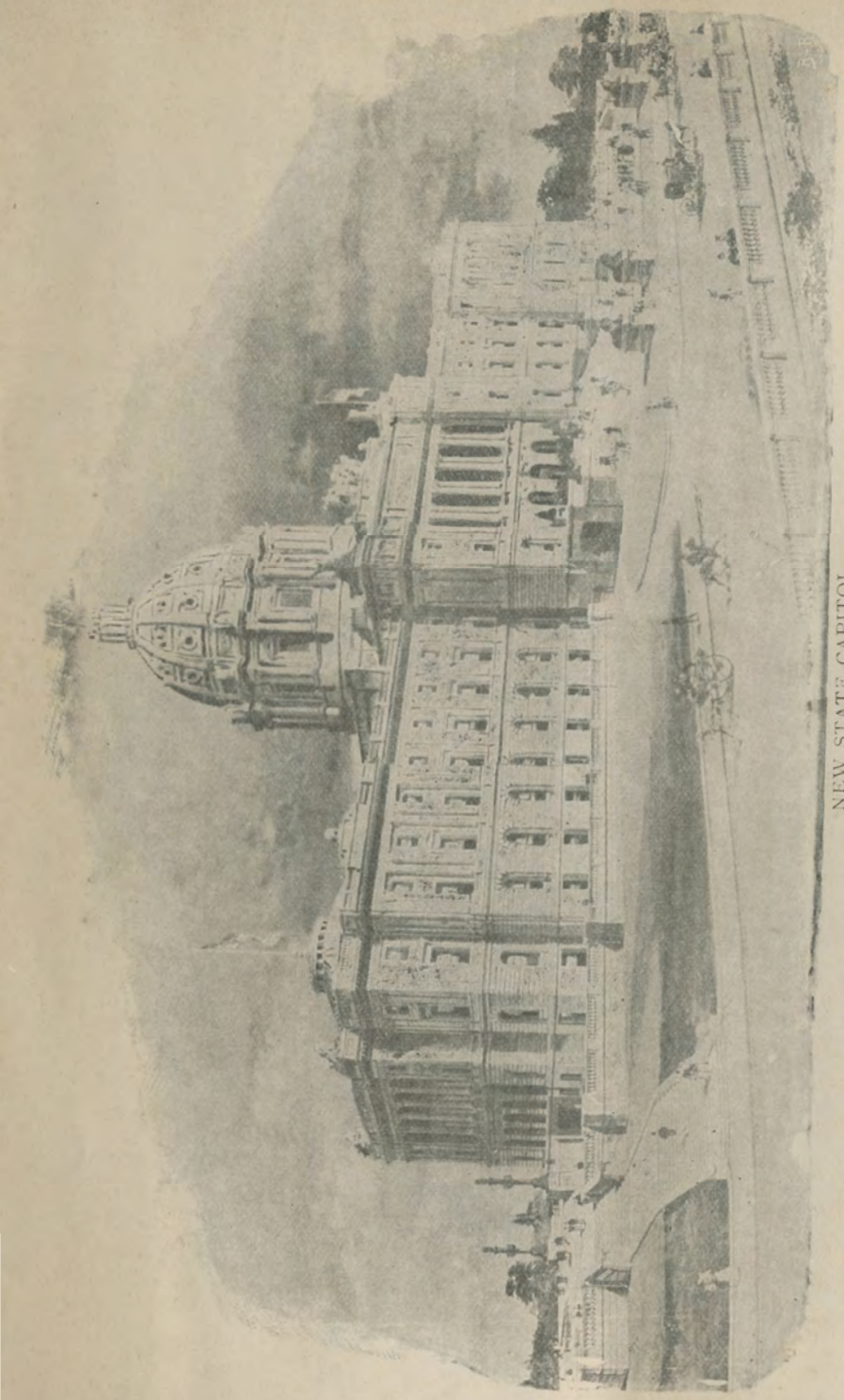

MINNESOTA
"The
BREAD and
BUTTER
STATE."
BUREAU-ENG. MPLS.

MINNESOTA BUILDING, PAN-AMERICAN EXPOSITION, BUFFALO.



NEW STATE CAPITOL
ST. PAUL.

MINNESOTA,

"THE BREAD AND BUTTER STATE" OF THE UNION,

TO THE PAN-AMERICAN EXPOSITION VISITORS,

GREETING:

In the succeeding pages is given briefly a sketch of the wonderful progress of Minnesota within the past half-century, a review of its magnificent resources, and a glance at the promises for its future.

Practically, the history of Minnesota is the record of but from twenty to thirty years, as the great proportion of its achievements have been within that period. Wonderful as is this record and proud as we are of it, it is to the future that attention is called with especial emphasis, for a little study of the tendencies of the country's development must compel the conviction that Minnesota is just entering upon the fufillment of its destiny as the great mid-continental state which is to serve as the gateway through which must come and go the commerce from the South and East, not only to the new Northwest, to our possessions in the Pacific and the Orient, but to a great and new country stretching away to Hudson's Bay, recent revelations concerning which assure immense wealth and prosperity.

This little book is prepared for the purpose of giving in a cursory way information which may incite further investigation on the part of those who are on the lookout for opportunities in agriculture, manufacturing or commerce. Only statistical information sufficient to attest the truth of assertions has been attempted.

ITS MARVELOUS PAST.

"The natural highways of nations will usually be along the great water courses," says Humboldt, and it was the water way of the Great Lakes that led to the discovery of Minnesota in 1655, when

two French traders came down from the St. Lawrence and found, after months of travel along the shores of the interlocking lakes, that they could go no further west by water. They spent a winter with the Indians and then wandered leisurely back, but it was twenty-five years later before a map was made which located the head of Lake Superior and the land of the Dakotah Indians which they had discovered, and it was a century and a half before an exploration was made that revealed anything tangible of the topography of the country.

In the treaty of peace of the United States with England in 1783 at the close of the Revolutionary war, the Mississippi river was made the western boundary of the United States. The territory west of it belonged to Spain. In 1803 the United States purchased the Province of Louisiana, which included all that part of Minnesota west of the Mississippi. In 1812 western Minnesota became part of the territory of Missouri and in 1818 a part of Michigan, and in 1836 a part of Wisconsin.

It was watchfulness of the movements of British traders that caused the United States in 1824 to establish a military post (Fort Snelling), at the junction of the Minnesota and Mississippi rivers. The now great and populous state of Minnesota may be said to have a history from this time, for the same year the first steamboat reached the head of navigation of the Mississippi, and small mills to grind wheat and saw timber for the use of the soldiers were built at the Falls of St. Anthony, which furnished the power for their operation.

Another decade had passed before there was more of a settlement in the state than a collection of a few log cabins about a Jesuit mission a few miles below the falls, which marks the site of the present city of St. Paul. In 1849 Congress organized a territory to comprise the region between the Mississippi and Missouri rivers, and in 1857 gave it the boundaries of the present state, one year later admitting it into the union.

The War of the Rebellion intervened to retard the settlement of the new state and drain its strength, for it contributed one-seventh of all its able-bodied men to fight for the preservation of the Union. Next in the way of impediment came a terrible conflict with the Indians, in which many settlers were made homeless, and many lost their lives.

It was a bold stroke of railroad enterprise which started Minnesota on its rapid way to prosperity and importance. In 1869 a company was formed to build a railroad, the Northern Pacific, to Puget's Sound, opening up a vast amount of rich territory and forming a connecting link between the commerce of the Atlantic and the Pacific, and making Minnesota, the head of navigation on the Great Lakes and of the Mississippi, also the center from which many lines of railroads have radiated to the south, east and west.

IT'S ABUNDANT PRESENT.

