out to see if it is up to the standard set by the mill. (1)

2^d. Early Labor Troubles in the Mills.

Labor difficulties, in the early days, were mostly with the coopers who were not directly connected with the milling industry. In July, 1876, for example, the Northwestern Miller records the fact that the coopers of the Minnetonka Mills had gone on strike, and had come to Minneapolis to induce the coopers there to do the same, but without success. (2) Nothing is said of the cause of the strike nor of its result. There are frequent references to difficulties with the coopers in the same decade. The problem was finally solved by the establishment of cooperative shops on which basis, the industry-now (3) badly declining in importance-is still operated.

The difficulties with the coopers may have tended to stir up troubles between the millers and their employees. In May, 1879, (4) the coopers were again on a strike. The millers had been planning to reduce wages, but when the men refused to accept the reduction, and (5) threatened to strike, the millers gave way. At the same time the flour-mill employees planned a sick-benefit and accident society which the Northwestern Miller highly approved of, inasmuch as the men

(1). Minneapolis Survey, pp. 333-334.

(2). Northwestern Miller, July, 18, 1876, p. 43.

(3). Ibid., Holiday Number, 1884, p. 69.

(4). For the cooperative cooper shops, see above, Chapter VI; Ibid., May 16, 1879, p. 298.

(5). Ibid., May 2, 1879, p. 270.

(1)
disclaimed any intention of making it a union.

Throughout the eighties, there seems to have been very little friction between the millers and the employees. Sometime during the decade, they were organized into three unions-(1) the flour-loaders, (2) the packers and nailers, (3) and the mill-operatives which included the rest of the skilled workers. In 1891, after a long period of industrial peace, came another strike. For some time the packer's and nailers' wages had varied considerably in the different mills. The union demanded an increase that would put them all on the same footing-\$2.25 per day for the nailers, and \$2.75 for the packers. The mill-owners, at first, refused to grant the increase, but when they found that the men were going to strike unless their demands were granted, three of the mills yielded. In the others, the men struck. It was a very busy season so the mill-owners had to yield. They gave the increased demanded, and the men came back, none of them having been out more than a half day. The mill-owners were dissat-

(1). Northwestern Miller, May 2, 1879, p. 270.
(2). Wages paid in the Minneapolis Mills, 1903-1920.

Bolters and Grinders	2.80	3.50	5.76
Smelters	1.80	1.92	4.64
Oilers	1.88	2.40	4.24
Sweepers	1.76	2.40	4.00-4.40
Packers	2.75	3.00	5.04
		(9hr)	
Truckers	2.00	2.50	4.40
	(10hr)	(10hr)	
Loaders	2.00	2.50	4.40
	(10hr)	(10hr)	
	(1903)	(1916)	(1920)

All wages are for an eight-hour day unless otherwise specified. Schedule of 1903, Northwestern Miller, Oct. 21, 1903, p. 891; of 1916, *ibid.*, July 25, 1916, p. 228; of 1920, obtained from representatives of the unions.

(3). Northwestern Miller, Aug 21, 1891, p. 268.

isfied, for they claimed they were paying higher wages than the work justified—too high in proportion to the wages paid other employees—and stated that the settlement was only temporary. The union had gained the upper hand, however, and the increase proved permanent. Some blamed the mill-owners for the trouble, asserting that they had been unnecessarily harsh in their treatment of the employees, especially in "docking" them for every minute not actually at work. Others regretted the trouble because relations between the millers and their employees had been generally pleasant. Some experiments were made with a piece-work plan for the packers and nailers. It was estimated that one crew consisting of two nailers and a packer, could pack 375 barrels of flour a day. One firm had tried doing their packing by contract, paying two and a half cents per barrel. On that basis, the men could make more money than on regular wages. The plan was soon abandoned, however. Apparently the millers felt that they were paying too much. (1)

For a decade following the strike of 1891, relations between the millers and their employees were cordial. Toward the end of the decade the men began to agitate for an eight-hour day, the mill-operatives leading the way. The mill-wrights had organized a union and they joined in the movement. Nothing came of it then, but in October 1902 the mill-operatives' union again demanded the eight-hour day with the same wages as before. They admitted that wages were relatively high in Minneapolis, but claimed that cost of living was high also. Their work was exhausting, especially in summer, because of (2)

(1). Northwestern Miller, Aug. 21, 1891, p. 268.

(2). Ibid., Dec. 19, 1900, p. 1196.

(3). Ibid., Oct. 1, 1902, p. 682.

the heat of the mills. The mill-owners answered that they were not responsible for the high cost of living. Flour prices had not gone up; on the contrary, severe competition had forced profits down almost to zero. They admitted the desirability of the eight-hour day, but claimed they could not compete on that basis with mills running
(1)
twelve hours.

After some discussion, a compromise was agreed on. The mill-operatives were to have the eight-hour day with bolters and grinders, who had been paid \$3.00 per day, getting thirty cents per hour, or \$2.80 for an eight-hour day. As soon as this was granted, the mill-wrights also asked for the eight-hour day. They had a strong union, but most of the members were employed otherwise than in the mill. When this was refused, they struck, but, after being out eight
(2)
days, surrendered and went back to work on the old terms.

It was at this time that the International Union of Flour and Cereal Mill Employees was founded. The organization was perfected in Minneapolis, and the officers were Minneapolis men. It took in the various local mill organizations and affiliated itself with the American Federation of Labor.

In July, 1903, the flour-loaders asked for the eight-hour day which had been granted to the mill-operatives. Their request was refused. They repeated it on September 14th, and it was again refused. They then consulted with the International Union officials and also secured the support of the mill-operatives' union and of the packers' union. Thus, the movement had the support of the greater part of the

(1). Northwestern Miller, Oct. 1, 1902, p. 682.

(2). Ibid., Oct. 29, 1902, p. 893; ibid., Nov. 5, 1902, p. 987.

(1)
mill employees. The loaders claimed that it was only just that they have the same length of day as the other employees. The employers claimed that they had just given the loaders an increase in wages, and that two dollars for eight hours work was an exorbitant demand. The Washburn-Crosby Company had hired a number of girls for the work of filling and sewing the smaller packages and were paying them a dollar a day, and the men felt that these girls should get the same pay as the men packers. (2) There seems to have been some friction between the employers and the union officials so that the employers, resentful at what they felt was unwarranted interference, with their business, refused to deal with the union officials and seemed bent on provoking a strike.

Having called in the International Union officials, the men on their advice offered to arbitrate the matter, with the understanding that if arbitration was refused, a strike would be declared. The mill-owners rejected the proposal, claiming there was "nothing to arbitrate". As a result, on September 24th, seventeen mills belonging to Pillsbury-Washburn, Washburn-Crosby, and the Northwestern Consolidated Companies were closed down. The smaller mills were not disturbed, but their owners were told that they, too, would be closed if they attempted to fill any orders for the big mills. It was understood that they would accept any agreement forced on the big mills, and the strikers hoped that if the small mills ran to full capacity, they might get many orders which would otherwise go to the big companies, and that the knowledge of this would tend to weaken "the big three". (3)

(1). Northwestern Miller, Sept. 16, 1903, p. 621.

(2). Ibid., Sept. 23, 1903, p. 673.

(3). Ibid., Sept. 30, 1903, p. 927.

The striking employees included 500 packers and nailers, 375 loaders, and 630 other mill operatives. Not all of these belonged to the union, many non-union men being forced to strike with the rest by pressure of public opinion. ⁽¹⁾ Out of 1934 men employed by the three ⁽²⁾ companies, over 1500 struck. Only the millwrights, machinists, electricians, and a few others remained at work. The millwrights had a union and were affiliated with the American Federation of Labor, but not with the International Union of Flour and Cereal Mill Employees. Their union had refused to strike, but there were rumors that it, too, would be called out by the American Federation of Labor if the strike ⁽³⁾ was not speedily settled.

The mill-owners seem to have been surprised at the strength of the movement, but soon organized and determined to fight it to a finish. The strikers again proposed arbitration and asked the Mayor to appoint a committee of five citizens to offer mediation. This was done, but the mayor's offer was rejected by the committee of mill managers who directed the strike. The mill-owners once more stated their position, that the strikers' demands were unreasonable, that they were paying the highest wages of any millers in the world, and that flour profits were too low to allow the increase. They claimed, too, that when the eight-hour day had first been instituted in the mills, the unions had promised to force competing outside mills to ⁽⁴⁾ accept it also, but that they had failed to do so.

Some of the seventeen mills closed by the strike were reopened almost immediately. By bringing together in one plant the

(1). Northwestern Miller, Sept. 30, 1903, p. 727.

(2). Ibid., Oct. 14, 1903, p. 837.

(3). Ibid., Sept. 30, 1903, p. 727.

(4). Ibid., Sept. 30, 1903, p. 727.

scattering few who remained faithful, by impressing into service of-
fice-men, university students, etc., each company succeeded in start-
ing some of their mills. The first day they operated six and a half
(1)
out of the seventeen mills. The strikers picketed the mills so strong-
ly that the millers found it difficult to bring in strike-breakers or
to hold them after they were brought in. They took possession of the
Pillsbury oatmeal-mill building which was unoccupied at the time and
fitted it up as a barracks, when the restaurants and hotels refused
(2)
to feed the strike-breakers. The open court between the two rows of
mills was enclosed by a high fence so that the strike-breakers might
have space for exercise. At the start, the strike was quiet and or-
derly though after the fourth week complaints of attacks on strike-
(3)
breakers began to be heard.

The strikers fought with grim determination, but it was a
losing fight. The millers gradually increased their crews, and, as
these became better trained, the production of the mills increased.
The strikers were given financial assistance by the other unions of
the city, and there was talk of a sympathetic strike of the railway
switchmen and other unions. The millwrights' union offered financial
(4)
aid, though it was not willing to strike. In the third week of the
strike, the president of the International Union, who was directing
the strike, became discouraged and advised the men to return to work.
There were rumors that he had sold out to the millers, and after a
stormy meeting, the men rejected his advice, and new officers took
(5)
charge. The men talked of bringing about a national boycott of the

(1). Northwestern Miller, Sept. 30, 1903, p. 727.

(2). Ibid., Oct. 14, 1903, p. 837.

(3). Ibid., Oct. 21, 1903, p. 893.

(4). Ibid., Oct. 7, 1903.

(5). Ibid., Oct. 14, 1903, p. 837.

millers, but the strike was already lost. A month after the strike had begun, only one mill was idle, and production had become almost normal.⁽¹⁾

The failure of the strike was the ruin of the unions. The men claimed that the millers after that refused to hire any men who belonged to the union and blacklisted the leaders of the strike.⁽²⁾ Moreover, they feel that these older organizations were fundamentally weak because they were craft organizations. They still had a nominal existence, and various efforts were made to revive them, particularly after the panic of 1907, but there was no success.⁽³⁾ By 1916, the Minneapolis Survey could state with substantial accuracy that "there is no trade organization of any kind in the mills."⁽⁴⁾

25. Effects of the Great War--Unionizing the Mills.

Then came the Great War with the unrest, the increase in the cost of living, the demand for democracy in industry as well as in government. The mills could not remain unaffected by these forces.⁽⁵⁾ Wages were increased materially, but unrest was not quieted. In 1917 packers of the Washburn-Crosby Company struck. The Company was forced by the exigencies of the war to settle with them, and this started a unionizing movement.⁽⁶⁾ The International Union of United Brewery, Flour, Cereal, and Soft Drink Workers of America put organizers into the field, and the men rapidly became unionized.

The mill-owners quite naturally looked upon the movement with disfavor. The Northwestern Miller made sarcastic comments on

(1). Northwestern Miller, Oct. 2, 1903, p. 893; Ibid., p. 891.

(2). Conversations with union leaders.

(3). Ibid.

(4). Minneapolis Survey, p. 322.

(5). Northwestern Miller, July 25, 1916, p. 228.

(6). Conversations with union leaders.

the unnatural union between the flour mill workers and the brewery men. It criticised the Journal of the union because it was partly printed in German. It objected to the talk of peonage and slavery in their propaganda. The editor of the Northwestern Miller had known many of the mill workers personally for forty years and knew that they were "satisfied with the conditions of their work and wages, and on excellent terms with their employers, between whom and themselves (1) has always existed the utmost good feeling".

The millers combatted the union in various ways. They organized shop committees consisting of representatives elected from each group of workers, such as the bolters and grinders, the nailers and packers, the truckers and loaders. The Washburn-Crosby Company, and later the Pillsbury company, bought group insurance for the men. Under these policies every Pillsbury employee, for example, after three months service is insured for \$500 and this is gradually in- (2) creased until, at the end of five years, the policy amounts to \$2,000. The companies also organized sick benefit associations, provided cafeterias and made many other efforts to better working conditions in the mills. Generally speaking, they paid better wages than the country mills-probably better wages than any other mills in the country.

In spite of these efforts, however, the unions have made rapid progress. The Pillsbury employees have organized a "company union", but in all other mills the men belong to locals of the International. To what extent they are organized it is difficult to say. They claim to be almost one hundred per cent strong in some of the

(1). Northwestern Miller, Oct. 15, 1919, p. 253.

(2). Carry-On, edited by the Employees of the Pillsbury Flour Mills Company, Feb. 1920, p. 3.

mills and admit that they have made considerably less progress in others. The millers do not recognize the union officially, claiming that they maintain an openshop. The Washburn-Crosby Company states that it does not inquire into a man's union affiliations any more than into his religion. The union officers make no complaint of discrimination against union men, and relations between the millers and their employees seem to be fairly satisfactory.

Chapter 1X. Marketing the Product of the Mills.

26. Growth of the Domestic Market.

The first market for Minneapolis flour, beyond the purely local one, was St. Louis. In the fifties when there were no railroads in Minnesota, and the Mississippi formed the only route of transportation, the flour was floated down the river to that city whose facilities for distributing products by rail and river were unequaled west of the Alleghenies.¹ As early as 1851, St. Louis was not only manufacturing flour on a considerable scale, but was also showing large receipts from interior mills. By 1860 her combined receipts and manufactures of flour amounted to over 1,200,000 barrels.² Up to the Civil War, doubtless, most of the flour shipped out from the Minneapolis mills found its way to the St. Louis market.

The Civil War, together with the opening of the railroads to the East, caused a shift, and from that time on, the Eastern market became the most important for the Minneapolis millers. The flour was sent by rail to Milwaukee or Duluth, thence by lake steamers to Buffalo, and by canal or rail to New York whence it was distributed to the smaller cities of the East.³ After a time as the markets

1. See chapter V., p.111

2. St. Louis Trade and Commerce, 1880, p. 67.
1851 - Receipts 184,715 bbls., Manufactures 409,099 bbls.
1860 - Receipts 443,196 bbls., Manufactures 839,165 bbls.

3. Commercial and Financial Chronicle, Aug. 21, 1878.

of the Minneapolis millers became extended, Boston, Philadelphia, Albany, Baltimore, and other cities became distributing centers. The trade of the middle West was reached through Chicago as a distributing center, though as late as 1885 Minneapolis flour had but a slight foothold in that market.¹ But the regions of Pennsylvania New York and New England remained the principal market of the Minneapolis mills. There was little effort in those days to invade the southern states because the St. Louis and other flours made from soft winter wheats were supposed to be better suited to the climate and tastes of the people.²

The first shipments of flour outside of purely local terri-

1. American Miller, vol. XIII, p.235.
2. For the growth of the domestic market and the methods of marketing the product in that market, there is very little material available. There is strikingly little said about marketing in such trade journals as the Northwestern Miller. The slight details given here are mainly pieced together from letters contained in the Hale Papers some of which are given in the footnotes on the following pages.

A. Gene Hale to Major W.D. Hale. Bradford, Sept. 3, 1880.

I have just spent half a day in the city looking up the flour business - A great deal of Patent flour is used here; but it all comes from Ohio - made of Winter Wheat bears the "Brand" of "White Foam" - costs here a fraction over \$8.00 - makes very white bread. One large dealer told me he knew the Minnesota Patent Spring Wheat Flour was the best but it was not so white - & there was the trouble - also it required a knowledge of how to use it, etc. - he further added that he would take 5 to 10 Bbls if I succeeded in getting it here - and do what he could to introduce it. To sum it all up - it will require a great deal of patience and work to introduce Minnesota flour. I think each sack (paper if sent here) should be printed on it the peculiar method of using this flour - just what to do to make good bread of it - then each and every one could read and follow directions in this way a multitude of mistakes would be prevented in making poor bread, etc. To make such a receipt for using and express it so it would be readily understood by those who make bread - and such a receipt as would not fail to produce the result when followed - will require some skill as well as practical knowledge of making bread, etc.

