THE GREAT NORTHWEST

A GUIDE-BOOK AND ITINERARY

FOR THE USE OF

TOURISTS AND TRAVELLERS

OVER THE LINES OF THE

NORTHERN PACIFIC RAILROAD

THE

OREGON RAILWAY AND NAVIGATION COMPANY

AND THE

OREGON AND CALIFORNIA RAILROAD

CONTAINING DESCRIPTIONS OF STATES, TERRITORIES, CITIES, TOWNS, AND PLACES ALONG THE ROUTES OF THESE ALLIED SYSTEMS OF TRANSPORTATION, AND EMBRACING FACTS RELATING TO THE HISTORY, RESOURCES, POPULATION, PRODUCTS, AND NATURAL FEATURES OF THE GREAT NORTHWEST

WITH MAP AND MANY ILLUSTRATIONS

BY

HENRY J. WINSER

Author of "The Yellowstone National Park; a Manual for Tourists," etc.

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depths have that deep azure tint that belongs to the purest water under summer skies, and its charmingly irregular shores, forested clear down to the shining beach, break into new combinations of woodland beauty at each advance of your boat. Upon the banks of this lake, and upon the islands that stud its bosom, many residences have been built, the summer homes not only of gentlemen who in the winter live in the neighboring cities, but also of many families from the South, even from New Orleans. This queen of the lake district is becoming more and more a favorite resort, and large preparations are making to accommodate summer visitors." There are many hotels on the lake shore, the largest of which, Hotel Lafayette, is capable of accommodating 1,200 guests.

The Mammoth Flour Mills.—It is aptly said that the history of the flour mills of Minneapolis is like the story of Aladdin. In 1860 the product was 30,000 barrels, and in 1882, 3,125,000 barrels. There are twenty-six mills in operation, the maximum daily capacity of all being 26,000 barrels. An idea of the gigantic proportions which this branch of industry has assumed may be obtained by remembering that the number of barrels of flour manufactured by one of the largest mills in the course of twenty-four hours is greater than that produced by an average-size mill in the course of a year. The capacity of the largest mill, the Pillsbury "A," is 5,200 barrels per diem; that of the Washburn "A," 3,000 barrels, and six other mills range from 1,200 to 2,000 barrels a day. The estimated quantity of wheat required to supply these mills in 1882 was 18,000,000 bushels. The capital invested in the flour milling industry is enormous, and the amount is constantly increasing. This is the result of the changes in the mode of manufacturing flour, which have been almost radical within the past few years. The use of the old mill stone has given place to the system of gradual reduction by iron rollers. The new process has not only raised the grade of flour, from the dark and inferior quality formerly produced, to the standard of the best Hungarian fancy brands, but has increased the quantity obtained from the grain as well as the capacity of the mills; thus better flour is now made at less expense than that which the inferior quality previously cost to manufacture. The flour of the Minnesota mills finds a ready market in all the Eastern cities, and also in Great Britain, France, Germany, Holland, Spain and Italy. Single orders are frequently taken for from 10,000 to 15,000 barrels, and the millers find it necessary, in securing the best trade, to control a great manufacturing capacity. Otherwise they would not be able to fill large orders promptly, nor obtain that uniformity

in quality without which both the foreign and American market would soon be lost. Moreover, there is economy both in the construction and operation of a large mill over a small one. For example, the cost of one mill, with a capacity of 4,000 barrels daily, is much less than that of sixteen mills of 250 barrels capacity, or of eight mills of 500 barrels capacity, or even of four mills of 1,000 barrels capacity. The relative cost of operating a large mill is still less, and the chance of a uniform grade of flour is increased in the same ratio as the capacity of the mill. So medium-size mills, a few years ago considered the safest and most profitable, have been superseded by those of great capacity.