Just glance over this short recapitulation of the features of Minnesota's progress within fifty years:

In 1850 the population was but 6,077. In 1900 it was 1,751,394.

In 1860 its assessed valuation of property real and personal was $35,753,408; in 1900, $588,016,688.

In 1860 there were 18,181 farms in the state, valued at $27,505,922; in 1900 there were 120,000 farms valued at $252,180,126.

In 1860 there was raised 2,187,995 bushels of wheat; 2,941,952 bushels of corn and 2,176,002 bushels of oats. In 1900 there was raised 73,276,551 bushels of wheat, 46,434,142 bushels of corn and 73,276,551 bushels of oats.

Dairying as an industry, the pride of the state, did not begin to attract attention until a dozen years ago, and the development of the iron mines, which in 1900 yielded ten million tons of ore, dates back to only 1884.

From the crude saw mill at St. Anthony Falls which slabbed logs for the first house, has grown a lumbering business which in 1880 placed Minnesota in third place and in 1890 in first place among the lumber producing states of the Union.

About the site of the first grist mill are now grouped the largest flour mills of the world.

Few of the ten thousand manufacturing establishments of Minnesota were in existence even twenty years ago, which now involve $150,000,000 in capital.

The first railroad was not built until 1862, and now there are 6,500 miles of railroad in operation within the state.

From the grant of public lands fifty years ago has come a school system which expends $5,000,000 annually for free education.

A little Jesuit chapel dedicated to St. Paul the Apostle, in 1840 marked the beginning of a progress in religious teaching that has more than kept pace year by year with the march of commerce.

Where there were two small settlements near the frontier military post at St. Anthony Falls fifty years ago, are now located two mighty cities, Minneapolis, with a population of 202,718 and St. Paul with a population of 163,065. Separate cities they are in municipal organization alone—so closely built together as to be in reality but a single metropolis with a population of 365,783. At the head of Lake Superior stands Duluth with a population of 52,969, while scattered throughout the state are 447 prosperous cities, towns and villages.

But this record of the past, although a guarantee of the future, hardly indicates the progress that has but only this first year of a new century brought Minnesota to a point where certainty has taken the place of what some deemed to be visionary hope. She has just come to her place in national importance and esteem as the mid-continent center of commerce, as the gateway to the richest region in North America, and as the head of the two great water

ways which make her a natural distributing point to the south and east.

The opportunities that came to capital and labor in those days of struggle against unbroken forest and prairie are multiplied today a thousandfold. There are no privations to be suffered. On the contrary, there are wanting no advantages, conveniences, nor elegancies of life to be obtained in the civilization of the older states.

And yet there is virgin land almost for the asking, the cultivation of which assures not only a home and comfort for life, but wealth as well for the man who works, while the needs of a great population and the manufacturing of products afford occupations for those skilled in trades and the pursuits of business.

ITS GLORIOUS FUTURE.

This is a pivotal year with Minnesota. Mighty influences have been at work which have brought about the dawn of the era predicted by William H. Seward that the Pacific ocean is destined to become the commercial arena of the world.

The acquisition of a foothold in the Phillipines has given us an entrance to the Orient, and commerce with China, Japan, Siam and India will come to us without the fierce competition which required the struggle of a century to overcome, and bring the balance of trade between this country and Europe in our favor.

Our Pacific ports are thousands of miles nearer to Yokohama and Hong Kong than London, Liverpool and Hamburg. What the Orient needs, too, is what the Northwest best and most produces: Wheat, lumber and iron for railroad construction.

Even with China closed to us, and without Hawaii and the Philippines, the increase of Oriental trade has been over 150 per cent in the last eight years. We are shipping $18,000,000 of American products to Japan, where we only sold $3,300,000 in 1892, and over $12,000,000 to China, where we shipped but $4,800,000 in 1893. Our exports to Hawaii have risen from less than $3,000,000 in 1893, to $7,000,000, and our shipments of American wares to Australasia have grown in the same time up to $17,000,000 a year.

The completion of the Siberian railway and the "open door" in China means tremendous possibilities. If China and Japan alone bought our wheat at the rate of one bushel per capita, instead of four and a half bushels per capita, as is the consumption in this country, the United States could not supply one-fourth of the demand. Careful investigation has proven that American flour would cost the Chinaman but one-half as much as rice, the present great staple article of food, and economy alone will furnish a strong argument for the substitution. It is a matter of history of the human family that wherever wheat and flour have been introduced to any race, with the single exception of the colored race, that from that time its adoption has followed.

There is already in the cities of China and Japan a demand for

our butter, condensed milk and other dairy products. Our meats and packing house products, pork especially, will be wanted in addition to our fabrics, woolens in particular. Our farming machinery will grow in popularity with the modernizing of the Orient.

While allowing that the Pacific coast will be the first to profit by the increase of Oriental trade, and that wheat will be cultivated on a large scale in Canada and in Siberia, yet Minnesota and the two Dakotas will be certain to be called upon to supply as much of their crops as they can spare. Minnesota, it must be remembered, stands in the center of the great wheat fields. Her railways lead both east and west. She can exploit trans-Pacific as easily as trans-Atlantic trade. Commerce abhors a vacuum, and commerce begets commerce. The teas and silks of China and Japan will no longer need go to New York and across the country to supply the middle-west and the west, as well as the south and east. Minnesota will be the natural distributing point for this trade, and here will be located the great jobbing and wholesale houses.

The stimulus which the Oriental trade will give to manufacturing will be tremendous. It is shortsightedness for us to export our wheat for Asiatic mills to grind. They want our machinery and railroad iron, not our iron ore; our woolen goods, not our wool. To give an inkling as to what this development of manufacturing means to the future of Minnesota, understand that ore mined in Minnesota at $2 a ton will be turned into railroad iron paying $30 a ton for labor, nails paying $60 a ton, and finished machinery paying $200 a ton.

In peering into the future, few, perhaps, have given any thought to the probability that to the north, as well as to other points of the compass, can Minnesota look for an interchange of commerce, yet a railroad is not only projected, but is in the process of construction for completion in 1904, which will give Minnesota a connection with the Hudson Bay country, a new empire in its resources. What its development may bring forth a guess cannot be hazarded even, but the time for being surprised at the new wonders revealed by the march of civilization across the North American continent is long past. Who would have thought a few years ago that in 1901 the Klondike region would yield $25,000,000 in gold!

When the Northern Pacific transcontinental railroad was first broached so soon after the completion of the Union Pacific it was regarded as a reckless enterprise, yet before its completion the rich reward that was to follow became so apparent, and the revelations of the richness of the country to be opened up so certain, that a second transcontinental railroad, the Great Northern, was projected, to be completed within ten years, and even a third transcontinental line, the Canadian Pacific (which has its United States termination at the Twin Cities of Minnesota), was added.

If the building of the first transcontinental railroad through the northwest so soon brought realization of the logical position of Minnesota as a factor in the development of the country and the expansion of national commerce, what must be thought of prospects now that great railroad consolidations have been perfected, which unite, in Minnesota, the Northern Pacific and Great Northern roads with the Burlington and Erie systems?