Minnesota Historical Society, Hale Paper, case 4.

tory were generally consignments to commission men.¹ These saved the miller the trouble of looking up a buyer, found storage room, when it became necessary, coopered up damaged barrels, and disposed of the flour when a favorable opportunity presented itself. An honest, conscientious commission man, a man with a sound financial standing was a great help to the miller with whom he did business. But business conditions made it possible for too many reckless and irresponsible men to get in, men who, when their sales did not net a fair profit, were inclined to gouge the millers. The temptation to get in extra charges, interest for money advanced, etc., proved the commission man's ruin.² Today the miller who consigns his flour after the old plan, is looked upon quite generally as pursuing a suicidal policy and as being a very potent factor in helping to demoralize the flour business.³

1. See Letter O, p. 193.

2. Northwestern Miller, Jan. 21, 1898, p. 101.

3. Ibid., p. 101.

B. Gene Hale to Major W.D.Hale, Bradford, April 20, 1881.

The flour business goes slowly - still all that use it make good reports, especially those who make bread. A noted bakery man here gives it a high recommend - says it is the strongest flour that he ever put his hands into. If we had a room here so that a carload could be shipped to this place and then sell to Bakeries in lots (small) as they buy from Buffalo, then quite a trade could be worked up in this town - no Baker buys more than 20 to 25 barrels at a time. The lots that I left with Higgins-Arnold (at Cuba) and a dealer here sell slowly for the reason that they have other Patents and consumers usually take the kind they are in the habit of using - the lots that I sold to acquaintances through my recommendation comprises nearly all the sales - these will want more soon anyway. Enclosed is a N.Y. Draft for \$110.00 collections I have made on the small lots sold by self. Arnold & Higgins likely will pay for theirs as soon as their customers who are trying the flour make a second purchase, confirming the success of the flour - In short it takes time. ----I can hurry the selling of this car by selling to bakers here and bring to expense of draying and freighting but thought you'd rather wait a little.

The abuses of the commission business evolved the flour broker. The growing markets often far distant, and widely separated, reached only at an outlay of considerable expense and valuable time, needed constant presentation of ones claims to keep the flour moving. The broker was a man who knew all the flour buyers of his vicinity and for a fee of five or ten cents a barrel kept them informed of the merits of your flour, "effecting all the preliminaries of a sale, but leaving the miller in control of his product until the terms of the sale were complied with."¹ The commission man bought the flour from the miller, and so was selling his own property; the broker merely acted as agent for the miller. It was a good system for the small miller who could not afford to send out travelling salesmen, but abuses crept into this system also. Brokers got into the habit of selling for a number of mills and if the millers were not watchful they sometimes sold for competing mills in the same territory. Many reckless and irresponsible brokers arranged sales to the disadvantage of their principals, caring only for their own commission.² These evils caused a new development.

1. Northwestern Miller, Jan. 21, 1898, p. 101.

2. Ibid., p. 101.

3. W.F. Thayer, Boston Representative of the Washburn Mill Co. to W.D. Hale, Boston, Feb. 27, 1883.

We are pounding away at them getting our share of the trade and at top prices. Last week was a good one for us and we scored \$8.00 cash on several cars. I have heard of no one selling this high save ourselves, though the leading mills ask it. I take no stock in the late "combination." \$8.00 was the price telegraphed on here at the time and not \$8.10 as reported to you. I took the street at once at \$8.00 and offered trade this with 30 days to time buyers and was told that P. Best was offered below \$8.00, so this is a laugh on the said "combination." ---Am keeping our old trade and making new ones often. Am striving for the cream of the trade, wholesale grocers, etc. We have many such and must have more. Our goods are all O.K. and suit every time. I do hope we will be very careful about wheat and get none but the best or shut down. Our reputation is good and I expect soon to have it "the talk of the Town." ---To get a backset now would hurt us muchly. H-W and Pills have each had some poor cars here lately and would not pass inspection and all know it.

Flour now began to be sold by flour houses or by salesmen and branch houses. The salesmen were at first sent out by the mills on a commission basis so that they were practically travelling flour brokers.¹ After a time the mills began to pay their men regular salaries, but as late as 1903, the mills of St. Louis were said to prefer the flour broker to the regular salesman. The Northwestern Miller discussing the relative merits of the two was inclined to favor the salesman.² The salesman was more apt to try to get the highest price possible for his mill; the broker, whose living depended on his pleasing his customers, would sell at the lowest price the mill would allow. If he represented a number of mills -- and he usually did -- he was likely to play off one mill against another. If he sold other lines of goods, he was apt to push these when he should have been pushing the flour. So in the matter of disputes between the mill and the buyer, the salesman would be more likely to look after the mills' interests than would the broker.

Whether the flour was sold by commission men, flour brokers, or salesmen, the buyer was usually a jobber (or a Flour House)

1. See Letter K., p. 191 for an example of this.
2. Northwestern Miller, April 24, 1903, p. 826 .
- D. W. F. Thayer, to Major W.D. Hale, Boston, Aug. 4, 1883.

We were all getting good prices in May and June, and trade was beginning to believe in higher futures. In fact we had just worked them up to where we wanted them when Pills and W.C. & Co. began to cut each other and of course it took the wind out of our sails, as we had to sell at their prices. ---- J.A.C. & Co. are selling at \$7.25 and have sold at \$7.30 all rail. Dozens of good Pats are here at \$7.00 to \$7.15.

Minnesota Historical Society, Hale Papers, case 4.

in one of the great markets of the country.¹ This jobber was usually a man, or firm, of considerable capital, with a wide acquaintance among the bakers and grocers of the territory. He bought on a large scale from many different mills. Since he bought outright he could sell as he pleased. He usually had a warehouse in which he stored his flour and from which he supplied other jobbers in the smaller cities, the wholesale grocers, and the large bakeries.² In the days when the mills employed few salesmen, the jobber would be quite as likely to come to the mill to buy. Much of the flour

1. See Letter E, below.

2. Northwestern Miller, April 24, 1918, p. 267.

E. W.F. Thayer to Major Hale, Boston Oct. 27, 1880.

Am working away at them as hard as I can, Maj. but trade is awful quiet just now and the lower it goes, the harder it is to sell because the harder it is for the jobber to get a profit they say. I have been on the road constantly for about five weeks and will keep it up and see all hands and go over the same route again and try for more orders. We have sold all our old trade, but you see they don't buy heavy because it has declined in price for two years now and they are sick of the market and long for an advance just as we do ----- I look for better trade after election and Elaine is Prest. There is no question about it in my mind.

F. W.D. Washburn to Major Hale, Washington, Jan. 24, 1885.

I have your letter of Tuesday with reference to flour sales, etc. So far as Church is concerned, I am satisfied that he has not had a fair chance. He can not go on to the market and sell against W.C. & Co. and Pillsbury Co. without having a chance to put flour into the hands of parties to test. This flour he has not had and as a consequence he has worked at a disadvantage and will do so. When W.C. & Co. went into New York in the first place they did what I now propose to do -- put their flour into the hands of a great many dealers, even if they did not get a full price for it.

was bought from the smaller mills and sold, not under its own name, but under the name and brand of the jobbers. This practice persists to the present day to some extent, so that it is said that the most popular brand in New England today is not a mill brand at all, but that of a flour house. This flour house buys its flour at several different mills, where it is made according to the buyers' specifications, puts its own brand on the product, and sells it under its own name.¹ As the trade increased, the millers began to establish branch houses in New York and Boston and one or two other cities, and from these agencies to send out two or three salesmen to call on the jobbers who sold their flour.² As their facilities in this matter increased they began to sell directly to the smaller jobbers, the wholesale grocers, and the bakers instead of selling through the flour houses. In many cases the flour houses were bought

1. Conversation with a representative of a Milling Journal.

G. W.S. Church (New York agent of the Washburn Mill Co.) to Major Hale, N.Y. Feb. 10, 1885. (There is little demand for flour, he says, though he does not believe any of the jobbers are carrying large stocks and there is little flour arriving. Jobbers refuse to bid over \$5.30.) I sold the 25 bbls. to the Brooklyn grocer of whom we talked at \$5.50 and sold today 25 bbls. at same time to a N.Y. grocer under much the same circumstances. From others, I refused that price including Weeks & Parr who offered that for 1000 Ebls.

H. W. F. Thayer to Major Hale, Albany Feb. 26, 1885.
(Thayer writes on letterhead of Bouton & Geer, Commission Merchants.) I enclose you a card from W.C. & Co. and our customers say they hope we will keep up with the times and give them something similar to help the sale of Best. When WC & Co. and Pillsbury, the great millers of our land, resort to all kinds of "ads" to help sell their goods, I think it wise for us to do the same and keep up. There is no question about it Maj. but that this kind of "ad" pays well and the consumer and retailer become familiar with the brands.

Minnesota Historical Society, Hale Papers, Case 5.

2. See Letter N., p. 193/

out by the mills.¹ The Pillsbury Flour Mills Company, for example, now has twenty-four such branch houses scattered over the country from Boston to Los Angeles and from Jacksonville to Portland.² The large mills probably sell from thirty to sixty per cent of their output in this way.³ The tendency of these branch houses is to eliminate the jobber entirely so that the mills may sell directly to the baker and the grocer, if not to the ultimate consumer. The smaller mills cannot, of course, establish branch houses, and so they

1. Conversation with a milling journal representative. See also letter B, p. 85, C.p. 186.
2. Carry-On, Published by the Employees of the Pillsbury Flour Mills Co., Feb. 1920, p. 11.
- I. W.F. Thayer to Major Hale, Boston, Feb. 28, 1885. (Thayer writes in regard to some pictures of the mills which have been framed for presentation to customers. He needs at least 200, he says, because some will want a number to pass on to their largest customers.)
"The mill wire of 5.60 to me seems low, yet yesterday Christian wired several buyers here at same price so I learned today."
- J. W.S. Church to Major Hale, New York, April 11, 1885.
"It seems to me perhaps it would be as well to let up a little on the newspaper advertising for the present - say discontinuing in the Mail and Express anyway and perhaps the Tribune, leaving two ads a week in the Commercial Advertiser - of if thought desirable to keep the other two insertions per week, to put in some other paper. Want to keep expense account for the N.Y. office as low as possible."

Minnesota Historical Society, Hale Papers, Case 5.

3. Northwestern Miller, April 24, 1918, p. 267.

continue to sell through jobbers and brokers.¹

From the days of the Civil War, if not before, New York had been the principal flour market of the country, both because of its large local consumption, and because of its importance as a distributing center. In the late seventies, that position as a distributing center was seriously threatened by the efforts of the western cities to establish a direct trade with the smaller cities of the East. This was strongly combatted by the New York Produce Exchange. They established a system of grading and inspection which safeguarded the market for a time.² Gradually, however, other western millers

1. Ibid., p. 267.

K. J.E. Stevens, Jr., Manager of the Washburn Mills, to Major Hale, Chicago, May 28, 1885.

"Crane reached here this P.M.----He made arrangements with Ardniger at Greenfield to sell flour for us at 10¢ per barrel, to be included in our quotations and we to draw on the buyers direct and settle commission except in the local trade at Greenfield, where we ship everything to him and draw on him net price. He will send you a list of the towns so you can get rates of freight and send him. Crane quoted him following prices including comm. at Minneapolis W Best 5⁰⁰ Bbls. Standard 4⁹⁶ Bbls. Lincoln 4²⁶ Bbls. Usual difference in sacks. He quoted the same to Geo. Alfo (?) & Co., Peoria, less the Commission.

"Crane says that the St. Louis Millers will have a poor show this year and that he has considerable faith in being able to do a good business in the section he has travelled over. He (Crane) starts for Indiana and Ohio in A.M.----Eckhart is selling Best and Lincoln right along. I saw it in front of his store today."
(Minnesota Historical Society, Hale Papers, case 5.)

2. Commercial and Financial Chronical, Aug. 21, 1878.

L. J.E. Stevens Jr. to Major Hale, Philadelphia, July 9, 1885. (Mr. Stevens is apparently looking for a man to act as Philadelphia representative for the Washburn Mill Co.) "I met J.R. Tomlinson who used to be a resident of Minneapolis. He was in with G.H. Christian and C.C. Washburn at one time.He hasn't dealt in flour for 10 years but buys and sells feed and grain here and all through interior Penna. He has two men on the road all the time. He says that he will take hold of our goods on terms we have talked (5¢ Bbl. Philadelphia 10¢ Bbl. outside 5¢ Bbl. all trade in his territory that is sent direct to mill) providing we will agree to let him try it for six months. He wants this on account of the time required to start trade on new goods. ----says he

(Footnote L continued on the following page)

found it more advantageous to distribute through Buffalo, Boston, and other cities, and accordingly New York lost its pre-eminence as a flour market. It is still, perhaps, the most important market, however, because of its large local trade. Conditions in the New York market can best be understood by a description which appeared in the Northwestern Miller in November, 1907.¹ Substantially the statements hold good for today. At that time about six million barrels of flour were sold in New York City every year. The market was a dumping ground where every miller anxious to unload a lot of flour and willing to let it go at a low price, found a buyer. Hence, low prices were the rule. In 1907 about half of the flour sold in New York was made from spring wheat, one-fourth from Kansas or hard winter wheat, and one-fourth from soft winter wheat; at present about forty per cent is spring wheat flour, thirty-five per cent Kansas,

1. Northwestern Miller, Nov. 18, 1907, p. 401.

L. (Continued from p. 171.)

will canvas city trade Baltimore and Washington and near towns himself, and will extend territory where he already has men. He proposes to do this in connection with his grain and feed trade. While this is not exactly in accordance to Mr. W's. ideas, it looks to me as though we would stand a much better show to do some business in the country than on any other basis. We can put it up also to sell a great deal more flour here than we have. Morrison's man for this city and New York sells a winter and S F H & Cos man for NY Phila Balt & Washington confines himself to their Brands Markets are flat here everyone afraid flour will sour this hot weather.

and twenty-five, soft winter.¹ The spring wheat flours came from Minneapolis, Chicago, Milwaukee, Buffalo, Rochester, and New York mills. Winter wheat flours came from Pennsylvania and New York as well as from the west, and Kansas flours from mills in that state, Missouri, and Illinois. Up to 1903 the railroads had allowed thirty days free storage for unloading flour cars and as a result, much of the flour had been sold on consignment. Since that had been reduced to seven days after which a storage fee was charged, the millers had sold less flour on consignments and more to jobbers.

1. Millers' Almanack, 1919-20, p.86.
- M. W.F. Thayer to Major Hale, Boston July 18, 1885.
"As it has been a poor year in flour and little money made in milling I accepted Joe's out down and new proposition which is as fol's,---work next year for \$2500 and expenses out clerk down to \$25 or \$30 per mo. to be discharged after 30 dy notice, in case mills burn down or you go out of business or consolidate-- to give up N.H. & H. Phila Balt & Washington and confine myself to Mass Conn R.I. & Hudson RiverI hope you wont burn down or consolidate as our flour is getting better known every day and with the advertising we are doing and the work we will put into it yet, it is bound soon to stand with Pillsburys and WC & Co-- we have passed N.W. & J A C."
- N. J.E.Stevens, Jr. to Major Hale, Oakland, Me. July 21, 1885.
"I advised Thayer to sell Faxon 1000 Bbls @ 560 30 ds yesterday. While there is a better tone to market it is hard to get trade to take hold and as you wrote to press matters I advised Boston NY & Portland agencies to push goods. We must do this to get our goods before the people."
- O. J.E.Stevens, Jr. to Major Hale, Chicago, July 19, 1886.
"The flour market is badly demoralized here. Patents selling from 440 to 485 ...Called on Reid Murdoch & Fisher & had a pleasant chat with their flour man but there is no prospect of our doing anything with them unless we could offer them a special bargain. They buy on the open market here & put their own brand on any one's goods. I called on Franklin MacVeagh & Co. I think they have had about the same experience that Sprague W & Co have this year & they have an idea that they can get some milling firm to consign them goods pay them a good round sum commission & handle only one flour and give the consignor the benefit of the best prices they can get. They handle about 8 cars per month."

Spring wheat flours were sold by the mill to wholesale bakers, jobbers, or wholesale grocers. The jobbers sold to smaller jobbers, small bakers, macaroni manufacturers, etc. Spring wheats got most of the bread trade while winter wheats were sold to pie, cake, and cracker manufacturers. The macaroni manufacturers bought mostly Kansas wheat as they used very little of the durum or "Macaroni" wheat. In former years buying was heaviest in the autumn when the new wheat came in, and many mills booked orders for six or eight months ahead, but this practice was being discontinued. The baker or wholesale grocer now buys his flour in car-load lots and takes the flour whenever it arrives. Forms of sale vary widely. Some of the bakers buy directly from the mill on sight or arrival drafts. Others get ten to sixty days time but these buy mostly from jobbers rather than from the mill. The jobbers who sell to the small bakeries must give liberal terms. Many of their accounts are never completely paid up and often they must take a mortgage on the bakery.

P. F.E.Holmes to Major Hale. (Letterhead of Rice Quimby & Co. Commission Merchants)

"I do not believe in holding off and giving the other mills the chance to load up our customers. At Rice's request I wired the mill last night for prices and have their reply to meet the leading mills. Rice sold about 9 cars at 475 which is a good price the way flours are selling. I know positively that P O & Co. sold 5000 yesterday at that and with wheat weak today would be glad to sell more. I have about made up my mind to give Paterson's territory to Duryea. He is to meet me in Scranton Thursday. I also think of putting the Phila trade into his hands. He will probably go with us there. The general feeling here is that Chicago wheat is going to 65¢. I think best to be pretty free sellers for the next 30 days. The more I travel over the country the less confidence I have in the word of the Minneapolis millers. The idea that the Columbia has not sold below 500 N.E. is absurd they were selling at 485 Saturday and would probably sell at 4.80 today. There are a good many tricks to the trade. I have seen Peter Martin twice. I think he could be hired to go abroad but not at a price that we could think of paying. I have been talking with a Glasgow man today with whom I think we may make very good terms to control our business there commencing with the new crop. I hear very good reports of our flour and think we are getting it pretty well established." Minn. Hist. Society, Hale Papers, Case 5.