In order that some idea of a large Minneapolis flour mill may be obtained, the following facts relating to the Pillsbury "A" mill are given. This establishment is 180 feet in length by 115 in width, the building material being Trenton limestone, rock-faced, and laid in courses to the height of seven stories. Inside, on the basement floor, is a stone wall, 125 feet in length and fifteen in height, which holds the water from the canal after its passage from the falls before it descends to the wheels. Within this canal are the wheel-pits, dug out of the solid rock, fifty-three feet in depth. Inside these pits are flumes of boiler iron, twelve feet in diameter, in which two fifty-five inch wheels, each weighing, with the shafting, thirteen tons, are placed. The hydraulic power of a column of water, twelve feet in diameter, with a fall of fifty-three feet, is enormous. Only the strongest and toughest metal could withstand the strain. Seventeen thousand cubic feet of water rush down each flume every minute, and the combined force of the wheels is estimated at 2,400 horse-power, equivalent to that of twelve steam engines, each of 200 horse-power. This power is geared and harnessed to the machinery requisite to grinding 25,000 bushels of wheat in every twenty-four hours. On the first floor there are the main shafts of the driving apparatus, with pulleys twelve feet in diameter, weighing 13,000 pounds, over which runs belting of double thickness, forty-eight inches wide, at the rate of 4,260 feet in a minute. From the shafts also run thirty-inch belts perpendicularly to the attic floor, over eight-foot pulleys, at the rate of 2,664 feet per minute, furnishing the power which drives the bolting and elevating machinery. There are other pulleys and belting attached to the shafts for operating the rollers and purifiers, the electric light and other machinery. On this floor also is the wheat-bin for stowing grain. This holds 35,000 bushels, and extends through to the ceiling of the floor above, where it is connected with the weighing hopper. On the second floor the wheat is ground; the third floor is mainly devoted to packing; the fourth, fifth, sixth and seventh floors are filled with bolting chests.

middling-purifiers, bran-dusters and other machinery. Before going to the rollers to be ground into flour, the wheat is cleansed by passing through eight different sets of machinery. It is purged in this manner of wire, nails, cockle, small and imperfect kernels, and becomes actually polished before it is converted into flour. On the packing-floor the flour is discharged constantly from twenty-four spouts, and accumulates so fast that a car is either loaded with flour or bran every twenty-five minutes throughout the day. Any lack of transportation facilities at once clogs the mill. To every bushel of wheat there are thirteen pounds of bran or shorts; but for this "offal" there is a steady demand on the part of stock-raisers in the East. There are railroad tracks on either side of the mill, and the loading and unloading methods are complete. The establishment is provided with fire apparatus, electric lights, passenger elevator, machine shop, and every appliance for its convenient working. In fact, it is one of the model flouring mills of Minneapolis, and the visitor who examines its features in detail will be well repaid.

The process of manufacturing flour in a typical Minneapolis mill are clearly described by Ernest Ingersoll, in *Harper's Magazine* for June, 1883:

"When the wheat comes in it is unloaded from the cars, by the aid of steam shovels, into a hopper bin, whence it is elevated to the fifth floor, and fed into a receiving bin, the bottom of which extends down to the fourth floor. Out of this it empties itself into conveyers, consisting of small buckets, traveling upon an endless belt, and is taken to storage bins on the first and second floors. Here it rests until wanted for milling. When this time comes the wheat travels by conveyers to the top floor, whence it is fed down into the grain separators in the story beneath, which sift out the chaff, straw, and other foreign matter. This done, it descends another story upon patented grading screens, which sort out the larger-sized grains from the smaller, the latter falling through the meshes of the screen, after which the selected portion drops into the cockles on the floor beneath, and, these escaped, falls still further into the Brush machines. All this time the wheat remains wheat—the kernel is entire. Its next move, however, begins its destruction, for now the ending stones are encountered, which break the germinal point off each grain. This matter accomplished, the wheat is shot away up to the attic again, and, traversing the whole length of the mill, falls into an aspirator on the seventh floor, having passed which, it slides down to the second floor, and is sent through the corrugated rollers. These rollers have shallow grooves cut spirally upon them, with rounded ridges between. The opposing rollers are grooved in an opposite direction, and it is impossible for a grain of wheat to get through without being cracked in two, though the rollers are not sufficiently near together to do much more than that. It comes out of this ordeal looking as though mice had chewed it, and, pouring into special conveyers, speedily finds itself up on the seventh floor again, where the flour dust which has been produced by this rough handling is bolted out in reels, and all that is left—no longer *wheat*—is