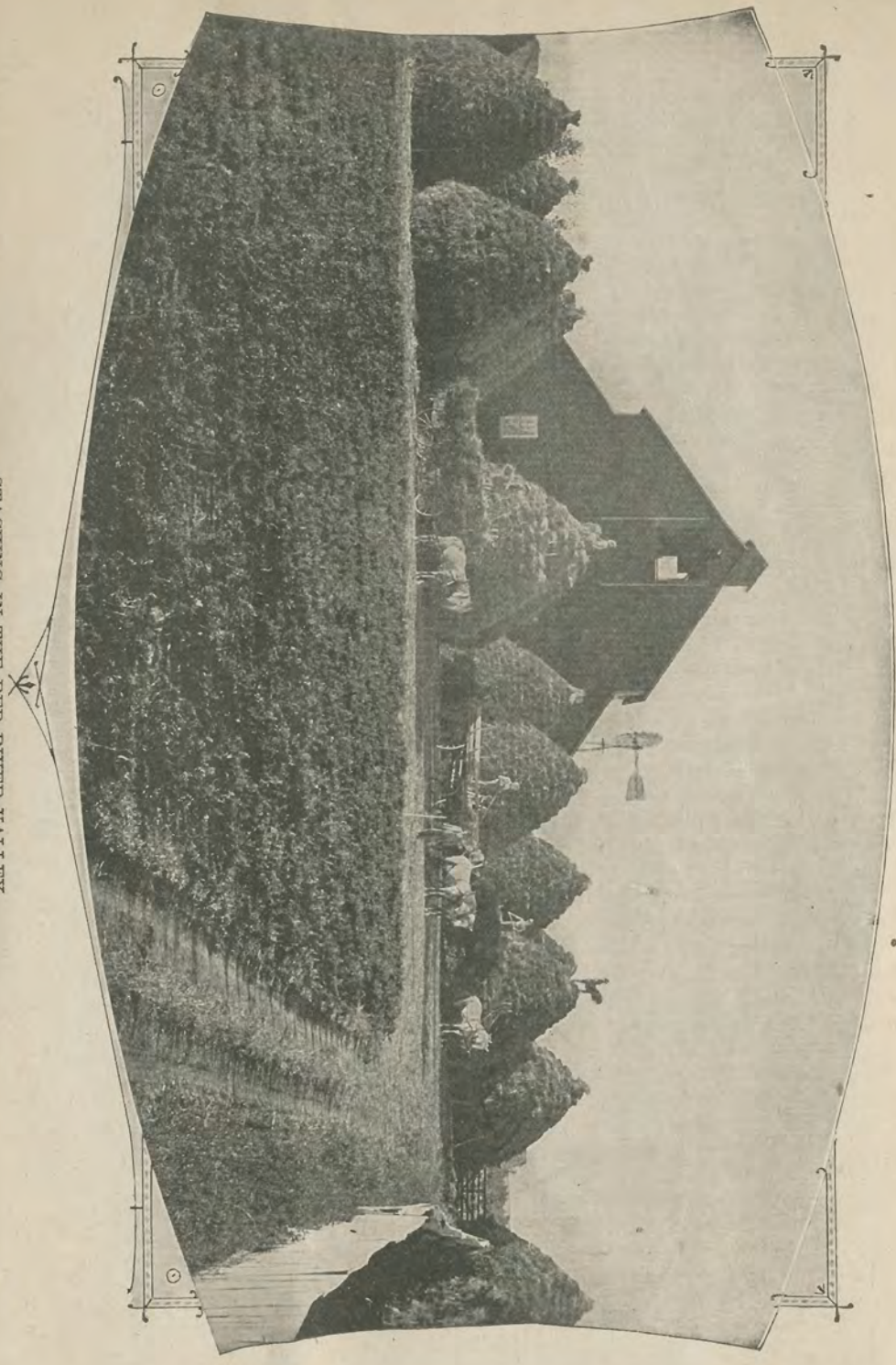
These preparations, the building of miles of docks at Pacific ports and the fitting out of mammoth freight steamers surely mean an anticipation, by the greatest financial minds in the country, of the possibilities of a tremendous growth of commerce to the west.

MINNESOTA'S RESOURCES.

Land agents report that this year will see at least one hundred thousand newcomers settle upon Minnesota farm lands, and sales presage a still larger immigration next year. The prices of lands are advancing naturally. The population of the United States is increasing at the rate of 2,000,000 people a year, and within the next decade this would make the number of newcomers seeking homes, 20,000,000. In three years, it is estimated, there will hardly be a desirable piece of government land open to settlement between the two oceans, so the opportunity for locating in the northwest, and especially in Minnesota, under circumstances so exceedingly favorable as now, may not be long lasting. Thirty years ago the population of the six wheat producing counties in the Minnesota Red River Valley was 451. Ten years later it was 21,123, and in another ten years it had reached 71,190. Now it is over 100,000. Twenty years ago these counties raised 1,500,000 bushels of wheat. Now they raise 10,000,000 bushels on the average in a year.

Minnesota has an area of 83,531 square miles, or 53,459,840 square acres. It is larger than the whole of New England; it is nearly equal to Ohio and Pennsylvania combined, and it is one-eighth larger than Indiana and Ohio combined. It is not a prairie state in the sense that there are long stretches of plains such as are found in some western states. Although three-fourths of the surface is prairie land, it is rolling prairie, undulating, interspersed with timber, and dotted with almost innumerable lakes.

The headwaters of the continent are divided within the boundaries of Minnesota. A water-shed separates the streams that flow to the Mississippi to the south from the streams that feed the Red River of the North, which flows to Hudson's Bay, and the streams that flow into the St. Louis river and into Lake Superior to the east. More than 3,000,000 acres of the state's area is water surface. There are eight thousand lakes and ponds, five thousand of which are named and located upon maps. They are located chiefly upon the table lands and constitute the sources of many streams. This abundant water surface enriches the land, moderates the extremes of temperature often found in northern climates and affords some



STACKING IN THE RED RIVER VALLEY.

three thousand miles of navigable water within the state. Red Lake in Minnesota is the largest body of fresh water lying wholly within the boundaries of the United States, Lake Michigan excepted. A number of others are of considerable size and are widely known as fishing and summer resorts.

PHYSICAL CHARACTERISTICS.

Take a ride across Minnesota and you will not see the red and yellow clays that underlie eastern and southern surfaces. There is a rich black loam that varies in depth from two to five feet, which is extraordinarily productive for all branches of semi-tropical agriculture.

Without crowding, Minnesota has an area ample for the comfortable support of ten millions of people, and as yet has but a population of 1,751,394, while not over an eighth of its surface is under cultivation. Such diversity of natural resources is seldom to be found within the borders of a single state: Grain, lumber and iron in quantities to lead the markets of the world.

A surface description, dividing the agricultural portion of the state into the sections, as they are best known, is as follows: Southern Minnesota is the name applied to the area south of the Minnesota river, and extends from the Mississippi on the east to the western boundary of the state. This section, in its mild climate, rich soil, and diversified industries, offers more inducements to the agriculturist and dairyman than almost any part of the country. It was settled early in the history of the state, and its people have been uniformly prosperous. It is a beautiful country, which includes rolling prairie, woodlands, valleys and many pretty lakes. Its timber is sufficient for domestic purpose, but it is pre-eminently a farming section, with many towns and villages of good size that afford a competition in markets. It has sufficient mineral wealth to justify expectations that iron manufacturing may some day be carried on.

The famous Red River Valley, the home of No. 1 hard wheat, which begins in Minnesota, was also settled early and is uniformly in a fine condition of cultivation throughout the six large counties which lie along it. As high as twenty crops of wheat have been raised in succession here without fertilizing, and still the rich black lands show no signs of becoming impoverished. An average yield of wheat for periods as long as fifteen years has been twenty-five bushels to the acre, and, in the best seasons, forty bushels to the acre is gathered. Oats, barley, rye, flax and potatoes grow here with remarkable profusion. It is splendidly watered by streams that flow into the Red River.

Central Minnesota, or the Park Region, is covered with a moderate growth of mixed hard and soft wood timbers, with considerable meadow land. In addition to wheat and the other small

grains, corn is largely raised. The climate is about the same as in the eastern part of the state, and apples and small fruits are successfully cultivated, as well as all kinds of vegetables. Numerous lakes and beautiful scenery are prominent characteristics.