Much of the flour used in New York is blended after its arrival in special plants erected for the business. There are also several "flour doctors" who take flour that has been rejected by the inspectors, flour infested with weevils for example, and "recondition" it. The blending plants are located at the water's edge so that they may load their product conveniently for export.

There remains to be considered the widening out of the markets for the Minneapolis mills. This was gradual growth with few outstanding features so that it is difficult to fix a definite date at which time, we can say, the trade extended over a given area. Up to about 1900 the millers sold to jobbers and wholesale grocers and left to them, and to the merits of the flour, the problem of ex-

- Q. F.E.Holmes to Major Hale, Philadelphia, June 24, 1887. (From Scranton to Philadelphia and going to Washington. Has arranged with Duryea to handle Philadelphia, Baltimore and Scranton. Duryea sold in Scranton 1000 Ebls. Patent at 4.75 N.Y. Rate). "This I consider equal to 4.80 or 85 with Rice. I get very good reports as to the quality of our flour and we must take pains to see that it holds up to the present high standard. I hear a good many reports of the unevenness of Pillsburys and if it was not for his great reputation we would easily walk away with him. Thayer writes me a doleful tale of the condition of the N.E. market. The more I think over the N.Y. market the more I am convinced that the interior and the N.E. trade is the most desirable."
- R. W.F.Thayer to Major Hale, Boston, Feb. 21, 1888.
...."Our sales have been limited for some time simply because our price has been higher than several other good Minneapolis mills of which there is not the slightest doubt - like N.W. Columbia Morrisons and others. These mills have pursued the policy of making their own price regardless of what leading mills like Pills. may do and consequently secure good business by keeping from 5¢ 10¢, ^{under market} whereas I am instructed to follow Pills & WC & Co. and thus have to follow their asking price and not their actual selling price...."

tending its use. There was, of course, some advertising by the mills before 1900, but it was neither wisely planned nor well executed. The miller advertised in the home newspaper more as a matter of civic pride than anything else.¹ A good deal of money was spent on pictures, show cards, and occasionally newspaper advertisements; but these were designed to appeal to the jobber and wholesaler rather than the flour consumer. Appeals to the consumer took various forms. One miller chartered a city street car, decorated it elaborately, and loaded it with sample bags of his flour for free distribution. A manufacturer of pancake flour hired several all-night lunch wagons and put in cooks who served his pancakes and oatmeal free of charge, at the same time distributed advertising matter and souvenirs.²

It was not until the early nineties that the mills began to advertise in the trade journal; and not until 1900 that they began to advertise in the popular magazines. The success of this advertising campaign is a matter of common knowledge. The natural result was that the flour was sold not only in the great competitive market of the East but all over the country. Today there is not a single section of the country where the local miller does not have to face the active competition of the Minneapolis mills.

1. Northwestern Miller, March 13, 1903, p.979.

2. Northwestern Miller, Nov. 18, 1898, p. 868.

3. W.F.Thayer to Major Hale, Boston, August 30, 1888.
"Flour booming and I am glad it is so. The millers ought to make a pot of money now. We sold at 5.65 cash yesterday! Seems strange when a month ago we were coaxing them to buy at \$5. (W.F.T. tells how in 1885 he sold 70,000 barrels of flour with New.Eng. & Hudson R. Territory, and next two years about the same amount although his territory was cut down).

27. Growth of the Export Trade, 1877-1895.

In the period before the Civil War, almost all the bread-stuffs exported from the United States were milled before being shipped. For the five years ending in 1850, the wheat exported in the form of flour made up 99.46 per cent of the total.¹ At that time the American milling methods developed by Oliver Evans, were still superior to those of Europe.² But about the year 1850, began a decline in the relative importance of flour exports. The European mills began to improve their methods.³ As we have shown, they introduced the purifier, the roller system, and the gradual reduction method before the American millers. Moreover, they were aided in many instances by protective tariffs.⁴ Even without the handicap of inferior methods, the American mills could hardly have increased their capacity fast enough to keep pace with the growth of the wheat supply at this time. As a result of these things the proportion of the wheat milled before being exported gradually declined, until, in 1875, it was only 27.2 per cent of the total. Then came a great revival in the export flour trade which lasted until the beginning of the New Century and for which the Minneapolis millers were mainly responsible.

Up to 1877 the Minneapolis millers depended almost entirely on the domestic market. As a result they often found themselves with large stocks on hand and a depressed market.⁵ The rapid

1. See Table No. 1 Appendix.

2. See above, Chapter III, pp. 36-37

3. Pillsbury, American Flour, p. 272. See also Chapter III above.

4. Bogart, Economic History of the U.S., pp. 312-313.

5. Minneapolis Board of Trade, Annual Report, 1880, p. 56.

growth of milling throughout the country, the decline in flour prices, the growth of large scale production in Minneapolis were all factors in determining the Minneapolis millers to seek a foreign market for their flour. Doubtless some of it had already been sold to New York flour exporters in small lots for export.¹ But what the millers wanted to do was to sell it directly to European flour houses and large consumers under their own name and brands. The credit for originating the plan belongs to Governor Washburn. After trying ineffectually to secure the cooperation of the other milling firms of Minneapolis, he determined to send a representative of his own firm to Europe.² And accordingly W. H. Dunwoody went to England in 1877 to organize the direct trade.³ Mr. Dunwoody visited the flour houses and the large bakeries of Liverpool, London, Glasgow, and other leading cities, but it was months before he succeeded in getting a single order.⁴ The naturally conservative British mind was prejudiced against foreign firms and brands; it was claimed that the American flours were very uneven in quality and that Americans were shipping their flour in barrels when sacks were wanted.⁵ The English were used to flour containing a greater percentage of moisture; and their bread, as Mr. Pillsbury said, is baked in larger loaves than those to which we are accustomed. "Little bread is eaten in the United States that is over thirty-six hours old, while that which has been made twice as long is frequent on British tables."⁶ Natur-

1. Ibid., p.58.

2. J.A. Christian and Company.

3. Northwestern Miller, Feb.11,1881, p.84.

4. Northwestern Miller, Feb.11, 1881, p.84.

5. Commercial and Financial Chronicle, Dec.30,1882, p.751.

6. Pillsbury, American Flour, pp.270-271.

ally, bread so different from American bread, would require a different flour to make it. Moreover, what American flour had been sold in England up to this time had been made up of job lots gathered by commission firms from many different mills, with no uniformity as to quality. The English millers, it was claimed, often bought this flour. They took the best of it, mixed it with their own, and sold it as English flour, while the poorest was sold under its true name and thus helped to create a poor reputation for American flour.¹

The flour houses because of their relations with the British millers were unwilling to handle American flour in competition with British. It was not until after Mr. Dunwoody had put the flour into the leading bakeries for a test and they had begun to call for his flour, that he was able to get flour houses to handle it.²

These were not all his difficulties. The American miller had no protective tariff to aid him in building up his foreign trade. Because of the weakness of our merchant marine at this period, as it is said, he was at the mercy of foreign steamship owners, who refused to give him a fair bill-of-lading and frequently caused annoyance and loss by unnecessary delays, carelessness, and neglect in handling the cargoes, etc.³ In the higher grades, at least, they had to face the competition of the Hungarian flours which had pre-empted the field.⁴

Mr. Dunwoody now established agencies at London, Liver-

1. Minneapolis Board of Trade, Annual Report, 1878, p. 53.
2. Ibid., p. 53.
3. Edgar, The Miller and his Mill, Chataugan, Nov. 1892, p. 169.
4. The Northwestern Miller, March 10, 1892,

pool, and Glasgow; and shipped flour to these agencies, by whom it was put into the hands of bakers for trial. Thus, the prejudice against American flour was overcome, and the flour houses were forced by their patrons' demands to buy from the American manufacturers. From the principal markets, the trade soon spread to all parts of the United Kingdom.¹ At first, only the "bakers' flour" was sold, but as the British public became educated to demand a whiter flour, the patents began to be sold also.²

The English millers kept up the fight against the American flour. They accused the Americans of adulterating their flour with alum, marble dust, beans, etc., to whiten it. How much truth there was in these charges is not clear. It seems hardly probable that the Minneapolis millers could be such poor business men to do such things. On the other hand, the millers who shipped direct, had to pay for the sins of the commission men who continued to export for the small country mills. These undoubtedly did, at times, misbrand flour, mix flours of different grades, and deceive their customers in various ways. Possibly they may have adulterated occasionally, as the English millers charged.³

Less serious, but probably more truthful, was the charge that the American flours of a given brand and grade were not uniform

1. Minneapolis Board of Trade, Annual Report, 1880, p.56.

2. Ibid., p 58 - Bakers' flour was the third grade flour which was left after the two grades of Patent flour had been taken out. About 1900 the bakers began to object to the name as they claimed that it gave the people a wrong impression. As a matter of fact, they claimed that they were using only the highest grades. So they induced the Chicago Board of Trade to change the name of bakers' flour to "Clear," by which name it is known today. Undoubtedly, before the millers got to making so much patent flour, the bakers' was a strong, high grade flour which could well be used by the large bakeries who did not object to its lack of the whiteness that distinguished the patents. [Northwestern Miller, Feb. 21, 1900, p.366. See also N.W. Miller, March 12, 1880, p.165]

3. Barnes, Milling History of Mpls., Holiday number, 1890.
Northwestern Miller, p.54

in quality.¹ The Northwestern Miller quotes the London Miller as follows: "There can be no doubt that English millers are in some considerable degree affected by the large arrivals of American Flour, especially since the introduction of bags as substitute for barrels, which for storage are more convenient, and which when empty do not occupy valuable space. The qualities of the flour are very various and the brands legion, it being a well known fact that the same article is shipped in different names. One important fact in favor of the English miller is that the American maker has yet to learn that the bakers here expect, above all things, uniformity."²

The strongest and perhaps the most useful American flour for bakers, comes from Minnesota: three distinct parcels of this class of flour yielded the following results: By the usual sample tests they formed three degrees of comparison -- the third produced the third quality of bread, the second the first quality, and the first, a quality which hardly differed from the third?³ The English writer goes on to claim that some of the American brands which stood highest are already deteriorating. He claims that this deterioration and lack of uniformity is due to the "New Process," which robs one grade of flour (the baker's?) to enrich another (the patent?). The English bakers seem to have bought the American flour and attempted to mix it with the home product. Their lack of experience in blending caused such poor results that they were inclined to leave this branch of the business to the millers.⁴

1. See Letter Q, p. 195.

2. Northwestern Miller, June 20, 1879, p. 383.

3. Ibid., p. 383.

4. Northwestern Miller, June 20, 1879, p. 383.

How the initial obstacles were overcome has been told, but there were still many difficulties to face. The flour had to be sold on long time, say four to six months, which was something to which the millers were not accustomed. The steamship bill of lading could not be negotiated at the bank and it took a long time for the cargoes to reach their destination. The shipments had to be in sacks which often got wet or broke open in transit.¹ But as the millers built up their connections in England, and established a market and a reputation for their individual brands, they were able to make contracts for the shipment of their flour in stated quantities.² Shipping facilities began to improve; and large bakeries and dealers began to depend on American millers for the largest portion of their supplies. The trade was thenceforth on a permanent basis.³

The growth of the export trade was so rapid that the Minneapolis millers could hardly take care of it. Said the Northwestern Miller in 1878: "Some of our millers expect to soon be entirely independent of the home markets, and will dispose of all their products through their European agencies."⁴ They undoubtedly had a margin of superiority over their European rivals due not only to the

1. Barnes, Milling History of Minneapolis, Holiday No. 1890, Northwestern Miller, p. 34.
2. Commercial and Financial Chronicle, July 30, 1881, p. 113, Ibid., March 5, 1881, p. 243.
3. Commercial and Financial Chronicle, July 30, 1881, p. 113, Ibid., Nov. 25, 1882, p. 593.
4. Minneapolis Board of Trade, Annual Report, 1880, p. 56.

cheapness and excellence of their hard spring wheat, but also due to the fact that the "New Process" had given them supremacy in the processes of manufacture. In 1879 the president of the National Association of Millers boasted that, "Already John Bull is growling over the cheapness of American flour as compared with the raw material, and the mills of England and Scotland have seen more idle days in the past six months than they have done for years before. France too, is getting alarmed at the cheapness with which American flour is being furnished them."¹

² The shipments in 1877 amounted to but a few hundred barrels, but in the following year two other firms were induced to send agents to Europe and try direct shipment; and soon the other millers were eagerly joining in the enterprise.³ As the trade developed, the railroads began to see its possibilities and decided to cooperate. They arranged with the steamship lines to make direct connections so that the flour could be landed at Liverpool within eighteen days after leaving Minneapolis.⁴ The steamship lines placed agents at Minneapolis who contracted with the millers to carry the flour from the mill to the consumer at a specified rate.⁵ The millers were thus enabled to save greatly on terminal charges at New York, as

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1. Northwestern Miller, May 16, 1879, p. 300.
 2. Commercial and Financial Chronicle, July 30, 1881, p. 113.
 3. Northwestern Miller, Feb. 11, 1881, p. 84
 4. Northwestern Miller, March 22, 1878.
 5. Minneapolis Board of Trade, Annual Report, 1878, pp. 53-4.

well as saving the expense and profits that would formerly have gone to the New York exporters.¹ The export of a few hundred barrels in 1877 had grown in 1878 to 107,183 barrels; in 1879, to 442,508; in 1880, to 799,442; and in 1881, to 1,181,322 barrels.² From that time on there was a steady growth to over two million barrels in 1885; to over three in 1891; to over four million in 1895.³ The British market was the first to be conquered and has ever since been the principal one for the foreign trade.⁴ From England the millers pushed on into France, Germany, and even into Russia.⁵ At first they sold only the "bakers' flour" in England, but as their markets were extended they were able to sell their patent flour in that country and the low grade flours on the continent as well.⁶

They then began to extend their markets into regions which they had left up to this time to the southern millers - the Spanish-American countries, for example.⁷ As the competition for

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1. Ibid., 1880, p.58
 2. Northwestern Miller, March 22, 1878
 3. Minneapolis Chamber of Commerce, Annual Report, 1896, p.115.
 4. Millers' Almanack, 1919-20, p.139.
 5. Minneapolis Board of Trade, Annual Report, 1880, p.56
 6. Commercial and Financial Chronicle, Dec. 30, 1882, p.751.
 7. W.D.Washburn to Major Hale, Washington, Jan. 20, 1883. "I hear nothing from you with reference to a South American trade for our flour. I do not believe either Crosby or yourself appreciate the importance of an early movement in this direction. Has Crosby reached any conclusion about it? (Minn.Hist.S.Hale Papers Case 4.)
- W D.Washburn to Major Hale, Washington, Jan. 23, 1883. "I enclose a letter just received from General Andrews. I think perhaps you had better correspond with parties in New York referred to by Gen.A. and I think arrange to make a small shipment perhaps, through them. My own judgment is we ought to send a good man to Rio and study up and work up the business.- If Crosby does not care to join us in this, let him understand that we have dismissed the idea, but at the same time look for a good man to go out there and look things over. I believe Barden would be just the man for this and that he would likely be glad to try it. Supposing you sound him. Anyway I would send along a small shipment. Minn.Hist.Sy.Hale Papers, Case 4.

the home market grew greater, the Minneapolis mills more and more concentrated their energies on this foreign trade. They never reached the point where they were entirely independent of the home market as the Northwestern Miller had so exuberantly prophesied.¹ In 1886-7 they exported 39.59 per cent of their total production and that was the highest mark attained.² And although the Minneapolis mills were in an advantageous position for foreign trade, if only because their large scale production enabled them to export more efficiently than the smaller mills, they never exported even thirty per cent of the total amount of flour shipped out of the country.³

28. Methods of The Export Trade.⁴

It seems worth while at this point to describe the methods by which the export trade was handled at this period. The first step was to form a connection with a flour house in Europe. This was usually done through the advertising columns of a milling journal. Or a European buyer might tour the country visiting the mills and thus become personally acquainted with the prospective exporter. The next thing to arrange was a cable code. There were several in common use, of which, that originated by W.H. Dunwoody was considered

1. See above, p.9.

2. See Table 2, Appendix, Minneapolis Output and Exports, and U. S. Exports of Wheat and Flour.

3. Ibid.

4. The description of exporting methods in this section is mainly a reproduction of an article by John W. Heywood, "The A B C of Exporting," published in the Northwestern Miller, Dec 28, 1888.

the best. Many firms had private codes of their own.

It was usually customary to send a trial shipment of all brands to be handled as a consignment. The flour was usually shipped in sacks of two hundred and eighty pounds weight, though "half-sacks" of one hundred forty pounds were also used. All quotations and offers were on a 280-pound basis. Jute bags were used which had to be sewed with a close stitch having ears at the end. Care must be taken to use only the very best quality bags.

When the buyer had received a trial shipment and the quality of the flour was fixed in his mind, he was ready to make offers. Flour sales were almost universally made "C. I. F.", meaning Commission, insurance, and freight; that is, the miller made a price on his flour which included these items. For example, suppose he were asked for a price on bakers' flour delivered at London. Suppose he figured that he ought to have four dollars a barrel (196 lbs.) for his flour at the mill. He asked the agent of one of the fast freight lines for a freight rate through to London. Then he figured as follows:

280 lbs. flour at \$4.00 per 196 lbs.....	\$5.71
Cost of sacks.....	.17
Freight at 45¢ per 100 lbs.....	1.26
Commission @ 2 %.....	.14
Total cost of 280 lbs. delivered at London.....	<u>7.28</u>

which changed to English money would be 30s. 4d per 280 pounds. He then decided how much flour he could offer at that price and how long it would take to grind it and cabled his offer accordingly. If his offer was accepted, he booked it, and contracted for the freight at once.