divided into 'middlings' and 'tailings.' The tailings consist of the hard seed case and the refuse part, and go into market as 'feed' and 'bran,' while the middlings are reserved for further perfection into flour; they are the starchy, good centres of the grains.

"The first operation toward this end is the grading of the middlings, for which purpose they pass upon silken sieves arranged in narrow horizontal troughs, and given a gentle shaking motion by machinery. There is a succession of these bolting cloths, so that the middlings pass through ten gradings. Next, they go to a series of purifiers, which resemble fanning machines, and thence to corrugated rollers, each successive set of which are more closely apposed, where the meal is ground finer and finer. There are five of these corrugations in all, and between each occurs a process of bolting to get rid of the waste, and a journey from bottom to top of the mill and back again. Nevertheless, in spite of all this bolting, there remains a large quantity of dust, which must be removed in order to make the flour of the best quality. And hereby hangs a tale of considerable interest to Minneapolis men.

"In the old mill which not long ago occupied the site of this new one there stood upon one side the usual rows of buhrs, in this case twenty in number. Through the conveyer boxes connected with them was drawn a strong current of air that took up all the fine particles of flour dust, and wafted it with the strength of a tempest into two dust rooms, where it was allowed to settle. The daily deposit was about three thousand pounds, which was removed every morning. In addition to these small chambers there were several purifiers on the upper floors, that discharged their dust right out into the room. The atmosphere of the whole mill thus became surcharged with exceedingly minute and fuzzy particles, which are very inflammable, and, when mixed in certain proportions with the air, highly explosive. This mixture had apparently been brought by the millers to just about the right point, when fate supplied a torch. A piece of wire fell between the buhr stones, or into some rollers, and began a lightning express journey through the machinery, in the course of which it became red hot, when it found an exit, and plunged out into the air. It was a most startling instance of the conversion of heat into motion. A lighted match in a keg of powder is the only analogy to illustrate the result. One room down-stairs burst into flames, and the watchman had only time to pull the electric fire alarm near his hand, when he and the mill together disappeared from the face of the earth. A terrific explosion, generated throughout that great factory in an instant, rent all parts of the immense structure as suddenly as a child knocks over a tower of cards, leaving nothing but blazing ruins to show where, a twinkling before, had stood the largest flour mill in the country. Nor was this all. The land was dug from under the foundations, and the massive machinery buried out of sight. Two other mills and an elevator near by were demolished, so that not one stone remained above another, while of three other mills, cracked and tottering walls, and charred interiors, were the only mementoes of the day's flourishing business.

"The good that came out of this seemingly wholly harmful episode, which scratched an end mark to one era of the city's prosperity, was the introduction into the new mills of a system of dust-saving that renders such a calamity improbable, if not impossible, in future. Now, instead of being

thrown abroad into a large room, the dust is discharged by suction pans into close, fire-proof receivers, where it accumulates in great quantities, and is sold as a low grade of flour. This dust having been removed, what remains is the best quality of flour. It is barreled by the aid of a machine permitting the precise weight of 196 pounds to be determined, packed and branded with great speed.

"Bakers, however, use what is known as 'wheat' or 'straight' flour, which is the product of the five reductions, all the subsequent processes through which the middlings pass in making fine flour being omitted. 'Fancy' flour differs from the ordinary superfine in that the middlings are ground through smooth rollers."