Eastern Minnesota includes the famous mining region, as well as great pine forests. All grains, fruits, and vegetables indigenous to the state can be raised. In the mineral ranges in this section at least $5,000,000 is paid to operatives annually, while the lumbermen's wages amount to $2,000,000 annually.

The extreme fertility of Minnesota is accounted for in part by its geological formation. It is deeply buried in drift deposits which make the best farming soil in the United States. In Northern Minnesota the character of the surface becomes more hilly and rugged until it runs into the Vermilion and Mesaba ranges 2,200 feet above the sea level. To the northwest the surface slopes away to level prairies. To the north and east is the section lying between the Rainy Lake river and the headwaters of the Mississippi, and reaching from the Red River counties on the west to Lake Superior on the east, which includes a large part of the area of the state, the resources of which have not been fully analyzed. The extreme eastern portion of this section is known to be rich in minerals and the balance is well adapted to general agriculture.

AS TO PRICES FOR LAND.

As to the lands open to settlement. The government lands which are available under the United States Homestead Law amount to between three and a half and four million acres. They are located chiefly in the northern portion of the state, and they may be increased somewhat by the opening of Indian reservations.

The state lands, consisting largely of the unsettled sections set aside by congress for the support of schools in each township, for internal improvements and for the support of the state university, amount to 3,437,786 acres. The prices for these run from $5 to $6 per acre as a rule, but as high as $15 an acre for especially desirable lands. There are also lands included in grants to railroads remaining unsold amounting to about a million acres.

Lands improved and unimproved are also held by individuals and land companies which are upon the market. As has been said, prices for Minnesota farm lands are advancing rapidly, the increase in value having been more than one hundred per cent in seven years. The present year will see the largest land sales in the history of the northwest, those being made thus far indicating especially large movements of farmers from Indiana, Nebraska and Kansas to Northern Minnesota.

If you are tired of looking for work, want to be independent, want a home of your own—Minnesota offers you a chance to help yourself.

AS A SUMMER RESORT.

It would be unfair in this connection to omit a mention of Minnesota's attractions as a summer resort. There are fashionable resorts near the cities, and the 8,000 lakes and ponds within the state are so well stocked that fishing is a recognized industry, giving employment to several hundred men. A state hatchery annually distributes about 150,000,000 fish eggs. Thousands of people come to Minnesota for recreation every summer. Probably no state in the Union has so many game birds, while deer and elk and many varieties of smaller fur animals are still abundant.

MINNESOTA'S CLIMATE.

The matter of climate should be an important consideration with one seeking a location for a home. Great opportunities for making money should count but little if health is to be sacrificed. Minnesota has an exceedingly healthful and bracing climate. Its, dry, pure air is absolutely free from malaria. Pulmonary complaints seldom originate within this state. With the exception of Colorado, Minnesota is generally recommended by physicians as the most favorable location in this country for consumptives and sufferers from lung diseases. There is even a movement on foot to induce congress to set aside a section of pine forest land for a national sanatarium park in the northern part of the state. In southern climates invalids are often enervated, but here they are invigorated, and recovery, not mere convalescence, is likely to follow.

The climate of Minnesota has been called the most normal of this continent. The general elevation above sea level is high, and the ample drainage by its unsurpassed system of lakes and rivers mitigates the temperature, and insures a lightness and dryness of atmosphere. The elevation of the state averages about 1,200 feet, it being 1,575 feet at the head of the Mississippi, and at St. Paul, 672. At Duluth it is 630 feet. There is an absence of humidity, which in the Eastern and Middle states, intensifies both the heat and the cold. The average annual precipitation in New England is forty-three inches. On the Pacific coast it is over sixty inches, while in Minnesota it is from twenty-three to twenty-five inches. Rain in Minnesota falls largely in the spring and early summer, and there are few of those heavy storms which interfere with agriculture. Minnesota has gained the reputation of being a "cold state," because the mercury, on rare occasions, descends to a low temperature. It should be understood, however, that the dryness of the atmosphere mitigates these extremes of temperature. Thirty degrees below zero in Minnesota does not entail as much discom-

HARVESTING IN MINNESOTA.

fiture as zero weather in Chicago and New York. The combination of high wind and extreme cold is unusual. The weather here is not as changeable as further south and east, where it may rain, snow, freeze and melt all in the same day. Minnesota winters are even, and a snowfall may cover the ground for weeks, and is not likely to be turned into slush the next day. Long stretches of uniform cold weather also confer the benefit of killing disease germs in the air.

The Minnesota display of fruits, which will be seen in season in the Horticultural Building at the Pan-American Exposition, is a complete answer to the statements concerning the severity of the climate of Minnesota.

MINNESOTA WHEAT.

Minnesota is the great primary wheat market of the world. Its agricultural development has been little short of the marvelous. In 1822 a colony of settlers, who had come from England, expecting to locate near Winnipeg, found the temptation to settle in the Red River Valley too strong, and stopped at the conjunction of the Mississippi and Minnesota rivers. Twenty-five years later a little trading post at Red Wing had developed into the wheat market of the state, to which the farmers along the Minnesota river hauled their grain from distances as great as a hundred miles. From here the wheat went down the Mississippi to points reached by railroads, which had begun to branch out from Chicago. It cost in those days seventy-five cents a bushel to carry wheat from Red Wing to New York City, and $2.50 was not an unusual price per bushel paid for this wheat, which soon gained fame for its quality. The fame of the Red River Valley and its No. 1 hard wheat spread, and as a result the counties along this golden grain belt were the first to be settled.

As the wheat production increased, the capacity for taking care of it increased proportionately, by means of milling development.

The railroads reached Minnesota just as they were most needed, and opportunely came the discovery of the new process of milling. The system of the storage of wheat by means of elevators followed naturally. When Thos. Jefferson accomplished the Louisiana purchase in 1803, the Falls of St. Anthony were almost unheard of. Fifty years later the need of a better process in milling brought the new invention and led to the erection of mills at these falls, which have multiplied until today they number twenty-five of the largest flour mills in the world, with an annual combined capacity for grinding 65,000,000 bushels of wheat, which would yield 19,303,500 loaves of bread a day, sufficient to meet the wants of the people of all New England, New York, Pennsylvania and Ohio. At this rate they can make 27,630,500 barrels of flour a

year, which, if laid end to end, would reach half way around the earth. This is the capacity of the mills of Minneapolis alone, without counting Duluth and the other mills in the state. The receipts of wheat at Minneapolis for 1900 amounted to 83,312,320 bushels, and at Duluth to 53,080,396 bushels. The cultivated wheat area in Minnesota is estimated at 11,000,000 acres, while North and South Dakota, Iowa and Nebraska add great amounts. Great elevator lines, with terminal points in Minnesota cities, reach out to the Missouri river, and north into Manitoba, into Iowa and Wisconsin, and south to Kansas City. One elevator system has a capacity of 35,000,000 bushels alone, it being the largest elevator system in the world. In the states of Minnesota, North and South Dakota there are 2,000 of these elevators, all controlled from Minnesota. Country mills in all sections of the east buy selected Minnesota wheat, and Pennsylvania especially receives large amounts for grinding purposes.