The brand had to be printed or stencilled on the sacks,

a printed brand being better looking but involving the keeping on hand of a large supply of bags. The brands must show the weight of the sack, the name of the manufacturer, the place of manufacture, both city and country, and the name of the flour. The freight line agent gave the shipping directions as to routing, etc. The bills of lading were made out in four copies - one for the miller, one for the bag maker so that he could collect the drawback on the bags, and two originals endorsed in blank, and attached to the bills of exchange.

The bills of lading, an invoice for the flour covered by it, and a "hypothecation paper" which was simply a contract between the miller and the bank to protect the bank in case the bill of exchange was sold, were all turned over to the bank. The miller then drew a bill of exchange on the buyer and the bank credited him with the amount of the draft. The drafts were for sixty days and the hypothecation paper gave the bank, or the holder of the bill, the right to sell the flour if the draft was not paid by the buyer. Having insured the cargo, by simply filling out an insurance certificate in duplicate and mailing one copy to the insurance company, the miller had completed all the formalities. The papers were gathered in two sets. A bill of exchange, a bill of lading, an insurance certificate, and a hypothecation paper formed one set. The wording of the documents showed that when the buyer had paid on one set, the other was void. The two sets were usually mailed a day or so apart so that they might cross the ocean on different steamers, thus the danger of loss in transmission through the mails was minimized.

29. The Export Trade Since 1895.

The tremendous growth in Minneapolis flour exports to

England after 1877 came at a period when there was a disastrous decline in British agriculture. A succession of bad harvests, a disastrous live stock epidemic, and the low prices caused by American competition had caused, it was estimated, a loss to British farmers in the four years from 1878 to 1882 of almost one-third of their available capital.¹ It was made possible by the fact that the millers of England refused to adopt the new processes. As long as they were milling the soft English wheats they saw no need of trying any experiments. When, however, the rush of hard wheats from Hungary, Argentine, and especially from the United States started, they were unable to mill them satisfactorily by the old methods. These wheats were in fact, better than the softer English varieties and the new methods of milling were cheaper and more efficient. Their natural conservatism for a long time held them back from making the change, but gradually the English millers were forced to adopt the new processes.² By the beginning of the new century, there were some eight mills in England, each of which had a capacity of 3,500 to 8,500 barrels a day and forty others that would be ranked as large mills in this country.³ With large increases in capacity and financial strength came the desire for more business, and the British millers began an active campaign to educate the consumer to the use of the home-milled flour.⁴ By 1900, the science of milling had pro-

1. Northwestern Miller, Feb. 17, 1883, p. 105. Quoting the London Times.
2. Humphries, 'Modern Developments of Flour Milling', Journal of the Society of Arts, Vol. 55, pp. 110-11.
3. Davis, Flour and Wheat Trade, p. 10
4. Ibid., p. 7.

gressed to the point where it was claimed that the best flours were obtained, not from some one variety of wheat, but by a judicious blending of various kinds. The British miller buying wheat from all the world would seem to be in the most favored position, although as a matter of fact, the British miller hardly ever gets the very finest of the foreign wheats to mill.¹ Nevertheless conditions were distinctly more favorable to him than in the previous decade.

Meanwhile, transportation conditions were working against the American mills. "On the ocean, while wheat and flour can be stowed with about equal facility, and while the cost of handling flour, all things considered, is less than is the case with wheat, and the shrinkage on flour is nothing, while it may be considerable on wheat, yet flour is generally charged a much higher rate for transportation via ocean than is wheat. Some ships and some lines are better prepared for handling wheat than flour and the competition rates gives wheat the preference."² Moreover the steamship companies provided a bill of lading which allowed an arbitrary "working out charge" at the port of London amounting to about three cents per barrel, which was not charged against Australian or European flour.³ On top of this, there were excessive delays in transporting the flour and irregularities in arrivals so that the flour which was shipped from America at regular intervals might, to the great inconvenience of the buyer, arrive all at the same time.⁴

1. Davis, Flour and Wheat Trade, p.12.

2. Ibid., p.14. "Wheat was at first shipped in sacks, then bulk shipping was tried, but proved unsatisfactory. There was too much danger of the cargo shifting in a storm. The final solution seems to have been to ship the wheat in bulk but to put two or three tiers of sacks on top to prevent shifting of the load.

3. Davis, Flour and Wheat Trade, p.15.

4. Ibid., pp.15-19.

The railroads as well as the steamship lines^{dis-} discriminated against American flour. Originally, railroad rates for wheat and flour had been the same. But about 1899 the trunk lines began to give wheat a lower rate. This increased until it amounted frequently to a discrimination against flour of ten cents per hundred pounds. As a result, the wheat could be transported to England, and there ground, more cheaply than it could be ground here and then shipped. The Interstate Commerce Commission finally decided that a discrimination greater than two cents per hundred pounds was unreasonable. This difference was permitted on account of the greater cost of handling the flour in shipping. The railroads, however, paid no attention to this decision and conditions remained for some time, at least, as bad as ever. The Minneapolis millers to some extent, escaped this discrimination because much of their flour was shipped out over the¹ Canadian lines.

Then in 1904, the American millers were forced to make flour from a crop badly damaged by wheat rust; which lowered the quality of their flour and on top of that, the government in its anxiety to get a drought-resisting wheat, began to encourage the farmers to grow durum or macaroni wheat.² The Minneapolis millers fought against this propaganda of the Department of Agriculture.³ They claimed the new wheat would not make good bread; that it took a larger quantity of it than spring wheat, to make a barrel of flour; that it required more power to grind and bolt it; and that it produced a

1. Ripley, Railroads, Rates and Regulations, pp.136-137.

2. Davis, Flour and Wheat Trade, p.19.

3. Northwestern Miller, April 10, 1907, p. 93.

smaller, darker loaf, having a sickly, unhealthy, and most undesirable yellow tinge. More than that, they said that in a few years the durum wheat would degenerate and become soft and starchy like the Pacific coast wheats.¹ The Northwestern millers tried to discourage its growth by paying ten to twenty cents per bushel less for it than for the hard spring wheat. This did not prevent the growing of durum wheat. It did raise doubts in the minds of the foreign buyers as to whether the Minneapolis flours were really made from hard spring wheat. And at the same time the English miller who was necessarily a blender of wheats, was enabled to buy the cheaper durum wheat and under-sell the American miller just to the extent that he used it.²

Still another cause of a decline in American exports to England was the bad business methods of some of the millers which reflected on the rest. The English flour dealer, having unfortunate experiences with one of these American millers, was apt to feel that the characteristic traits of American mills were "delay in shipping, long time enroute, off grade on arrival, and refusal to settle." A lowering of the quality of various grades, and false branding as, for example, branding flour made from Kansas wheat as made in Minnesota, had "made great talking points for those striving to displace American flour."³

Such were the conditions which caused a decline in American flour exports after 1900. As has been shown, almost all of

1. Northwestern Miller, April 10, 1907, p. 93.

2. Davis, Flour and Wheat Trade, pp. 20-21.

The Millers' charges against the "goose wheat" as the original durum variety was called, seem to have been well founded. Since then new varieties have been introduced such as the Kubarka, which make good bread flours.

3. Davis, Wheat and Flour Trade, pp. 9, 22-25.

them applied also to Minneapolis; consequently, there was a decline in Minneapolis flour exports that was even more marked than that of the country as a whole. Whereas the exports had averaged 34.41 per cent of the total output of Minneapolis in the decade 1880-1890, in the following decade they declined to 30.38 per cent; in the decade 1900-1910 to 16.82 per cent; and in the first eight years of the present decade, exports averaged only 6.40 per cent of the total output. This decline was absolute as well as relative, exports decreasing from over four million barrels in 1899-1900 to less than one million in 1917-1918.¹

Whether this decline will continue in the next few years, until the export trade of the Minneapolis mills disappears completely, is a question. Doubtless, the decrease in the last two or three years is at least partly due to poor crops in the spring wheat region. A good crop or two may change the figures somewhat. A recent writer in the Northwestern Miller has contended that the trade will soon disappear.² He gives as his reasons, (1) the increased efficiency and capacity of the British mills, (2) the poor methods of handling the American flour at terminals and enroute, and (3) the possibility of a British protective duty against American flour. The editor criticizes these statements, but concludes that the greatest danger to our export trade is the largely increased home demand which may soon bring our export trade automatically to an end.

1. See Table No. 2 Appendix.

2. Northwestern Miller, Oct. 15, 1919, p. 253.

The growth of the domestic trade has caused a gradual change in selling methods in the flour trade. The miller, who was at first content to abide at home and let the flour salesmen seek him out, found, when his mill grew tremendously in size, that he must make active efforts to gain and hold the trade. Sales at first made through commission men and then through flour brokers and jobbers, are now made very largely through branch houses and salesmen employed by the millers themselves. The whole tendency of flour selling is to out out the middlemen as far as possible. Moreover, as the competition grew keener; as the millers found it less and less profitable to depend on a foreign market, they began to extend their home markets. In this they found a most powerful instrument in their nationwide advertising campaign, as a result of which the Minneapolis mills sell their flour in every section of the country in competition with the local mills.

The growth of the export trade between 1877 and 1895 and its rapid decline after the latter date, has been explained in detail. Probably, if the millers had been forced to do so, they might have made successful headway against the forces that were cutting down on their export trade. But more and more, as America grows in population, they find that the domestic market is the richest and most desirable field of operation.

Chapter X

Growth of Minneapolis as a Milling Center 1891-1920

30. The Attempt to Form a Milling "Trust".

The year 1891 is the half-way point for the milling industry of Minneapolis. By that date the formative period was over, the main lines of development had been marked out. Since then there have been many important developments, but the story is neither as clear nor as interesting. Some parts of it have been told in previous chapters. The changes in milling technique, the difficulties with labor, and the changes in marketing methods have been discussed. There remains to be considered the position of Minneapolis with reference to the trade as a whole and in relation to rival milling centers. It is the purpose of this chapter to relate the story of the attempt to bring the Minneapolis mills into a combination of spring-wheat mills, - the so-called milling trust - and then to show how the leadership of Minneapolis has been challenged by the growth of other milling centers. We should then be in a position to make some predictions as to what the future holds in store for Minneapolis as a milling center.

In chapter IV the consolidation of the Minneapolis mills was traced as far as the year 1891. By that date about seven-eighths of the city's 1) milling capacity was owned by the four great corporations whose rise we traced. The process of consolidation did not end at that date. In 1893, the Minneapolis 2) mill was leased by the Washburn-Crosby Company. The Humboldt mill became the 3) Washburn Crosby E Mill in 1896 and was purchased by them in 1899. By the latter date there were just three independent mills left, - the Cataract, the Phoenix, and the Dakota, with a combined capacity of 2200 barrels as against a capacity for the four corporations of 67,746 barrels. It seemed only a question

1) Capacity of the four corporations 40,350, of the six independent mills 5,450.

See appendix, Table of Milling Company.

2) And purchased by the Washburn Crosby Company in 1898. Northwestern Miller Dec. 23, 1898, p. 1085.

3) Northwestern Miller, May 3, 1899, p. 833.

of time before these, too, would be absorbed, and that consolidation of all the mills under one company would be the next step.

While this was going on, the milling corporations were having difficulties of their own. The Northwestern Consolidated Milling Company was in trouble from the first years of its life. The promoters, who had proposed to make it a Minneapolis concern, tried to sell the bonds in the local market at a time when financial conditions there were unfavorable. The clouds which presaged the storm of 1893 had appeared on the horizon. Investors shied at the new bonds and only a part of them were sold. As a consequence, the working capital of the company, which was to be secured by the sale of the bonds, was far too small. The president of the company had little practical milling experience, there was friction between the managing directors, and, worst of all, the company was over-capitalized and so could not earn reasonable dividends on its stock under the strong competition they had to face. The poorest of the mills, the Pettit, was dismantled and used as an elevator, the other mills were overhauled and put into as good shape as was possible, but in spite of this, the company could not compete successfully against Pillsbury and Washburn-Crosby.¹⁾ For a time it managed to secure loans on the personal credit of the president of the company and thus make up for the deficiency of working capital.²⁾ But this could not continue indefinitely. In 1895, the president refused to carry the burden any longer and so the stock holders were forced, in October 1895, to leave the mills to an operating company composed of A. C. Loring and the Christian interests, George H. Christian, being president and A. C. Loring, secretary and treasurer. The arrangements were that the rentals and other revenues received from the new company were to be used first of all to reimburse the president of the old company for the money he had advanced and then to pay dividends.³⁾

1) See above, ch. IV, pp. 79-84.

2) Northwestern Miller, June 25, 1899, pp. 1227-1228.

3) Ibid.

The operating company seems to have been quite successful. The rentals from it were such that in two or three years the loans from President Martin were repaid. But meantime there were no dividends for the stockholders in the old company and the stock depreciated in value. The members of the operating company, among others, were shrewd enough to realize the value of the property and to buy up the stock as it was offered, at a very low price.¹⁾

This was the situation when Thomas McIntyre came to Minneapolis with his scheme for a milling trust. He was a flour dealer of New York City, who in 1898 had promoted a combination of the flour mills of New York City under the name of the Hecker-Jones-Jewell Milling Company.²⁾ McIntyre seems to have bought the five mills outright and sold them to the new company. The profits from this promotion encouraged him to undertake a larger scheme, and in 1898 he formed the plan of a combination of all the large spring wheat mills of the country, including the Hecker-Jones-Jewell Company and the mills at Syracuse, Buffalo, Milwaukee, Duluth, Superior and Minneapolis.³⁾

Mr. McIntyre was later called before the Industrial Commission and his testimony, there given, is interesting because of his statement of the economies which he anticipated from such a combination.⁴⁾ He claimed that mills on the water front had an advantage of ten cents per barrel on flour for export. If all the mills were combined, export flour of all brands could be made there.²⁾ There would be a large saving on cross-freights.³⁾ Any brand of the company might be made where wheat was, for the time being, the cheapest.⁴⁾ There would be a saving in the cost of selling because there would be fewer travelling salesmen in proportion to the volume of the business.⁵⁾ One man could do the buying and selling for each geographical group of mills, thus effecting considerable savings.⁶⁾ The combination could afford to pay higher salaries for superintendents of the mills

1) Northwestern Miller, June 28, 1899, p. 1228.
2) Industrial Commission Report, Vol. XIII, p. 691.
3) Ibid.
4) Ibid.

and thus secure better management. Mr. McIntyre went on to say that the combination did not lower wages. On the contrary, wages were to be increased and men employed more steadily, for if one mill was shut down, the employees could be shifted to another. Nor did they expect to increase the price of flour. Competition outside of the combination had forced prices down to such a point that the only hope of profit for the mills was to lower costs of manufacture. That could be done easily by a combination.

In December, 1896, McIntyre came to Minneapolis to put his plan before the millers of the city. The future of the trust depended on his winning the Minneapolis millers into it. The amount of money involved was too large to allow the mills being bought outright. Any combination must include the millers themselves. For a time they seemed favorable to the scheme, but the Northwestern Miller opposed it fiercely, and at length aroused public opinion forced them to reject the plan.

The trust's activities were then transferred to Milwaukee. The U. P. Allis Company owned mills in that city and also at Superior and it was known that they were for sale. The promoter had no great difficulty, therefore, in securing certain mills at Milwaukee and all the mills at Superior for the new combination.

Meanwhile, in April 1899, the United States Flour Milling Company had been formed. Its prospectus, issued some months earlier, announced that it was to have a capital of \$12,500,000 common stock, \$12,500,000 preferred and \$15,000,000 first mortgage bonds. Among the properties to be acquired were the Pillsbury-Washburn, Washburn Crosby, Northwestern Consolidated and Minneapolis Flour Manufacturing Company mills, as well as nine mills at Duluth, Superior and Milwaukee, - thirty-one mills in all, with a capacity of 96,150 barrels. It was

1) Industrial Commission Report, Vol. XIII, p. 681.

2) Northwestern Miller, Dec. 23, 1898, p. 1083.

3) Northwestern Miller, Dec. 1, 1898, p. 197.

4) Industrial Commission Report, Vol. XIII, p. 681.

5) The Miller Mill, (Oct., 1898, p. 186), gives a total of 98,300 barrels.

claimed that these mills were earning \$1,400,000 a year, that economies due to combination would provide additional earnings of \$15,000,000. Thus there would be sufficient to pay reasonable dividends on the total capitalization. The claim was that the mills would control eighty per cent of the total spring-wheat output. Since there was, as has been shown, a market for spring-wheat flour quite distinct from that of the winter-wheat flours, this would give the combination a real monopoly.

McIntyre had not, in fact, given up the idea of getting the Minneapolis mills into the combination. In April 1899, the Minneapolis Flour Manufacturing Company, the smallest of the four corporations transferred its properties to the trust. Chances seemed good to acquire the rest as well. The Pillsbury-Washburn Company was largely owned in England by stock-holders none too well pleased with the small dividends they had been receiving. The Washburn-Crosby Company was operating the Washburn mills under a lease, and the ownership rested with the C. C. Washburn Flouring Mills Company. Of this company, the major portion of the stock belonged to the estate of Governor Washburn, and the executors, it was said, were anxious to sell so as to settle up the property. Condition of affairs in the Northwestern Consolidated has already been shown.

In the Pillsbury-Washburn Company, the operating management, the old Pillsbury group, was opposed to the trust. They enlisted the aid of the local banks and organized a stock-buying campaign in England. They were so successful that they presently issued a statement claiming that the majority of shares were owned by those opposed to going into the combination. In the case of Washburn Crosby

1) Northwestern Miller, Feb. 15, 1899, p. 293.
2) Northwestern Miller, May 3, 1899, p. 333. (This was obviously an exaggeration. The combined Minneapolis and Duluth-Superior production amounted to less than seventy-five per cent of the total Minnesota production.)
3) The Roller Mill denied that there was any idea of monopoly. Roller Mill, Ser. 1899, pp. 465, 466.
4) Northwestern Miller, Feb. 15, 1899, p. 292.
5) Northwestern Miller, Apr. 12, 1899, p. 687.
6) See above - pp. 215-216.
7) Northwestern Miller, Apr. 12, 1899, p. 687. Roller Mill, March 1899, p. 467.

Mills, W. H. Dunwoody secured capital so that in May he was able to announce the purchase of the Washburn Mills by the operating company.¹⁾

With the purchase of these plants by the trust removed from the list of possibilities, the chances of securing a monopoly of the spring-wheat production had disappeared. Prospects were poor at best, owing to the large milling capacity outside of the milling centers. After that there really was nothing to justify a new combination. The advantages which Mr. McIntyre had enumerated²⁾ were not sufficient to counterbalance the inevitable over-capitalization. But if even one group of Minneapolis mills could be secured, their prestige might make the proposition attractive to the investor. It seems fairly probable that the leaders in the scheme were chiefly interested in the promoter's profits. There remained only the consolidated mills. The operating company had a lease that could be cancelled at any time. Through various transfers of stock, Mr. A. C. Loring had become the principal owner. The trust promoters concentrated their efforts on him and finally won him over. The United States Milling Company purchased practically the entire capital stock of the Northwestern Consolidated at par.³⁾ The old company, with the old brands and trademarks was preserved as a subsidiary of the trust and Mr. Loring became president and general manager.

The news of the purchase was received in Minneapolis with gloomy forebodings. The Northwestern Miller attacked Mr. Loring for his part in the transfer.⁴⁾ Newspapers throughout the state urged the Attorney-General to start⁵⁾ legal proceedings to prevent the transfer of the mills to the trust. The feeling against the combination was apparently compounded of hatred of trusts, distrust of stock promotion schemes, and a fear that the success of the combination might mean the closing of some, or all, the mills and an end to the milling supremacy of Minneapolis.

1) Northwestern Miller, May 31, 1899, p. 1027; Miller Mill, Apr. 1899, p. 521.

2) Ibid - June 28, 1899; p. 1227.

3) Northwestern Miller, July 5, 1899, pp. 17, 19.

4) Ibid. July 5, 1899, p. 17.

5) Ibid. July 19, 1899, p. 117.

As a matter of fact, Minneapolis had little to fear. Had the trust succeeded in getting control of all the mills, other independent mills could easily be built. The Christians, forced out of the Consolidated, immediately began the erection of their Century Mill (1650 bbls.)¹⁾ Had the trust carried out its plans in Minneapolis, doubtless there would have been other millers to start opposition mills. And Minneapolis still had so many advantages as a milling center as to make it very improbable that the combination would close down her mills.

From the time they purchased the Consolidated Mills, the promoters were in difficulties. Only sixteen millions of stocks and bonds had been floated of the projected forty millions.²⁾ The purchase of the Consolidated stock had absorbed a large portion of the money set aside for working capital.³⁾ Early in February, it was announced that a reorganization of the company was planned.⁴⁾ Apparently, the scheme fell through, for later in the month came the news that receivers had been appointed for the company. The money market had been unfavorable at the time the securities were marketed, the properties had been purchased at far more than their true value; some of the mills were so antiquated as to be practically useless for milling purposes. The failure of the Produce Exchange Trust Company of New York, which had been financing McIntyre, was the last straw.⁵⁾

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Mr. Loring was one of the receivers who organized the company. In October, 1900, the Standard Milling Company was incorporated in New Jersey to take over the properties of the United States Flour Milling Company. The failure of the old company had been hailed with expressions of joy throughout the country.⁶⁾ And it was assumed that the bankruptcy proceedings would break the combine.

- 1) Northwestern Miller, Jan. 10, 1900, p. 65.
- 2) Industrial Commission Report, Vol. XIII, p. 602.
- 3) Northwestern Miller, Jan. 31, 1900, p. 225.
- 4) Ibid., Feb. 7, 1900, p. 272.
- 5) Northwestern Miller, Feb. 26, 1900, p. 409.
- 6) Public Opinion, March 8, 1900, p. 296. The article quotes newspaper opinions on the subject.

This was not the case, however. The new company issued \$ 17,250,000 worth of stocks and bonds for which the old were exchanged. This was one million more than the paid-in capital of the United States Flour Milling Company and the extra million was to provide working capital. In Minneapolis there was a reorganization by which the two subsidiaries of the trust amalgamated as the Northwestern Consolidated Milling Company. A. C. Loring became president and general manager of the Consolidated. The oldest and least efficient mills were dismantled or torn down. The mills at Superior were shut down for a time and the plants farther east also. The standard was operated carefully and economically by a group of very able financiers, so that by 1903 it was in position to pay a dividend on its preferred stock. It was not until 1911-12, however, that they reached five per cent on the preferred stock and began paying dividends on the common as well.

The Standard Milling Company may now be said to be on its feet financially. It owns three mills at Superior and the properties of the old Minneapolis Flour Manufacturing Company at Minneapolis. It owns a controlling interest in the stock of the Hecker-Jones-Jewell Company, operating a mill at New York City, as well as stock of the Northwestern Consolidated, operating seven mills in Minneapolis. Within recent years it has acquired a controlling interest in the Southwestern Milling Company, operating two mills at Kansas City. The Standard is the only milling company in the country which compares with Washburn-Crosby both in size, and in the widespread extent of its operations.

The idea of forming a milling trust is probably settled for all time. The rapid growth of the interior mills both in Minnesota and the Dakotas, had made the financial obstacles almost insuperable, even if the Minneapolis mills could be brought into a combination, which is very improbable. The spring-wheat mills no longer have a monopoly; the combination would have to base itself solely on the advantages of large scale production, which would not be large enough to

1) Moody's Manual - Industrial Section - 1914, p. 989.

2) Ibid. 1919, pp. 719-720.

overbalance the inevitable over-capitalization. In any case it is clear that a corporation as large as Washburn-Crosby would have these advantages to as great a degree as would any conceivable combination. But the chief obstacle to such a combination would be the impossibility of getting the Minneapolis millers to sell. Not only Washburn-Crosby and Pillsbury, but the smaller milling firms, such as the Barber Milling Company, have become milling institutions. The second or third generations of the milling families are operating these mills. There is a personal and family pride in them, produced by years of association with them, which would make it impossible for these men to voluntarily relinquish control.

31. The Pillsbury-Washburn Failure.

Since the collapse of the milling "trust" in 1908, there has been but one important change in the management of the larger milling corporations - that occasioned by the failure of the Pillsbury-Washburn Company in 1908. G. A. Pillsbury had died in 1899, leaving no one capable of filling his position successfully. In addition, it seems that some of the officers of the company used the company's funds to speculate in wheat. These wheat deals were carried so far that nearly a million and a half of the company's money was sunk in them. The operations must have covered several years. To hide them from the stockholders, notes were issued in two series, A. and B. The one series was not carried on the balance sheet and the record of it hidden from the stockholders. In desperate efforts to retrieve the fortunes of the company, flour grades were cut so as to gain larger profits. This only resulted in a decline of the market for Pillsbury's Best. The mills and the elevators were allowed to deteriorate and poor management farther decreased the profits. The stockholders in England could not understand the situation. They knew that their property was an exceedingly

1) Northwestern Miller.- As a matter of fact the Pillsbury-Washburn Company had never made money and had paid dividends on its common stock in the only two years of Mr. Pillsbury's management. The general belief was that this was due to Mr. Pillsbury's wheat speculations. But his were open and public and with the consent of the directors. Then too it was generally believed that the company was over-capitalized. *Holler Mill*, Sept. 1899, p. 131; *Ibid.* Jan. 1899, p. 372.

2) Conversation with a Minneapolis broker. See also *Northwestern Miller*, Nov. 11, 1908, p. 359; *ibid.*, Dec. 2, 1908, p. 538.
 3) *Northwestern Miller*, Dec. 12, 1908, p. 398.

valuable one advantageously situated in its control over the water power of the city, and they could not understand why there were no dividends. The second generation of Pillsburys were only nominally connected with the management of the business and knew nothing of the reasons for the condition of the company. 1)

Matters came to a head in August, 1908., The banks of the city, growing suspicious of the company's failure to clean up on its loans, refused further credit. The Pillsburys, anxious to save themselves from bankruptcy, a company with which the family had been so closely connected, offered to advance a million dollars to the company on a second mortgage. But a very slight investigation of the company's affairs disclosed the existence of the liabilities that had been concealed from the stockholders, so the offer was withdrawn. The banks then petitioned for a receivership, which was immediately granted. Messrs. A. C. Loring, A. C. Cobb, and C. S. Pillsbury being appointed. Also an advisory committee of bankers, consisting of E. W. Decker of the Northwestern National, F. A. Chamberlain of the Security National, and C. T. Jaffray of the First National, all of Minneapolis, G. G. Thorne of the National Park Bank of New York, and C. W. Folds of Charles Hathaway and Company, brokers of New York. The receivers managed to raise enough money to keep the mills in operation. But the elevators of the Minneapolis and Northern Elevator Company were found to be in poor shape and the working capital required to operate them was so great that the receivers immediately disposed of the property. 2) For a time the mills were operated by the receivers, while various plans of reorganization were discussed. The English stockholders found it impossible to secure the necessary capital to reorganize and were therefore forced to accept the plan of the American stockholders.

In pursuance of this plan, there was incorporated in 1909, the Pillsbury Flour Mills Company, which took over the properties of the Pillsbury-Washburn

- 1) Conversation with a Minneapolis Broker.
- 2) Northwestern Miller, Aug. 19, 1908, p. 453.
- 3) Ibid. Aug. 12, 1906, p. 395.
- 4) Northwestern Miller, Aug. 26, 1908, p. 515.

Company on a twenty-year lease, with the option of renewal of another twenty years. The terms of the lease provided for an annual rental based on earnings, with a minimum of \$100,000 per year, plus one half of the net profits over \$ 150,000. The lessee may buy or build additional mills in which the Pillsbury-Washburn Company is to share in the net profits above seven and a half per cent¹⁾ on the capital invested. The new company was capitalized at \$2,000,000 and stock in it was offered to the stockholders of the old company. It seems, however, that the stock is quite closely held, mostly by the officers of the new company. These are A. C. Loring, president, C. S. Pillsbury, vice-president, J. S. Pillsbury, vice-president, and A. F. Pillsbury, secretary-treasurer.

The new company has gradually built up the Pillsbury mills to a paying basis. The capacity of the mills has not been increased and but one mill has been added to the group. But the old and worn out equipment has been replaced, the mills brought up to date, and as a result, they are again earning dividends. The Pillsbury-Washburn Company's balance sheet showed an annual deficit until 1914. In that year there was a surplus of 385. From that point on the profits²⁾ of the company have steadily increased.

The lease to the operating company runs out in 1929. It has the option of renewal for another twenty years, so that we may look to see the Pillsbury Flour Mills Company operating the mills until 1949 at least. What will happen after that, is, of course, impossible to predict. When the lease was made, the operating company protected themselves by purchasing the Pillsbury brands and trade marks outright.³⁾ Should they ever be forced out of the old mills, it is not difficult to foresee that they will be in good position to buy or build other mills and continue the business with the tremendous advantage of the old name and the good will that goes with it.

1) Moody's Manual 1914, Industrial section, p.

2) Ibid., p. 826.

3) Conversation with a Minneapolis broker.

32. Rival Milling Centers.

The leading place in milling which Minneapolis won in 1881 has been held ever since that time, but it has not been an undisputed leadership. Since that date she has been forced to fight to keep her position - first against Duluth-Superior and Buffalo, then against Milwaukee and Chicago, and within recent years against Kansas City.

The growth of the Twin Ports at the head of Lake Superior has brought on a triple conflict of interests (1) between lake and rail routes, (2) between Milwaukee and Chicago on the one hand and Minneapolis and Duluth on the other, and (3) between Minneapolis and Duluth.

As long as the wheat fields centered in the region immediately about Chicago, the railroads had the advantage over the lake routes. By rail from Chicago to Buffalo the distance was only 410 miles; by water it was 899 miles. ¹⁾ But as the center of wheat-growing moved westward - in the case of spring-wheat, north-westward to the Red River Valley - the time came when most of the wheat found a shorter route to the sea coast via Duluth and Buffalo. For a long time the railroads continued to get the bulk of the traffic, first, because they could operate at all seasons of the year, while the lake steamers could not, and secondly, because the lake steamers had not improved their facilities to keep pace with those of the railroads. ²⁾ After 1887, the lake steamers began to increase their share of the business, for with improved facilities, they were able to give a lower rate than the railroads.

The first lake shipments were made mainly via Milwaukee and Chicago. The opening of the St. Paul and Duluth Railway in 1870 opened up the Lake Superior route, and Minnesota shippers of flour and grain were not slow to take advantage of it. The railways leading to Milwaukee and Chicago - specifically, the Chicago, Milwaukee and St. Paul - waged war ^a against this road because they knew it would

1) Monthly summary of Commerce and Finance, Jan. 1900, p. 1989.
2) Ibid. From 1875 to 1887 the American tonnage on the Great Lakes declined from 838,000 to 784,000. Monthly Summary of Commerce and Finance, June 1892, quoted in Meyer, Government Regulation of Railroad Rates, p. 244.

take to Duluth trade from southern Minnesota which had gone to them.

The road managed to survive, however, and Duluth became a grain port of some importance. But its real growth dates from 1866, when the present Great Northern Railroad built a road to Duluth and put a line of steamers on the Lakes. To take care of the traffic during the winter months, the Duluth South Shore and Atlantic - "Duluth's Declaration of Independence" of Chicago - was built in the same year, giving an all-rail connection to the East byway of (1) the Canadian Pacific, (2) the Michigan Central, and (3) the Grand Rapids and Indiana line. ²⁾ As soon as its line was completed, the Great Northern demanded that merchandise rates from the East to Duluth be the same as from the East to Chicago, since the distance was about the same. There were storms of protest from the merchants of Chicago and from the railroads leading from Chicago to Minneapolis, but ultimately these demands were granted. As a result, Duluth shipping going East with grain or flour was assured a return cargo, and ³⁾ the growth of the port was steady from that date.

The Minneapolis millers were just as anxious as the Duluth people to build up that port. It gave them a competitive route which they could use in beating down railway rates via Chicago. Thus the Northwestern Miller reports that in 1876 that, "The millers of Chicago and vicinity are disgusted by reports that the managers of the Eastern railroad pool have privily agreed with the millers of Minnesota and Wisconsin to carry their flour from Chicago to New York for ten cents less a barrel than they will carry for the Chicago millers. This shows the benefits of competition. The Northwestern millers have the Grand Haven and Duluth routes which are not in the pool. For the Chicago ⁴⁾ millers there is no competing route.

1) Meyer, Gov't Reg. of R.R. Rates, pp. 242-3.

2) Meyer, Gov't Reg. of R.R. Rates, pp. 243-4.

3) Ibid. pp. 244-245.

4) Northwestern Miller, Jan. 7, 1876; see also Ibid., Jan. 25, 1878.

Presently, however, their attitude changed. In the early eighties, the wheat supply directly tributary to Minneapolis, was no longer sufficient to supply her mills, and so she was forced to seek supplies further north. There the Minneapolis millers had to meet the competition of European and Eastern wheat buyers who shipped their wheat out of Duluth. In order to meet the competition, it was necessary to have a low milling-in-transit rate from this territory via Minneapolis to Duluth. Or else the millers must seek such rates from the Milwaukee-Chicago lines as would justify them in shipping flour milled from this northern wheat on a milling-in-transit rate through those cities. In 1886 the rate from Minneapolis to Milwaukee was reduced so as to make the rate through that city to New York the same as the rate via Lake Superior.

The main reason, however, for Minneapolis' change of attitude was the fact that there had grown up at Duluth and Superior, in a marvelously short time, a group of flour mills which seemed likely to challenge the supremacy of the older milling center. The first mill at Duluth was abuilt about 1885. Ten years later the two cities (Duluth and Superior) were manufacturing over three million barrels of flour. The main growth was on the Wisconsin side, at Superior,

1) American Miller, Vol. XI, p. 440.

2) Ibid., p. 491.

3) Ibid., Vol. XIV, p. 318.

4) Duluth-Superior Flour Output, in barrels by crop years ending Aug. 31.