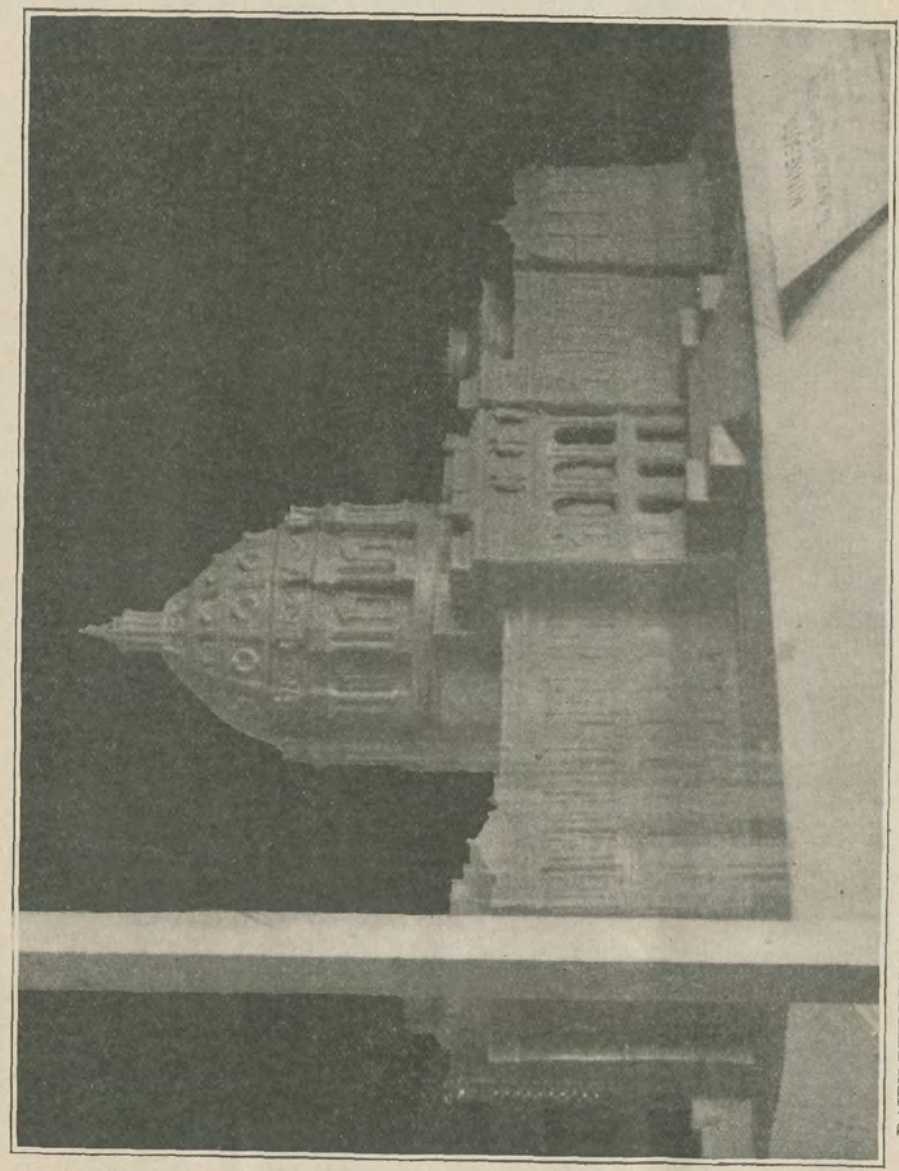
OTHER MINNESOTA CEREALS.

Wheat, however, is not the only cereal raised successfully in Minnesota. The other smaller grains are grown prolifically, and although wheat leads off with a crop record of 73,276,551, that of oats reaches 66,377,328 bushels, while corn, which a few years ago it was thought could not be successfully cultivated in this state, yields a crop of 46,434,142 bushels. Of barley, Minnesota raises 15,638,669; rye, 1,802,274; of cultivated hay, 783,076 tons; timothy seed, 317,348 bushels; clover seed, 50,876. Two-thirds of the flax raised in the United States is grown in Minnesota and the Dakotas, Minnesota's share being 4,505,790 bushels.

FRUITS.

Sugar beet cultivation is becoming a prominent industry. Beets are raised which yield as high as nineteen tons to the acre, containing from 19 to 18 per cent of sugar. At the Chicago World's Fair Minnesota was awarded 225 premiums upon its agricultural products. Its eighty-two counties produce almost everything in a horticultural line, aside from purely tropical fruits, known to the virgin soil. At the World's Fair 225 varieties of grasses were shown.

Among the other fallacies that have been exploded concerning this state, is the theory that apples cannot be raised here, yet they are produced in large quantities and of such quality as to repeatedly win prizes in competitions with apples shown from more southern latitudes. The apple orchards of the state cover at least 10,000 acres. Plums, melons, strawberries, currants, raspberries,



DAIRY BUILDING.—Model of Minnesota State Capitol in Butter. 11 feet 8 inches long, 5 feet 4 inches high, 8½ feet wide.

blackberries and cranberries are other fruits which grow here to perfection.

The fruit industry is growing wonderfully. This year 250,000 grafted plum trees are being set out. At least 1,000 acres of strawberries are being cultivated, and 1,500 of raspberries, and 500 acres of grapes, which will yield 1,500 tons. The value of the fruit stock planted this spring alone is estimated at $500,000. The Minnesota Horticultural Society has a membership of nine hundred, and is the largest organization of its kind in the country. At the State Fair last year there were shown 3,741 plates of fruit in competition for prizes.

MINNESOTA BUTTER.

Minnesota's distinction as the "bread and butter state" rests upon a solid foundation. The dairying industry has grown and is growing with giant strides. Its greatest progress dates from 1893, when the first co-operative creamery was started. Now there are 582 creameries and sixty cheese factories in successful operation, and the total number of cows is 610,496. For want of skill and proper facilities in the homes, which were formerly the sole butter factories, a vast amount of good cream and milk was converted into inferior and low-priced butter. Now the milk and cream goes to the creameries to be made into the choicest and highest-priced product. Dairy associations, the work of the state school of agriculture, which is spoken of at some length further on, Farmers' Alliances, and the stimulus of the competition of the National Creamery Buttermakers' Association have been the influences that have improved the quality as well as the quantity of Minnesota's butter so that it has led all the states of the Union in repeated competitions. The total butter and cheese product of this country last year was valued at $250,000,000, so it is no idle honor to stand as the leading state in such an important industry.

Here are some of the honors accorded Minnesota butter:

1901—Sweepstakes prize and prize for scoring highest average at the contest of the National Creamery Buttermakers' Association.

1900—Medal for best butter exhibit at the Paris Exposition. First prize for separator butter, and first prize for butter from gathered cream at National Buttermakers' Convention at Lincoln, Neb.

1899—Prize banner sweepstakes banner at National Creamery Buttermakers' contest at Sioux Falls, S. D.

1898—First premiums at four of the five contests at Omaha Exposition.

1897—Gold medal and silver cup at the contest of the National Buttermakers' contest at Owatonna, Minn.

1896—Gold and silver medals at the National Creamery Buttermakers' contest at Cedar Rapids, Ia.

1886—Sweepstakes prize at the New Orleans Cotton Exposition.

It was this last-named achievement that first attracted attention to Minnesota as a butter-making state, and aroused the interest of her farmers, stimulated state pride and led to a constant desire for improvement. Since then no other state has made such showing at any contests, national or international. In the five contests at the Omaha Exposition, Minnesota had over two hundred entries which scored above ninety. At the Chicago World's Fair and at the Paris Exposition Minnesota won gold medals over the famous butter of Denmark for superior quality. At the last National Creamery Buttermakers' contest held in February of this year, Minnesota won the highest award and three medals out of four, also the silk banner for the highest average, a wonderful achievement when it is considered that the average was scored upon 262 entries from Minnesota, while Kansas, her nearest competitor, had but twenty-nine entries.

The six hundred creameries of Minnesota last year made more than 60,000,000 pounds of butter, much of which was graded as extra fine, and the value of the output is estimated at $14,000,000. There are eighty-two counties in the state, seventy-three of which have creameries in operation. Freeborn is the banner county where the co-operative creamery system for which Minnesota is noted was inaugurated. In this county twenty-nine creameries made over 4,000,000 pounds of butter last year, and paid to the patrons over $800,000. The creamery patrons of the state number 60,000, with an average of seven cows to a patron. The average production is between 150 to 175 pounds of butter to the cow. The average creamery gets the milk from about 600 cows, and the receipts in individual cases run from about $15,000 to $40,000 a year. The amount of capital invested in the business in Minnesota is $3,000,000.

The splendid development of dairying in Minnesota is due not only to conditions which supply nutritious pasture, succulent forage, cheap milk-producing grasses, with pure water in abundance at all times of the year, but because of the careful study that has been made of the breeds of cattle, the process of feeding, etc. Experiments have shown that the cheapest forage is corn fodder and clover. A combination of the two, with a grain ration, based on the relative cost of ground mill stuff, makes the most satisfactory and cheapest milk ration known. As a result of a change from timothy hay, which the farmers fed almost exclusively a few years ago, they are now getting twice the return per acre of pasturage, and a larger production of milk. The winter system of dairying, which includes the birth of calves in the fall, which has been found to produce one-third more milk in the course of the year, is being gradually adopted, which makes the operation of butter-making continuous the year around.

Minnesota has been careful to safeguard its dairy interests by the vigorous enforcement of laws against the adulteration of food.

Every creamery and cheese factory is regularly inspected, as is every hotel, restaurant, boarding house, bakery, mining and lumber camp, against the use of renovated butter, and the adulterations and imitations of butter. A system of monthly tests of butter under state supervision has been inaugurated, which is proving very effective in improving the quality of butter. While Minnesota has not been as prominent in the making of cheese as in the making of butter, every natural condition necessary for the production of a superior quality of cheese is found here.

STOCK RAISING IN MINNESOTA.

The dairy industry has exerted a mighty influence in making Minnesota a state of diversified farming in spite of the temptations offered to bend all exertions to the raising of wheat. In former years this was not the case. The farmers depended almost exclusively upon growing wheat, and even under the most favorable conditions they were comparatively idle during the winter. This one-crop style of farming entailed many risks which dairying has obviated. In addition, stock raising has been greatly stimulated. The proof of the pudding is in the eating thereof, and Minnesota's record at the world's fair attests the success of its farmers as stock raisers. In a contest in which there were over 2,500 of the best cattle the world has ever seen entered for competition, and judged by the highest authorities, Minnesota took 57 per cent of the premiums, as compared with the total numbers of entries from the state. In horses the percentage of premiums won was 91 per cent.

A decade ago stock raising was confined to the needs of the farmers, and was not considered a money-making industry. Since then Minnesota has raised not only for the Chicago meat market, but a packing industry has developed, which is growing with every month. A territory which extends a thousand miles to the west and north, which includes the great ranges of North Dakota, South Dakota, Wyoming and Montana, is rapidly developing in stock raising, and its ranches furnish an immense supply of sheep and hogs, as well as cattle, for which there is already an almost limitless market at home. Minnesota meats have attained a great popularity, owing to the climatic conditions, which make them superior to those cured and packed in warmer sections of the country. At South St. Paul the stock yards do a business already exceeding ten million dollars annually. Statistics for 1900 show Minnesota has horses, mules and asses totaling 559,060; cows, 610,496; work oxen, 1,220; all other cattle, 451,246; sheep, 316,965; hogs, 40,480. The wool clip of Minnesota amounts to 1,517,313 pounds.

THE WHITE PINE STATE.

The first industry to be established in Minnesota was that of lumbering. A crude saw mill was put in at St. Anthony Falls to manufacture the timber with which the barracks at Fort Snelling were built. This was in 1848. In 1854 the first gang saw was brought to the state, and two years later the first circular saw was set at work. Within the next three years six saw mills were built along the natural water power furnished by the Mississippi. By 1880 Minnesota had reached third place among the lumbering states of the Union, with a record of 195,452,182 feet. Last year the lumber cut was 2,249,313,000 feet. Notwithstanding this tremendous slaughter of the forests, there are billions of feet of pine timber standing in Minnesota, with millions of forest acres yet untouched. This century will not see the supply exhausted, but already steps are taken to replenish and preserve the forest lands for the benefit of posterity.

To feed the voracious saw mills the Mississippi has been lined with booms for a distance of one hundred and fifty miles above the Falls of St. Anthony, by means of which a steady log supply has been assured, and the waste minimized. Logging railroads have been constructed to tap the rich pine land country of the north, and have been extended year by year to bring down the logs from the headwaters of rivers flowing toward the Canadian boundaries from distances of two hundred and fifty miles away. These roads dump the logs into the river, and the combination of rail and river makes the cost but fifty-eight cents a thousand feet, on the average, from the furthest points in the state to the big saw mills at Minneapolis. Inventions have vastly increased the economies in the manufacture of lumber. Sawdust, bark, shavings and millwood are all utilized, which formerly were thrown away. Band saws have replaced the circular saws; steam driven rollers, endless chains, log turners, steam cranes, automatic sorters, gang edgers and trimmers and other devices have been introduced from time to time, the use of which will send a log spinning through a mill, sorted into lumber of different sizes, quicker than the old-fashioned mill could have cut off the first slab. In this way the capacity of the mills has been increased fifty-fold. The great rafts, with a million feet of lumber, are no longer floated down the Mississippi to St. Louis. The mills have been built near the forests, and great piles of lumber leave the state to the west, as well as to the east and south.

Besides the state itself, Iowa, Nebraska, North and South Dakota, with portions of Wisconsin, Illinois, Missouri and Kansas are largely dependent on Minnesota for lumber. Its timber supply is not limited to white pine. There is a good percentage of Norway pine, besides a large proportion of hard woods.

RAILROAD DEVELOPMENT.

Eleven railroad companies, comprising twenty-three divisions, which, so far as traffic is concerned, are so many railroads, with gross earnings annually of $40,000,000, do the carrying for Minnesota. Thirty-eight years ago there were but ten miles of railroad in the state. Now there are 6,500 miles within its boundaries, and with their various systems they cover thirty-five thousand miles of road, which is more than there was in the entire United States fifty-five years ago.

Three great transcontinental railway systems have their actual and natural termini in Minnesota—the Northern Pacific, the Great Northern, and the Soo-Canadian Pacific. The recent "community of interests" established for the Northern Pacific and the Great Northern with the Burlington and Erie systems makes the twin cities of St. Paul and Minneapolis the pivotal point for their operations from ocean to ocean. These four roads touch nearly every city of importance north of the thirty-fifth parallel. Starting from the initial Northern Pacific and Great Northern territory at Portland, Seattle and Vancouver, the two Pacific coast lines reach east to Helena, Missoula, Spokane, Butte, Billings, through all the vast grain and cattle country of Montana, the Dakotas and Minnesota to the Twin Cities. Here the Burlington takes the shipments to Chicago, while another branch dips down to St. Louis, Kansas City, Omaha and other important southern points. From Chicago, connection is made with the Erie, which cuts across Northern Indiana and Ohio, with a branch running to Cleveland and another to Cincinnati and another to Pittsburg. The line also turns to Buffalo, while a cut-off goes straight to New York City. The span from ocean to ocean strikes every important revenue-producing section of the United States from Puget Sound timber to New York merchandise. It reaches the great grain fields of the northwest, and the immense steel industries of Pennsylvania. It reaches the distributing points in the southwest, where all the cotton coming up from the south is distributed among the Pacific roads for the haul to Puget Sound, and thence to the Orient. That the formation of this transcontinental traffic system will be a tremendous lift to Minnesota as a distributing point and railway center is apparent. Already negotiations are in progress for many hundred additional acres for trackage, in anticipation of the to be greatly increased volume of business.