Miller's Almanack 1920-21, p. 176:							
1891-2	872,665	1899-1900	749,155	1907-08	585,275	1914-15	1,212,080
1892-3	1,607,620	1900-01	477,615	1908-09	599,840	1915-16	1,401,500
1893-4	2,671,885	1901-02	1,605,945	1909-10	712,745	1916-17	1,096,980
1894-5	3,325,025	1902-03	1,423,365	1910-11	797,955	1917-18	1,035,495
1895-6	3,404,500	1903-04	1,031,355	1911-12	839,275		
1896-7	2,630,380	1904-05	635,755	1912-13	1,073,550	1918-19	1,051,385
1897-8	2,133,120	1905-06	1,034,605				
1898-9	2,637,015	1906-07	774,870	1913-14	1,420,890		

5) Minneapolis Civic and Commerce Association, Rail-Lake-Rail Rates, p. 13.

where six mills were erected within a period of eighteen months. The "Annual Report of the Trade and Commerce of Duluth" contained the statement that the year 1892 would long be remembered as the year in which Duluth "toppled over the framework of pre-eminence built by Minneapolis." ²⁾ "Milling" contained an article on "The New Milling Center of America", ³⁾ and the manager of the Lake Superior Mills, at Superior, was quoted as saying that ⁴⁾ "he did not believe that another flour mill would ever be built in Minneapolis."

The advantage claimed for the Twin Ports were weighty indeed. On the one hand they claimed to be nearer the best wheat-growing lands and therefore ⁵⁾ able to secure the choicest wheats. This advantage, coupled with the fact that their mills were newer and more up-to-date, made it possible for them to ⁶⁾ produce better flour. The chief advantage claimed was in the matter of rates. Lake and rail rates to Buffalo were six cents less from Duluth than from Minneapolis; to Albany, nine cents less; to Philadelphia, New York, and Boston, ten cents less. From the larger part of the wheat territory, wheat rates to Duluth and Superior were at least no higher than to Minneapolis. Therefore Minneapolis would always be at a disadvantage of from six to ten cents per barrel in shipping to the Eastern markets, -as soon, that is, as the mills at Duluth and Superior were ⁷⁾ big enough to compel the railroads and steamship lines to give them fair treatment. It would seem that the mills at the head of Lake Superior were built in consideration of the advantages over Minneapolis, above stated. The Minneapolis millers had not minded rates nominally unfavorable to them so long as there was every opportunity of overcoming the disadvantage of secrete rebate. The passage of the Interstate Commerce Law changed matters. Henceforth the published rate was likely to be the ⁸⁾ real rate. They claimed that if the differential in favor of Duluth were allowed to stand, it would wipe out "the whole of the meager profit of ten cents a barrel that Minneapolis millers are now making". But Duluth answered that the differential was

1) Milling, Vo. II, pp. 1-16.
 2) Quoted by Meyer, Gov't Regulation of Railway Rates, pp. 397-8.
 3) Milling, Vol. II, p. 1-16.
 4) United States Miller, Sept. 1892, p. 210.
 5) Milling, Vol. I, p. 555.
 6) United States Miller, April, 1893, p. 86--Northwestern Miller, Holiday No. 1893-
~~p. 8 Advertisement of the Duluth Imperial Mills.~~
 7) Milling, Vo. II, p. 11. 8) Though as a matter of fact rebates on this traffic were granted for some years thereafter. Interstate Commerce Commission Report, 1898, p. 6.

not an unfair discrimination but resulted simply from the natural advantages of her geographical position.¹⁾

In 1892 Minneapolis appealed to the Interstate Commerce Commission, not however on the matter of the differential, but on the question of the rates from the wheat region. The railroads had made a division of her territory in the Northwest between Duluth, Minneapolis and Milwaukee. That division provided among other things that from a large territory in North and South Dakota and Minnesota, the rates on wheat should be the same to Minneapolis and Duluth. This, in spite of the fact that numerous points in the territory were from seven to thirty-per cent nearer Minneapolis. This, the Chamber of Commerce claimed, was subjecting Minneapolis to undue and unreasonable prejudice and disadvantage.²⁾

The Commission took up the complaint and sustained the Minneapolis contention. "It can hardly be doubted", they said, "that under the present adjustment of rates on wheat, the milling interests of Minneapolis, and with them its general prosperity, and possibly its population, must decline. So far as such a result would be attributable solely to the greater natural advantages of Duluth as a point for the manufacture and shipment of flour, nothing perhaps, could properly be done to avert it. Duluth is nearer to the markets than Minneapolis, and to this extent its advantages cannot and ought not to be denied or taken from it. But on the other hand, Minneapolis is nearer to the wheat fields than Duluth and to this extent it is entitled to the advantage over Duluth, which, on that account, should naturally belong to it."³⁾

The railroads refused to obey this decision and it was not enforced. The Minneapolis representatives feared that if it were, it might encourage other cities to file similar complaints. If the Commission's ruling were followed out in principle, it might deprive Minneapolis of more territory than she could gain

1) Milling, Vol. I, pp. 236-237; Roller Mill, July 1898, p. 17.

2) Meyer, Government Regulation of Railway Rates, pp. 398-399. - Specific examples of discriminating rates are given in the Minneapolis Chamber of Commerce Annual Report, 1893, pp. 18-20.

3) Interstate Commerce Commission Report, 1893, pp. 22-29, quoted in Meyer, Government Regulation of Railway Rates, p. 399.

by it. As late as 1905, the Chamber of Commerce requested that it be not enforced, for the reason that if the same policy were pursued by the other cities Minneapolis would get no advantage from the southwestern trade, and Duluth would get all the advantage from the Northwestern trade. 1)

Possibly the mills in Minneapolis were getting secret rebates at the time, so that they could afford to disregard the differential. 2) At any rate, their flour production from 1894 to 1898 grew faster than ever. Duluth-Superior production, on the other hand, declined during the years 1896 to 1899. In the latter year the mills of Superior were purchased by the United States Milling Company - the flour-mill "trust". The financial difficulties of that company caused the mills at Superior to be shut down for a long time, and for two years there was a big drop in the total output of the Twin Ports. For a time there was only one mill operating at the head of Lake Superior and the Minneapolis mills were accused of price-cutting and under-bidding in an attempt to drive it out of business. 3)

In 1901-02, Duluth-Superior production again passed the one-million barrel mark. By that time the annual output of Minneapolis had grown so enormously that there was no longer any question of rivalry. However, the difficulty about rates has recurred again and again, for Duluth still aspired to take away from the Twin Cities their leadership as distributing centers. In 1913, the railroads re-arranged freight rates from New York to Duluth and to Minneapolis, so that the differential in first class freight was made twenty-eight cents, as compared to fifteen cents in 1897. The Minneapolis Civic and Commerce Association protested against this increase in a very able brief. The Interstate Commerce Commission upheld the changes in rates in favor of Duluth on the ground that the old rate denied Duluth the advantage of her favorable location. The Minneapolis men proceeded to

1) Meyer, Government Regulation of Railway Rates, pp. 401, 402.

2) Modern Miller, Aug. 18, 1900, p. 16; Roller Mill, Sept. 1902.

3) Modern Miller, Jan. 26, 1901, p. 16.

4) Minneapolis Civic and Commerce Association, Rail-Lake-Rail Rates, p. 3.

show "that it is not primarily the competition of the Twin City market that handicaps Duluth, so much as certain inherent difficulties both in her geographical position," and the character of the territory legitimately tributary. They claimed that the old rates did not really discriminate in favor of Minneapolis, but that "certain natural advantages exist at the Twin Cities, which entirely apart from the subject of rates, conspired to aid in the building of this market to its present proportions." ¹⁾ They then proceeded to divide the state on a basis of mileage from the two cities, into Duluth territory and Twin City territory. They showed that six-sevenths of the agricultural products of the state (in value) came from the territory tributary to the Twin Cities, that while the timber wealth of Minnesota came largely from Duluth territory, the Mississippi River had carried the flow of logs and lumber to Minneapolis. It was this natural advantage, together with the splendid water power of St. Anthony, and the concentration of railway lines from all Minnesota at the Twin Cities, and not discriminating rates, that had caused the growth of Minneapolis ²⁾ as a distributing center.

Since 1900 Duluth as a milling center has not progressed. Fundamentally the brief mentioned above stated the facts. While some of the wheat-shipping points are nearer to Duluth, the area as a whole is tributary to Minneapolis. Duluth is handicapped by the fact that her immediate hinterland is territory that is not suitable for agriculture and that the larger hinterland is limited. Had the removal of the tariff on wheat provided for in the Underwood Tariff law and made effective by the removal of Canadian flour duties in 1919, come at an earlier period, before Canadian flour-mills were firmly established, the results might have been quite different. ³⁾ Duluth might again be in a position to challenge the milling supremacy of Minneapolis, for then the wheat territory she could draw supplies from, would be incomparably greater. Failing that, she seems

- 1) Minneapolis Civic and Commerce Association, Annual Report, p. 3.
- 2) Minneapolis Civic and Commerce Association, Rail-Lakes-Rates, p. 15.
- 3) Miller's Almanack, 1920-21, pp. 61-62.

inevitably doomed to a minor place in milling.

One reason for the relative decline of Duluth-Superior as a milling center is found in the rise of Buffalo. ¹⁾ To some extent Buffalo draws its wheat supplies from Chicago, but essentially it is a spring-wheat milling center, and its wheat supplies must come mainly from Duluth. Its interests are therefore in even sharper competition with Duluth than with Minneapolis.

²⁾ Buffalo's first merchant mill was built in 1875. Two years later a mill of the first complete roller mills in the country was built at Buffalo by George Urban and Son. ³⁾ Growth was very slow, however, and the real importance of Buffalo as a milling center dates from 1902. Before that it had become an important

⁴⁾ elevator center and also a flour distributing center. To take advantage of the low lake rates, the Western millers built large warehouses at Buffalo, in which they accumulated flour during the spring and summer months for distribution during the winter. ⁵⁾ Incidentally, Buffalo was a natural distributing center

for western New York and Pennsylvania, and the millers could use the threat of canal competition to keep down the rates. ⁶⁾ When the power of Niagara Falls became available, it was natural that the flour-milling industry should

1) Buffalo Flour Output (bbls.) Millers' Almanack, 1914-15, p. 180;

Ibid., 1920-21, p. 177.				
1902 966,000	:	1907---2,607,500	:	1912---4,869,285
1903 990,000	:	1908---2,664,500	:	1913---5,107,870
1904---2,206,000	:	1909---3,172,500	:	1914---5,718,550
1905---2,465,000	:	1910---3,764,850	:	1915---6,590,350
1906---2,347,000	:	1911---4,731,000	:	1916---7,122,920

2) Northwestern Miller, December 2, 1881, p. 397.

3) Ibid., Jan. 6, 1862, p. 486.

4) Northwestern Miller, March 11, 1881, p. 151.

5) U.S. Miller, July 1891, p. 102; Ibid., Oct. 1892, p. 231.

6) Ibid., July 1891, p. 102.

take advantage of it. The new mills inevitably came into competition with those of Duluth, since they drew wheat from the same area. The editor of the American Miller, comparing the advantages of the two cities in 1896, was inclined to favor Buffalo. There was not room for two milling centers in Minnesota, he thought, and Minneapolis had too big a start to be overtaken. Buffalo had the advantage in that wheat rates were relatively lower than flour rates. In addition, she was nearer to the great consuming market of the East. Both Buffalo and Duluth suffered for a long time from the fact that the ships carrying wheat or flour to Buffalo found it difficult to secure return cargoes. As a result, freight rates were higher to Buffalo from Duluth than to Buffalo from Chicago.

Duluth had an advantage over Buffalo in being closer to the wheat region, but was at a disadvantage in that it could ship flour only during the summer. Buffalo could buy wheat only in the summer and spring months, but could ship its flour at all seasons of the year. Minneapolis can both buy wheat and ship flour at all seasons of the year. In addition to this, Minneapolis had an advantage over Buffalo in that it is closer to the wheat fields and the Minneapolis millers maintain they can get the choicest wheat.

The growth of Buffalo as a milling center has been marvelous. There are reports of new mills of tremendous size to be built this year, but it would seem that Minneapolis has so cause to be alarmed, even though her own largest milling company had been a big factor in the growth of Buffalo. There remains to her certain fundamental advantages over Buffalo also. She has no advantages in the matter of power, of course. But Minneapolis is not only nearer to the wheat

1) American Miller, Vol. XIV, p. 22.

2) Ripley, Railroads, Rates and Regulations, pp. 135-138.

3) Miller's Almanack, 1911-12, p. 99.

4) Ripley, Railroads, Rates and Regulations, p. 145.

5) Conversation with a Minneapolis miller.

6) The Washburn-Crosby Company owns the largest mill in Buffalo.

fields, but she has access to the larger wheat supply, since Buffalo is subject to all of Duluth's disadvantages. Buffalo's natural flour market lies to the east of that city and is smaller in area than that of Minneapolis, for Minneapolis has the advantage in reaching the great Mississippi Valley states.¹⁾

This latter advantage, however, may be wiped out in the conflict between Minneapolis and Chicago and Milwaukee over the milling-in-transit question.

Milwaukee's milling history began at about the same time as that of Minneapolis. At first, the city on Lake Michigan developed faster, so that in 1870 its output was probably double that of Minneapolis.²⁾ It should have shared in the advantages of the New Process, for it was a spring-wheat center.

But Milwaukee's water power was not the equal of that of Minneapolis, and the deterioration of Wisconsin wheat in the decade 1870-1880 was a blow to the city.³⁾ By 1870, Milwaukee had become the principal wheat market of the West, which should have been advantage to her flour mills. But the millers complained that wheat prices on the exchange of ten fluctuated so violently that they found it difficult to fix a fair price for their flour.⁴⁾ Because of these obstacles, Milwaukee's milling growth did not keep pace with that of Minneapolis, but there was a steady growth until 1892, when production exceeded two million barrels. By that time St. Louis had been passed and Milwaukee stood second in the list of milling centers of the country.⁵⁾ After 1892, there was a retrograde which Milwaukee millers attributed to inequitable freight rates. They claimed that their advantages for milling were fully equal to those of Minneapolis. The latter city's cheaper water power was offset by Milwaukee's cheaper coal; Minneapolis' nearness to the wheat regions, by Milwaukee's better facilities for distribution. With the assurance of relatively equal freight charges from the wheat fields

- 1) Conversation with a Minneapolis miller.
- 2) Milwaukee Trade and Commerce, 1914, p. 89.
- 3) Thompson, Wheat Growing in Wisconsin, p. 108.
- 4) Ibid.
- 5) Milwaukee Trade and Commerce, 1895, p. 31.

of the West to Milwaukee and Minneapolis, which the Interstate Commerce Commission has the power to enforce, the milling business of Milwaukee will continue its prosperous growth while that of Minneapolis will not be deprived of any advantages to which it is fairly and naturally entitled. ¹⁾ The Milwaukee Millers had always claimed that the milling-in-transit privilege gave Minneapolis an unfair advantage. ²⁾ Wheat from southern Minnesota on lines directly tributary to Milwaukee was carried to Minneapolis to be milled, and then through Milwaukee to the East, on a milling-in-transit rate. Moreover, the millers of Minneapolis had grown so strong that they were able to force the railroads to ³⁾ grant them special rates as favors.

In 1895, the Milwaukee Chamber of Commerce appealed to the Interstate Commerce Commission for relief against these discriminating rates, and in January 1898 the Commission handed down a favorable decision. ⁴⁾ The rates from many points in southern Minnesota were unfair to Milwaukee and the railroads were ordered to correct them. But the railroads did not obey the Commission. ⁵⁾ Milwaukee was at a disadvantage in having only two railroads. These claimed that they tried their best to carry out the Commission's orders but that the western railroads had resisted their efforts. Further attempts at enforcement of the Interstate Commerce Commission's orders merely emphasized again the weakness of that body.

In spite of this, Milwaukee continued the struggle. Improved methods of handling the grain and flour were introduced as well as improved transportation facilities across Lake Michigan. ⁶⁾ The millers of the city ground winter wheat ⁷⁾ when they could not get spring. Some of them utilized part of their surplus

- 1) Milwaukee Trade and Commerce, 1895, p. 31.
- 2) Thompson, Wheat Growing in Wisconsin, p. 106.
- 3) Ibid., p. 110.
- 4) Milwaukee Trade and Commerce, 1897.
- 5) Modern Miller, Sept. 22, 1900, p. 20.
- 6) Thompson, Wheat Growing in Wisconsin, p. 110.
- 7) Milwaukee Trade and Commerce, 1895, p. 89.

machinery in the making of breakfast cereals. In this way the city's flour production was kept above the million-barrel mark until 1912. Since then it has declined so rapidly that there seems a real danger of milling disappearing completely from among Milwaukee's industries. Milwaukee's disadvantage of being at an ever-increasing distance from the wheat fields, with Minneapolis so located as to be in a position to intercept her supplies, makes it improbable that there will soon be a renaissance of flour milling in that city.

In the case of all the cities whose milling history is touched upon in this chapter, the lack of source material, other than statistics and occasional brief reviews in the Chamber of Commerce reports, makes it difficult to offer more than very tentative conclusions. This is especially true of Chicago, since the industry has never been considered among the important ones of the city.

Chicago has many advantages of milling. She has no water power, but the Illinois coal-fields secure her a comparatively cheap fuel supply. She is farther from the wheat fields than Minneapolis, but no other city has such a large and varied supply as the Chicago elevators provide. The disposition of by-products should be easier in a city as large as Chicago, than elsewhere. No other city is such a railroad center as Chicago. Yet, though the manufacture was begun as early as 1869, the end of the century was reached before it attained any size. Long before that time, Chicago had become an important center for the

1) Milwaukee Trade and Commerce, 1907, p. 87.
 2) Flour Output of Milwaukee (bbls.) Milwaukee Trade and Commerce, 1914; Millers' Almanack, 1919-20, p. 129.

1858 - 150,107	1873 - 634,102	1888 - 1,425,258	1903 - 1,443,430	1915-511,260
1861 - 250,256	1876 - 647,581	1891 - 1,826,758	1906 - 1,371,721	1917-371,600
1864 - 187,339	1879 - 752,133	1894 - 1,576,064	1909 - 1,480,376	1918-376,530
1867 - 546,000	1882 - 1,346,509	1897 - 1,753,020	1912 - 1,080,801	
1870 - 530,049	1885 - 961,152	1900 + 1,866,501	1915 - 715,212	

3) American Miller, Vol. XIII, p. 325.

flour trade. In 1885, for example, flour production in Chicago was 575,000 barrels; but over five million barrels were received and shipped.

It would seem that Chicago's pre-eminence as a wheat market worked to the disadvantage of her flour mills. It was claimed in 1890, that flour-milling did not invite special effort for its vigorous prosecution in the city, presumably on account of the price of wheat ranging almost almost relatively higher than that of flour. As a result, the city's manufacture of flour was less than its consumption.³⁾ The Annual Report of 1892 explains that "Extensive wheat speculation in Chicago causing higher relative prices here for this grain, than elsewhere prevail, render this an unfavorable locality for the establishment of flour mills."⁴⁾ This does not seem a satisfactory explanation, but perhaps should stand until we have adequate data on the subject.

In 1901, Chicago's mills were given milling-in-transit privileges, and it may be that this was the reason why Chicago flour mills turned out twelve hundred thousand barrels of flour in 1902. That was a record which they have never attained since that time.⁵⁾ With such a large local market to supply, it seems likely that there will always be a considerable production of flour in the city. Chicago has one advantage over all other rivals in that, no other city is so well situated to draw supplies both from spring and winter-wheat districts. Twenty years ago the mills there were built in separate spring- and winter-wheat units.⁶⁾ Today, the advance of milling has made this unnecessary.

- 1) Chicago Flour Output (bbls.) Millers' Almanack, 1911-12, p. 96. Ibid., 1919-20, p. 148.
 2) Chicago Trade and Commerce, 1895, XXV:
 1902 - 1,262,225 1906 - 960,000 1910 - 1,090,000 1914 - 1,067,000
 1903 - 838,880 1907 - 1,000,000 1911 - 1,027,500 1915 - 1,122,000
 1904 - 750,000 1908 - 850,000 1912 - 1,108,000 1916 - 1,232,000
 1905 - 975,000 1909 - 1,058,000 1913 - 1,028,000 1917 - 1,268,118
 1918 - 1,148,250
 3) Chicago Trade and Commerce, 1890, p. xlii.
 4) Ibid., 1892, p. xli.
 5) Modern Miller, Feb. 16, 1901, p. 19.
 6) Roller Mill, April 1900, p. 554.

But the labor situation and the growing difficulties resulting from congestion in the freight yards there, tend to prejudice millers against Chicago as a future field of operations.

Kansas City first became a grain market and milling town in 1871. Beginning that year there was a small grain surplus and grain buyers began to go there from St. Louis and Chicago. A small mill was built, and exchange was organized in 1876, and the market grew rapidly. In 1888 Kansas City was granted a milling-in-transit rate. Milling grew slowly, however, partly because of the unfriendly legislation against the elevator men, passed by the Missouri legislature. The crop at this time was mostly soft red winter wheat, the kind that St. Louis had based her milling on. For this kind of wheat St. Louis was, of course, the chief market.

About 1875, some Mennonites immigrating from Russia brought over a hard, flinty wheat which was rich in gluten. It was quickly adapted to the region and presently the progressive farmers of Nebraska, Kansas, and Oklahoma were specializing in this wheat, for it was hardy, drouth-resisting and gave a heavier yield than softer varieties. In the eighties many of the Kansas mills changed their machinery, so as to mill the hard wheat. By 1900, eighty per cent of all the wheat from Kansas was of this variety.

1) Kansas City Commercial Club, Annual Report, 1891, pp. 32.

2) Modern Miller, Nov. 24, 1900, p. 16. A miller of Enterprise, Kansas, puts the date somewhat later. Roller Mill, July 1900, p. 31.

3) Flour Output of Kansas City (bbls.) Millers' Almanack 1911-12, p. 100 ;
ibid., 1919-20, p. 145.

1901-1,431,000	1905-3,053,000	1909-2,827,376	1913-2,394,617	1917-3,365,200
1902-1,298,000	1906-1,989,000	1910-2,226,266	1914-2,376,840	1918-2,469,777
1903-1,298,000	1907-1,974,949	1911-1,822,257	1915-2,865,460	
1904-1,595,100	1908-2,577,577	1912-2,080,268	1916-3,146,332	

4) Roller Mill, July 1900, p. 31.

5) Ibid.

In 1900, there was a short crop of spring-wheat, and the northwestern millers were forced to go down to Kansas City to buy Kansas wheat. The Modern Miller (of St. Louis) claimed they were buying fifteen to twenty million bushels. It was opening charged that this wheat was used to make what was advertised as "Spring Wheat Flour"¹⁾. The wheat was said to blend well with hard spring and make a strong flour, which even experts could hardly tell from pure spring wheat flour. The Minneapolis millers denied this, claiming that the Kansas wheat was not good enough to mix with spring.²⁾ Thereupon, the Modern Miller printed the results of various chemical analyses in which Kansas and spring-wheat patent flours were compared to the disadvantage of the latter.³⁾

The Kansas millers further charged that the Minneapolis millers bought wheat in Kansas at a cent a bushel above the Kansas City market-price. How could they do it and compete with the Kansas mills? The answer was simple. The railroads, it was claimed, gave Minneapolis a million-in-transit rate on this wheat (Kansas City to Minneapolis to Chicago) which was as low as that given to the direct route.⁴⁾

This buying of Kansas wheat by Minneapolis millers must have been originally a temporary expedient caused by poor crops in spring-wheat territory. The same reports are heard every time there is a spring-wheat crop failure - in 1919, for example. From 1900 on, there are no such complaints, but rather complaints of rate discrimination in favor of Minneapolis. In 1908, the millers of that district applied to the interstate Commerce Commission for a reduction of four and a half cents a hundred pounds in the rate from the Missouri river to Chicago. This would make their rate equal to that from Minneapolis to Chicago. The Minneapolis exchange opposed the petition, and it was denied by the Commission on the ground that Minneapolis' more favorable rate was justified because

- 1) Modern Miller, July 28, 1900.
- 2) Ibid., Aug. 18, 1900, p. 19.
- 3) Ibid., Aug. 18, 1900, p. 12.
- 4) Ibid., July 21, 1900, p. 11.

of water competition.

Kansas City's growth has been comparatively slow since that date. She has no such supremacy in the winter-wheat area as that of Minneapolis in the spring-wheat region, for the state of Kansas, which forms the chief source of supply of Kansas City's wheat, had built up her flour mills faster than has any other state. The present tendency is to build up a series of smaller centers rather than to concentrate on one.

Nevertheless, Kansas City is a competitor to be feared. A city with such railroad facilities is not likely to have permanently unfavorable freight rates. The Kansas wheat flour is able to hold its own in the competitive market with spring-wheat flours. The area of wheat lands tributary to Kansas City is as large as that from which Minneapolis draws its supplies. Kansas City would seem to be a milling center whose future growth is reasonably certain.

33. The Future of Minneapolis Milling.

The general trend of the evidence seems to indicate that for a long period of time - certainly from 1880 to 1900 - the Minneapolis millers were aided in building up their industry by special favors from the railroads. They were given special export rates which were denied to other millers at intermediate points. They were given, it is claimed, secret rebates on shipments to the eastern market as late as 1900. The structure of favorable rates built up for them in those days is being attacked by conflicting interests at the present day. In January 1920, the Interstate Commerce Commission announced a decision, which would, it is claimed, if put into operation, "subordinate the grain and milling interests of the city to Chicago and Milwaukee. It would tear down the rate structure built up here through more than thirty years of practical ex-

perience." The Director General of Railroads had asked the Commission's

1) Milwaukee Trade and Commerce, 1908, p. 29.

2) Conversation with a milling journal editor.

3) Interstate Commerce Commission Report, 1899, p. 26.

4) Modern Miller, Aug. 18, 1900, p. 16. "Owing to the strong competition between railroads, it is reported that the freight rates between Minneapolis and Eastern points are practically annihilated. It was believed that there had been more or less cutting since early summer but no open reductions were made until the past week".

5) W. P. Trickett, manager, Minneapolis Traffic Association, Minneapolis Journal, Jan. 20, 1920.

opinion on certain charges in Northwestern freight rates recommended by the Western Freight Traffic Committee of the United States Railroad Administration. The Commission now approved of them. The Minneapolis Journal summarized the report as follows:

(1) It took away from Minneapolis the milling-in-transit privilege, with a single exception to be noted later, while leaving it to such competing milling centers as Milwaukee, Chicago, and Kansas City.

(2) It fixed a proportional rate of eleven cents per hundred pounds, Minneapolis to Chicago. This was an apparent reduction from the former rate of twelve and a half cents, but not a real one, since most of the flour had gone through on a milling-on-transit rate that was less than eleven cents.

(3) It denied the application of Duluth for lake and rail rates to Buffalo equal to the rates accorded Chicago. The Commission held that both Chicago and Duluth were intermediate points between Minneapolis and Buffalo. Therefore, the rate from Minneapolis to Buffalo should be the same through either city. Since the rate from Minneapolis to Duluth was five and a half cents less than from Minneapolis to Chicago, the rate from Duluth to Buffalo had to be five and a half cents more than from Chicago to Buffalo.

(4) Minneapolis might retain the milling-in-transit on grain from Omaha and Sioux City bound to Duluth.

(5) The report had recommended that Minneapolis be allowed to keep the milling-in-transit privilege on Montana wheat, but the Commission refused to allow this.

(6) The rail-lake-rail rate Minneapolis to New York on grain products was lowered a half a cent, but the all rail rate was increased a cent and a half. The rate for grain products had been lower than that on grain and the Commission held there was no economic justification for this.

1) Minneapolis Journal, Jan. 20, 1920.

The millers and grain men of Minneapolis immediately prepared an appeal for a re-hearing. In this city they had the support of the State Railroad and Warehouse Commission. Judge Mills of the Commission doubtless expressed the opinions of his fellow members when he said of the decision, "It is pure discrimination in the interests of Chicago. Other cities to the south are no more entitled to the milling-in-transit privilege than Minneapolis, yet they are left untouched."¹⁾

The Minneapolis representatives argued the matter before the Commission a second time, but in March, 1920, that body reaffirmed its former decision with only slight modification.²⁾ The rates were then adopted by the Railroad Administration and went into effect February 28, 1920.³⁾ The Minnesota Millers' Club had appealed to the grain raisers of the Northwest in full-page newspaper advertisements to join them in protest against these rates. The railroads are accused of trying to force Northwestern grain products to take the all-rail route through Chicago and thus to "dry up Lake Superior, and destroy the influence of Lake Superior as a rate-making factor."⁴⁾ But it is not clear how anything can be done to change the rates except by the very unlikely possibility of getting Congress to intervene.

It would seem that these rates will strike a blow at Minneapolis as a milling center - and not Minneapolis only, but Duluth and Buffalo as well. For each of them the new rates mean increased costs and when profits are reckoned at ten or fifteen cents a barrel, such increase of freights are serious matters.⁵⁾ Since the increased rates for these cities do not mean lowered rates for any others, it is not clear that either Milwaukee or Chicago will benefit very greatly; but more likely that the new rates will encourage the winter and Kansas wheat millers.

1) Minneapolis Journal, Jan. 20, 1920.

2) Northwestern Miller, March 3, 1920, p. 1033.

3) Minnesota Millers' Club, The Case of the Railroads vs. Lake Superior, Minneapolis Journal, April 18, 1920.

4) Ibid.

5) The Federal Trade Commission's Report (Flour Milling and Jobbing, p. 24) showed the Northwestern millers' profits to average as follows: 1912-13, 13¢ per bushel; 1913-14, 16¢; 1914-15, 21¢; 1915-17, 55¢.

In spite of the difficulties it has had to face in the period since 1891, Minneapolis has made progress as a milling center. The milling "trust", if it had developed as planned, would have been a vital blow, since it was likely to build up the tidewater rather than the inland mills. The opposition in Minneapolis was a principal cause of its failure. Then the failure of the Pillsbury-Washburn Company was a blow to all the mills. It seemed to show that milling was no longer profitable in Minneapolis. The effort of Duluth, Milwaukee, and Buffalo to build up rival spring-wheat centers, and of Kansas City to substitute Kansas wheat flour for spring-patent as the standard bread flour of the world, were all full of danger to Minneapolis, but all were successfully parried. The attempt to destroy the old rate-edifice and to build up a new one that will make Minnesota flours use the Chicago route was more successful, so that the future is problematic. When we note that, in spite of these difficulties, Minneapolis' share of the total wheat flour production of the country increased steadily in the last fifteen years, we are inclined to believe that Minneapolis will remain for a long time to come, the leading milling city of the world. 1)

1) Total United States Production (Bbls.)	Minneapolis Production (Bbls.)	Minneapolis' % of Total
1904 - 104,013,278	13,652,735	13.1
1909 - 105,756,645	14,867,245	14.1
1914 - 116,045,090	17,769,280	15.3

Chapter XI. CONCLUSION.

Having reviewed the history of the Minneapolis mills from their beginnings to the present day, we should now be prepared to state what factors were responsible for ~~its~~ ^{their} rise, and what has been ~~their~~ ^{its} influence.

1.. It was the lumbermen who gave the industry its start. They dammed the river to provide water-power. Their lumbering operations created a home market for the flour-mills. Many of the millers were men who had been engaged in lumbering and who transferred their capital from the one industry to the other.

2. But, though the lumbermen might start the industry, greater forces were required to build it. Up to 1870 Minneapolis was a flour-making city but not a very important one. Its growth after that date is due more than anything else to the series of inventions, including the purifier and the rolls, which revolutionized milling methods. Though Minneapolis men did not invent all these machines, Minneapolis millers were shrewd and progressive and appreciated their value. For several years, they were almost alone in the field,-- the only makers of the much-prized patent flours. The lead gained in those years has never been lost. Along with these improvements in machinery, there was a growth of large-scale production. This showed itself in (1) the building of mills of very large capacity, (2) the change from a partnership to a corporate form of organization, and (3) a concentration of ownership, as a result of which almost all the mills came to be owned and operated by four corporations.

But the most important change in this period was the shift in the center of wheat-growing from southern Minnesota to western and Northwestern. Before 1850 southeast Minnesota was the chief wheat-growing section, and as a consequence, such towns as Hastings,

Wabasha, Winona and Red Wing, were the principal milling cities.

Had the wheat belt remained in that region, it is conceivable that Minneapolis might never have become a leading milling center. One of the towns mentioned above, might have held that position. More likely Milwaukee or Chicago would have benefited since the railroads of the region concentrated there. In the decade after the Civil War, however, the wheat belt moved northward and westward. The railroads were so located, that the wheat from the new fields naturally was drawn to Minneapolis.

3. The saw-mills, the railroads and the flour-mills made Minneapolis. Of the three, the flour-mills were probably the largest factor since they drew the wheat to the city. Where the farmer sold, he would buy, and on this foundation the trade of Minneapolis was built, both wholesale and retail. When the mills could no longer consume all the wheat the farmer had to sell, the wheat market was organized, which today is the greatest in the world. The method of selling and transporting the wheat to market in the fall of the year created a financial problem to solve which the banking system of Minneapolis was created.

4. The Minneapolis mills not only lead in the revolution in milling methods in the seventies, but they have been leading ever since. Not only in the purifier and the rolls, but in the adoption of the plansifter in wheat and flour testing, in providing a market for by-products and in manufacturing specialized products, Minneapolis mills have taken the lead.

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Note. In addition to that secured from the sources listed above much information was obtained by conversations with leading members of the milling and other industries of Minneapolis. It seems unnecessary to list all these, but special acknowledgment of their kindness and courtesy in the matter is due the following men:

Messrs. A.C. Loring and A.F. Pillsbury of the Pillsbury Flour Mills Company, Wm. DeLa Barre of the Minneapolis Mill Company, J.W. Stephenson of the Northwestern Milling Company, D.F. Baldwin, Jr. of the Baldwin Flour Mills Company, H.A. Bellows of the North Western Miller, George Lane of the Lane-Piper-Jaffray Company, and J.W. Falconer of the Northern Bag Company.

Appendix --Statistics of Milling.

Relative Exports of Wheat and Flour From U. S.