One hundred and fifty passenger trains arrive and depart daily from the depots at St. Paul and Minneapolis, with a daily average of one thousand cars and 30,000 passengers arriving and departing daily. The year 1870 saw the real and rapid beginning of railroad development in Minnesota, but up to that time not a mile of rail-

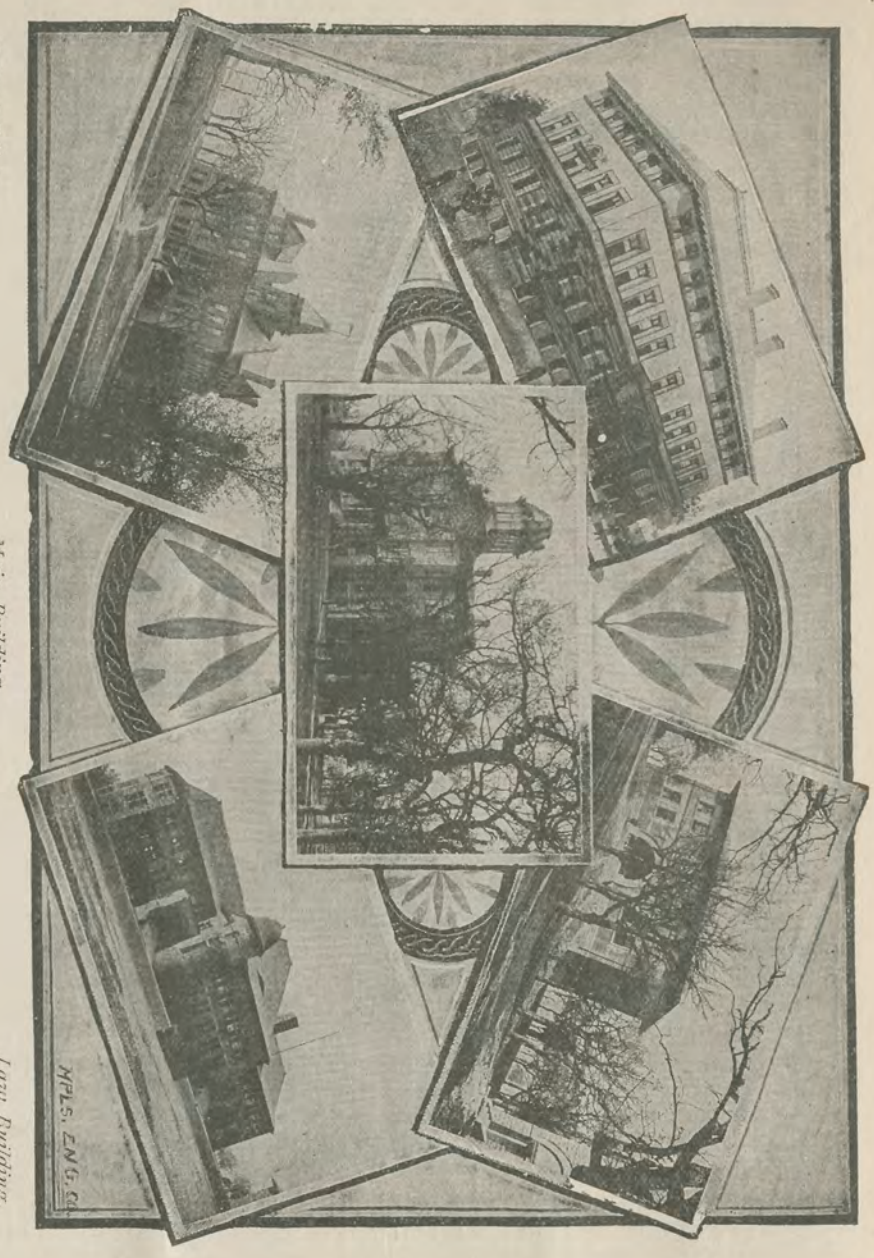
road had been built west of Minnesota, except sixty-five miles to what is now South Dakota. The building of the Soo, as the Sault Ste. Marie and Canadian Pacific is called, in 1887 was an important step. The main line extends from Sault Ste Marie, where it connects with the Canadian Pacific to the east, and runs 1,039 miles west of the Twin Cities to Portal, N. D., where it again connects with the Canadian Pacific, giving to St. Paul and Minneapolis an additional outlet to Atlantic and Pacific ports. On this transcontinental line are vast regions rich with agricultural forest and mineral resources.

To the advantages of all this railroad distribution should be added the navigation of the Mississippi, and the Lake Superior tranportation via Duluth. A large quantity of the eastern merchandise and general jobbing shipments consigned to Minnesota goes by water through the Soo canal to Duluth, where rail shipments of 150 miles follow to Minneapolis and St. Paul. The Soo canal passed west-bound traffic amounting to 4,636,276 tons of freight in 1899.

MINNESOTA'S SCHOOLS.

In Minnesota education from the common schools to the state university is absolutely free to every one. Its annual expenditure for education is $5,000,000. The number of scholars enrolled in the public schools in 6,000 school districts is 399,207. There are 10,616 teachers, and 7,303 school houses, which have been erected at a cost of $14,800,000. Its state university this year has an enrollment of 3,236. Twenty years ago the enrollment was 200. It has an annual income of $350,000, and a permanent improvement fund of $1,319,157. Minnesota has 115 state high schools, five normal schools, and state schools for the blind, the defective, and the deaf.

Early in its history Minnesota received from congress a grant of two sections of land in each township to be sold from time to time for public school purposes. The increase of the value of this land has piled up a school fund more than double that of any other state, save Texas and Kansas, and much greater than that of either of them alone. There are remaining unsold of these lands 1,374,370 acres, valued at $18,196,052 at present prices. In addition the state and local taxes yield additional support that is very liberal. For the encouragement of secondary education the state offers $800 to each town or village that maintains a high school nine months in each year. To deserve and receive the bounty the trustees must admit non-residents without charge for tuition, must equip the schools with suitable physical and chemical laboratories and support a circulating and reference library. Graded schools not maintaining a high school department are given a bounty of



Medical College.
College of Mechanic Arts.

Main Building.
MINNESOTA STATE UNIVERSITY.
MINNEAPOLIS.

Law Building.
Pillsbury Hall.

$200. The rural schools, of which there are 660, receive $75, and the semi-grade schools, of which there are 191, get $100 each. The normal colleges at Winona, Mankato, St. Cloud, Moorhead and Duluth have been highly successful, and 5,000 school teachers have been graduated from them, and partial instruction given to twice as many more. In addition, summer training schools for teachers are maintained, together with model schools to afford practical work and opportunity for observation.

The state university is a part of the public school system of education, supported both by the state and the nation. Its career began in 1869. Its location is between St. Paul and Minneapolis, and it is provided with ten handsome brick and stone buildings, in addition to the buildings of the School of Agriculture, at which there is a finely equipped experimental station. The university carries forward the work of the public schools in many directions, combining the culture of the college with the practical work of the modern school of technology. Tuition to residents of the state is free.

The department of sciences and arts has an enrollment of 931, and gives work in scientific, literary and civic courses. The engineering department has 209 students, and a school of mines, which sends classes of students to the mines in the western states for practical work. The school of law has an enrollment of 525, and is considered one of the best in the country. The school of medicine has 550 students, and is provided with modern apparatus and laboratories as finely equipped as any in the country. The department of botany has a herbarium collection of 200,000 specimens. A valuable library has also been added.

School libraries have been liberally encouraged throughout Minnesota as well, and forty school houses out of every hundred in the rural districts have good libraries. There have been founded 260 libraries in special and independent school districts, and 237 in the rural districts, containing over 300,000 volumes all together.