Five Years Ending	Wheat	Flour	Percent. of Total Wheat Exported in Form of Flour
1830	125,547	4,651,940	99.46
1835	614,145	5,241,964	97.2
1840	1,842,841	4,092,932	91.7
1845	2,946,861	6,274,697	91.1
1850	10,184,641	12,284,828	85.77
1855	16,446,955	13,149,518	79.9
1860	38,808,573	15,778,268	67.
1865	138,306,907	19,757,733	42.09
1870	81,808,364	11,454,785	41.2
1875	224,019,376	16,797,684	27.2
Year Ending			
			33.70
1876			45.
1877			47.61
1880			

U. S. Monthly Summary of Commerce and Finance, Jan. 1900,
vol. 7, no. 7, p. 2001.

Appendix-Table II

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	Minneapolis Output, (Bbls.)		Minneapolis Export and U. S. Export of Flour.		
	Mpls. Output	Mpls. Export	% of Output Exported	U. S. Export Flour	U. S. Export Wheat.
1917-18	15,255,310	888,240	5.82	21,879,000	34,118,000
1916-17	16,235,330	1,166,850	7.18	11,942,000	149,831,000
1915-16	20,443,185	1,628,195	7.87	15,520,000	173,274,000
1914-15	16,182,250	1,768,715	10.92	16,182,000	259,642,000
1913-14	18,146,530	1,699,580	9.31	11,821,000	92,393,000
1912-13	18,230,160	1,761,935	9.66	11,395,000	91,603,000
1911-12	15,708,075	739,500	4.70	11,006,000	30,160,000
1910-11	15,813,190	1,341,955	8.49	10,129,000	23,729,000
1909-10	16,075,155	1,609,135	10.01	9,040,987	46,679,876
1908-09	13,697,370	1,786,925	13.05	10,521,161	66,923,244
1907-08	13,137,300	1,984,640	15.10	13,875,000	100,212,000
1906-07	14,159,760	2,436,170	17.20	15,491,000	74,819,000
1905-06	15,141,785	2,574,755	17.66	13,871,000	34,794,000
1904-05	12,747,325	1,675,785	13.15	8,826,000	4,394,000
1903-04	14,213,085	2,284,755	16.07	16,999,000	44,230,000
1902-03	16,505,645	3,331,805	20.02	19,717,000	114,181,000
1901-02	15,802,270	3,160,160	19.19	17,759,000	154,856,000
1900-01	14,863,395	3,973,179	26.73	18,651,000	132,061,000
1899-1900	15,308,160	4,847,600	31.66	18,699,000	101,950,000
1898-99	15,318,415	4,593,140	29.98	18,486,000	139,433,000
1897-98	13,299,180	3,569,225	26.84	15,350,000	146,231,000
1896-97	13,473,160	3,618,555	26.85	14,570,000	79,662,000
1895-96	12,577,120	4,044,790	32.15	14,621,000	60,650,000
1894-95	9,428,255	2,377,090	25.21	15,269,000	76,103,000
1893-94	9,321,630	2,362,550	25.34	16,860,000	88,415,000
1892-93	9,549,615	3,038,692	32.50	16,620,000	117,121,000
1891-92	9,500,554	3,668,380	38.61	15,197,000	157,280,000
1890-91	7,434,098	2,576,540	34.65	7,946,000	150,565,000
1889-90	6,863,015	2,091,215	30.47	6,011,000	153,253,000
1888-89	5,740,380	1,557,575	27.13	9,000,000	46,000,000
1887-88	7,244,930	2,617,795	36.19	12,000,000	66,000,000
1886-87	6,375,250	2,523,030	39.59	12,000,000	102,000,000
1885-86	5,953,200	2,288,500	38.45	8,000,000	58,000,000
1884-85	5,317,670	1,805,875	33.22	11,000,000	85,000,000
1883-84	4,046,220	1,343,105	33.96	9,000,000	70,000,000
1882-83	3,175,910	1,201,630	33.19	9,000,000	106,000,000
1881-82	3,142,970	1,181,320	37.83	6,000,000	95,000,000
1880-81	2,052,840	769,440	34.08	11,000,000	55,000,000
				12,000,000	54,000,000

Minneapolis figures from The Millers Almanack 1919-20, p. 139. Figures are for crop years, sept. 1 to Aug. 31. Percents are percent of flour exported direct by mills to foreign countries. Figures for U.S. Exports of Wheat and flour are from The Millers Almanack p. 203.

#3

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Growth of Milling 1870 to 1910

Minnesota and Minneapolis Compared--

Census of 1870	No. Es- tablsh- ments	Capital Invested	No. of Wage Earners	Wages	Cost of Materi- als	Value of Product
Minnesota	216	2,900,915	790	293,081	6,090,006	7,534,575
Minneapolis	<u>14</u>	<u>554,500</u>	<u>105</u>	<u>49,209</u>	<u>945,081</u>	<u>1,125,215</u>
Interior	202	2,346,415	685	243,872	5,144,925	6,409,360
Census of 1880						
Minnesota	436	10,510,362	2,634	1,371,646	37,155,429	41,519,004
Minneapolis	<u>29</u>	<u>3,820,500</u>	<u>721</u>	<u>555,669</u>	<u>19,011,239</u>	<u>20,502,305</u>
Interior	407	6,689,862	1,913	815,977	18,144,190	21,016,699
Census of 1890						
Minnesota	307	19,518,743	3,509	1,748,115	52,383,867	60,158,088
Minneapolis	<u>25</u>	<u>10,701,068</u>	<u>1,621</u>	<u>1,043,858</u>	<u>27,366,986</u>	<u>30,707,998</u>
Interior Mills	282	8,817,675	1,888	704,257	24,016,881	29,450,090
Census of 1900						
Minnesota	512	24,125,781	4,086	2,383,836	74,509,733	83,877,709
Minneapolis	<u>12</u>	<u>14,322,061</u>	<u>2,071</u>	<u>1,321,998</u>	<u>45,218,238</u>	<u>49,673,568</u>
Interior Mills	500	9,803,720	2,015	1,061,838	29,291,495	34,204,141
Census of 1910						
Minnesota	322	38,595,000	4,345	2,782,000	124,217,000	139,136,000
Minneapolis	<u>13</u>	<u>19,869</u>	<u>2,279</u>	<u>1,550</u>	<u>70,953</u>	<u>78,570</u>
Interior Mills	309	18,726,000	2,066	1,252,000	53,264,000	60,486,000

The census of 1870 does not give figures for Minneapolis--the figures in the table are for Hennepin County and therefore includes two small mills outside of the city. "Interior" mills as used above includes the mills at St. Paul and Duluth.

#4.

Growth of Milling in the Northwest 1911-1919

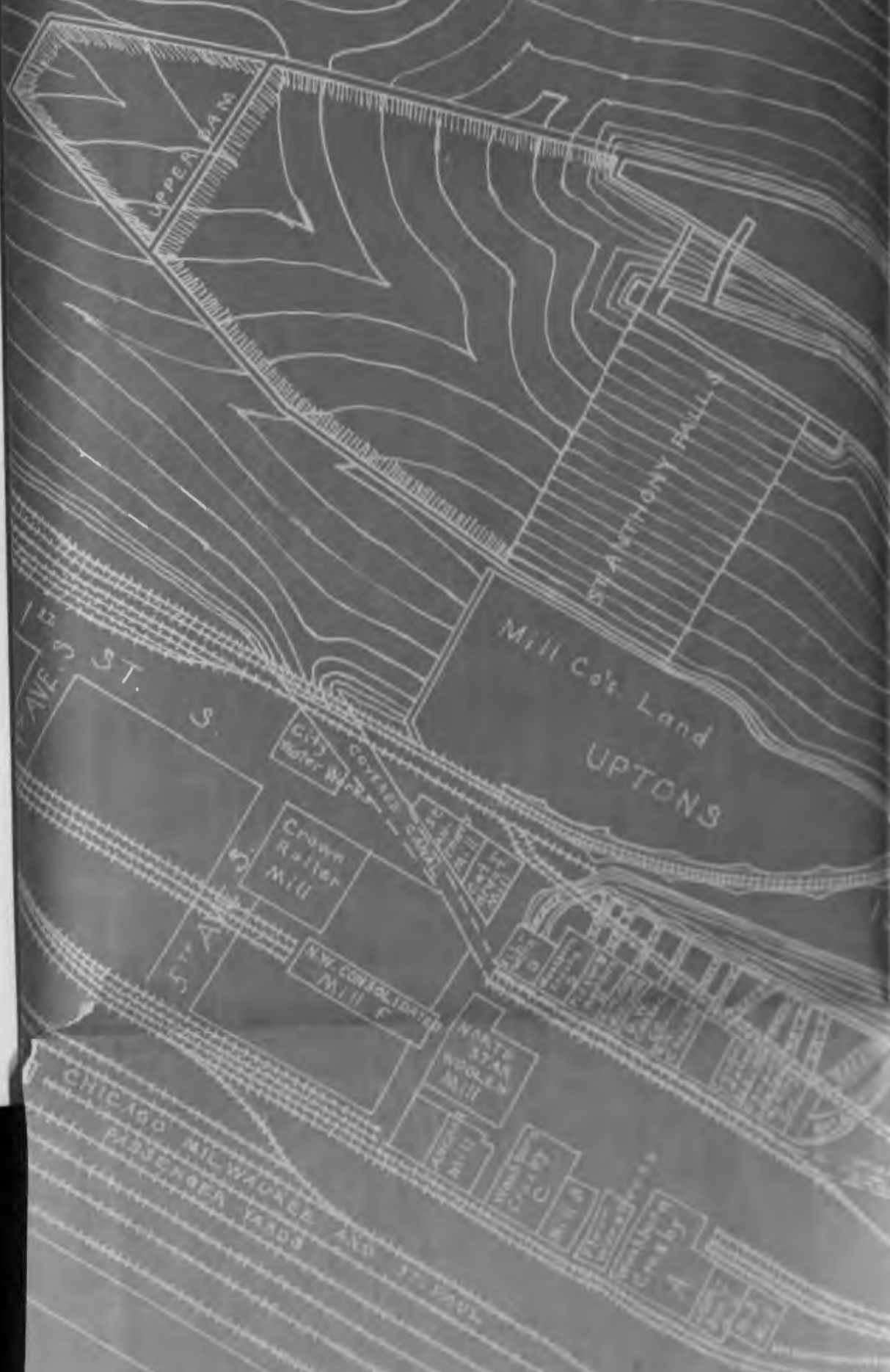
	1911	1912	1913	1914
North Dakota	77: 16,070:	72: 16,065:	73: 16,265:	73: 16,175:
South Dakota	88: 10,270:	85: 10,485:	86: 12,425:	81: 11,375:
Montana				26: 5,740:
Minnesota	303: 75,215:	288: 73,485:	292: 74,185:	273: 72,125:
Minneapolis	23: 72,800:	23: 72,800:	23: 72,800:	23: 72,800:
Duluth & Superior	4: 5,900:	4: 5,900:	5: 6,050:	5: 6,050:
	495: 180,255:	472: 178,735:	497: 181,725:	451: 184,265:

	1915	1916	1917	1918
North Dakota	71: 15,485:	75: 68,195:	77: 15,920:	85: 16,455:
South Dakota	82: 11,685:	76: 11,090:	74: 10,890:	73: 10,865:
Montana	35: 6,670:	52: 7,877:	60: 11,517:	66: 12,877:
Minnesota	258: 69,245:	243: 68,195:	237: 68,725:	234: 70,10:
Minneapolis	24: 73,800:	26: 80,200:	26: 86,400:	29: 89,300:
Duluth & Superior	5: 6,050:	5: 6,050:	5: 6,050:	5: 6,250:
	475: 182,935:	477: 189,097:	479: 199,502:	492: 205,757:

	1919.
North Dakota	98: 17,560
South Dakota	87: 10,450
Montana	82: 13,825
Minnesota	264: 76,915
Minneapolis	28: 93,900
Duluth & Superior	2: 6,500
	561: 218,950

Miller's Almanack 1919-1920 pp. 138 - 139. Under Minnesota, excluded Minneapolis and Duluth.

NICOLLET
ISLAND



MAP of the
MINNEAPOLIS
MILLING DISTRICT 1903

PREPARED BY ARTHUR H. HOBBS
FOR THE MINNEAPOLIS BOARD OF TRADE

3						111
4			17,00	15,00	14,00	5,000
5						300
6		3,000	3,000	2,500	2,000	3,000
7						2,100
8						1,500
9						300
10			3,000	2,500	2,000	2,500
11			2,000	2,000	2,000	2,500
12			2,000	2,000	2,000	2,500
13			2,000	2,000	2,000	2,500
14			2,000	2,000	2,000	2,500
15			2,000	2,000	2,000	2,500
16			2,000	2,000	2,000	2,500
17			2,000	2,000	2,000	2,500
18			2,000	2,000	2,000	2,500
19			2,000	2,000	2,000	2,500
20			2,000	2,000	2,000	2,500
21			2,000	2,000	2,000	2,500
22			2,000	2,000	2,000	2,500
23			2,000	2,000	2,000	2,500
24			2,000	2,000	2,000	2,500
25			2,000	2,000	2,000	2,500
26			2,000	2,000	2,000	2,500
27			2,000	2,000	2,000	2,500
28			2,000	2,000	2,000	2,500
29			2,000	2,000	2,000	2,500
30			2,000	2,000	2,000	2,500
31			2,000	2,000	2,000	2,500
32			2,000	2,000	2,000	2,500
33			2,000	2,000	2,000	2,500
34			2,000	2,000	2,000	2,500
35			2,000	2,000	2,000	2,500
36			2,000	2,000	2,000	2,500
37			2,000	2,000	2,000	2,500
38			2,000	2,000	2,000	2,500
39			2,000	2,000	2,000	2,500
40			2,000	2,000	2,000	2,500
41			2,000	2,000	2,000	2,500
42			2,000	2,000	2,000	2,500
43			2,000	2,000	2,000	2,500
44			2,000	2,000	2,000	2,500
45			2,000	2,000	2,000	2,500
46			2,000	2,000	2,000	2,500
47			2,000	2,000	2,000	2,500
48			2,000	2,000	2,000	2,500
49			2,000	2,000	2,000	2,500
50			2,000	2,000	2,000	2,500

	1914	1915	1916	1917	1918	1919
1	12,500	12,500	16,000	16,000	12,000	16,000
2	5,000	5,000	5,000	5,000	5,000	5,000
3	3,000	3,000	3,000	3,000	3,000	3,000
4	3,000	3,000	3,000	3,000	3,000	3,000
5	2,500	2,500	2,500	2,500	2,500	2,500
6	2,500	2,500	2,500	2,500	2,500	2,500
7	2,500	2,500	2,500	2,500	2,500	2,500
8	2,500	2,500	2,500	2,500	2,500	2,500
9	2,500	2,500	2,500	2,500	2,500	2,500
10	2,500	2,500	2,500	2,500	2,500	2,500
11	2,500	2,500	2,500	2,500	2,500	2,500
12	2,500	2,500	2,500	2,500	2,500	2,500
13	2,500	2,500	2,500	2,500	2,500	2,500
14	2,500	2,500	2,500	2,500	2,500	2,500
15	2,500	2,500	2,500	2,500	2,500	2,500
16	2,500	2,500	2,500	2,500	2,500	2,500
17	2,500	2,500	2,500	2,500	2,500	2,500
18	2,500	2,500	2,500	2,500	2,500	2,500
19	2,500	2,500	2,500	2,500	2,500	2,500
20	2,500	2,500	2,500	2,500	2,500	2,500
21	2,500	2,500	2,500	2,500	2,500	2,500
22	2,500	2,500	2,500	2,500	2,500	2,500
23	2,500	2,500	2,500	2,500	2,500	2,500
24	2,500	2,500	2,500	2,500	2,500	2,500
25	2,500	2,500	2,500	2,500	2,500	2,500
26	2,500	2,500	2,500	2,500	2,500	2,500
27	2,500	2,500	2,500	2,500	2,500	2,500
28	2,500	2,500	2,500	2,500	2,500	2,500
29	2,500	2,500	2,500	2,500	2,500	2,500
30	2,500	2,500	2,500	2,500	2,500	2,500
31	2,500	2,500	2,500	2,500	2,500	2,500
32	2,500	2,500	2,500	2,500	2,500	2,500
33	2,500	2,500	2,500	2,500	2,500	2,500
34	2,500	2,500	2,500	2,500	2,500	2,500
35	2,500	2,500	2,500	2,500	2,500	2,500
36	2,500	2,500	2,500	2,500	2,500	2,500
37	2,500	2,500	2,500	2,500	2,500	2,500
38	2,500	2,500	2,500	2,500	2,500	2,500
39	2,500	2,500	2,500	2,500	2,500	2,500
40	2,500	2,500	2,500	2,500	2,500	2,500
41	2,500	2,500	2,500	2,500	2,500	2,500
42	2,500	2,500	2,500	2,500	2,500	2,500
43	2,500	2,500	2,500	2,500	2,500	2,500
44	2,500	2,500	2,500	2,500	2,500	2,500
45	2,500	2,500	2,500	2,500	2,500	2,500
46	2,500	2,500	2,500	2,500	2,500	2,500
47	2,500	2,500	2,500	2,500	2,500	2,500
48	2,500	2,500	2,500	2,500	2,500	2,500
49	2,500	2,500	2,500	2,500	2,500	2,500
50	2,500	2,500	2,500	2,500	2,500	2,500

77,160 80,460 78,260 91,560 93,160 93,610 97,460

77,160 80,460 78,260 91,560 93,160 93,610 97,460