Chemistry, botany, animal biology and geology are especially prominent in the university work, as closely allied to agriculture, the most important industry in the state. The agricultural education is made practical as well as scientific, and embraces practical horticulture, agriculture, veterinary surgery, dairying, animal industry, together with the sciences usually taught in technical schools, as well as manual training of an advanced character.

Only one other state in the Union makes more generous appropriation for her agricultural experiment station than Minnesota, and that is New York. The work of the Minnesota station has reached a point of high value, recognized by agricultural colleges as of great usefulness in the promotion of agricutural interests and needs. The United States contributes $15,000 to its support annually, and this, with its revenue from the state and the sale of farm products, gives it an income, which, last year was $56,336.40.

A staff of fifteen scientists and experts is employed. Its work includes experiments with grain and forage crops, flax grown for fiber and for seed, sugar beets, the rotation of crops, etc., horticultural and forestry investigations, entomological investigations, especially with reference to repression of grasshoppers and similar pests, chemical studies of soil, foods, etc., investigations in dairy farming, and dairying, studies in veterinary science and practice, feeding experiments with cattle, sheep and pigs; the breeding of important varieties of cereals and vegetables. Farmers' institutes are being continued under the auspices of the university.

There are also in Minnesota thirty-four private colleges, seminaries, academies and schools, some of which have a national reputation. In the midway district of the Twin Cities are Hamline University, which represents the higher educational work of the Minnesota Methodists, Macalester College, a Presbyterian institution, St. Thomas and St. Paul Seminaries, both Catholic institutions, and a Lutheran college. Each has handsome buildings and grounds.

POPULATION OF MINNESOTA.

The population of Minnesota in 1900 was 1,751,394, which showed an increase since 1890 of 449,568 or 34.5 per cent. This is 288 times as large a population as there was in 1850, when the population was 6,007, that being the first census taken. The land-surface of Minnesota is 79,205 square miles, so the average number of persons to the square mile was in 1890, 16.4, and in 1900, 22.1. There are 447 incorporated cities, towns, villages and boroughs in Minnesota. Fifty-three have a population of over 2,000, and of these thirty-five have a population of less than 5,000; eleven have more than 5,000 and less than 10,000, and six have more than 10,000, namely, Minneapolis with 202,718; St. Paul with 163,065; Duluth with 52,969; Winona with 19,714; Stillwater with 12,318, and Mankato with 10,599. St. Paul first appeared in the census returns of 1850 with only 1,112 inhabitants; Minneapolis in 1860 with 2,564 and Duluth in 1870 with 3,131. From 1870 to 1880 Duluth made only a nominal gain, but between 1880 and 1890 made an increase of 850.8 per cent. In the same decade Minneapolis made an increase from 46,887 to 164,738, or 251.4 per cent, and St. Paul a gain from 41,473 to 133,156, or 221.1 per cent. Between 1890 and 1900 Minneapolis made an increase of 23.1 per cent, St. Paul an increase of 22.5 per cent, and Duluth an increase of 60 per cent.

Just a word about the magnificent twin cities, St. Paul and Minneapolis, whose rivalry is world-famous. Both are noted for their beauty and enterprise. Their buildings are almost without exception samples of the best modern architecture which have been erected within the past fifteen years. Their joint park system, as it

might be called, has reached a wonderful state of perfection, and includes over sixty parks, with a half-dozen natural lakes, around which are splendid boulevards, affording a continuous drive of one-hundred-foot roadway which could hardly be covered by a team of spirited horses in an entire day. Summit avenue in St. Paul, is conceded to be one of the handsomest residence streets in the country.

An idea of the industrial and commercial standing of the Twin Cities can be gained from this brief summary of their statistics: The jobbing sales of each aggregated $200,000,000 last year. St. Paul's manufacturing output amounted to $100,000,000. That of Minneapolis, with its great flour and lumber business, amounted to $150,000,000, this aggregate being only surpassed by New York, Chicago, Boston, Philadelphia, St. Louis, and Cincinnati. St. Paul has fourteen banks, with combined deposits of $30,590,141.34. Minneapolis has thirteen banks, with a combined capital of $6,000,000, whose bank clearings amounted to $539,000,000.

MINNESOTA'S WEALTH.

The growth of Minnesota in wealth has been proportionate to its increase in other directions. In no other state are the people more prosperous, nor is wealth more evenly distributed. Its assessed valuation for actual taxation for 1900, was $588,116,688. This is an increase of $229,961,145, or nearly double the wealth of the state a decade ago. In 1849 the valuation was but little over $500,000 and in 1860 it was but $36,743,408.

The average wealth per capita as assessed is $335, but as the actual value of property in the state is more than three times its assessed value, the actual per capita wealth of the citizens of Minnesota is fully $1,000. The present state tax levy is 1.3 mills. The rate is being reduced, notwithstanding the increased expenditures of the state government. The cause for the reduction is found in the rapidly increasing income from the taxes upon railroad gross earnings, which for the year 1900 was $1,450,000, or more than one-half of the needs of the state government. Legislation enacted this spring increases the railroad tax one-third, so it is reasonable to assume that in a short time no direct tax whatever will be needed for the support of the state government, and property owners will be subject only to county and town taxes. At present the tax rate for all purposes, state, county and city, is 25.4 mills.

MINNESOTA STONE.

When Minnesota comes to its own, and the richness of its resources become generally known, its reputation as a stone-producing state will rank that of Vermont. Valuable quarries of a granite more durable and handsomer than the famous Scotch granite extend in a broad belt across the state. Limestones of blue, gray, buff and pink varieties are found extensively along its rivers and lakes, while the best sandstone quarries in the Union lie along the Kettle river. Already some of the handsomest buildings of the country are made of Minnesota stone and the quarrying industry is becoming more prominent yearly. The following mention of the stone resources of the state, by Prof. C. W. Hall, the State University geologist, gives an idea of the value and variety of the state's resources in this respect. At Luverne and at several localities in the same county, is found red quartsite, and several other beautiful color phases of the same rock. At Jasper is found the same quartsite formation, but of a decidedly pinkish color. Paving stones are extensively quarried here. At Pipestone, red quartsite, very like that of Luverne, is found, and associated with the quartsite is the famous Catiline, which is wrought into many interesting ornamental pieces. The stone when first cut is soft, but hardens with exposure. It has become known everywhere by the use the Indians made of it in making pipes. It is the only deposit of this kind of stone in the world. There are also large quarries of fine granite at Sauk Rapids, in Benton county, and at Ortonville, in Big Stone county are the finest red and gray granite quarries in the United States. At Montevideo is a gneissic rock of a bright red color, found in river bottoms. At Granite Falls and Minnesota Falls are fine types of crystalline rocks, the dark colors of which are very handsome. At Morton and Beaver Falls a beautifully contorted, dark gray gneiss is extensively quarried. Red quartsite is quarried at New Ulm, and at Mankato is quarried a very light pink dolomite. The famous Kasota stone is found in three different colors at the place of the same name. At Le Sueur and several other places along the Minnesota river, a belt of dolomite, which is practically inexhaustible, has been opened. Trenton limestone is quarried at Faribault, Medford, and Charles City.

Both St. Paul and Minneapolis have extensive stone quarries and quarrying is prosecuted at the following other places; Owatonna, Mantorville, Rochester, Lanesboro, Winona, Lake City, Red Wing, Frontenac, Cannon Falls, Hastings, Stillwater and Hindsdale. At St. Cloud are extensive granite quarries which yield dark gray, light gray, and red granite. At Little Falls hornblend, biotite schists, staurolite schists, and gabbros occur, and to the eastward in Morrison county are several promising localities for quarrying. At Grand Rapids there are sandstone, and quartsites, and granites. At Sandstone there are great quarries of sandstone that have a national reputation. At Duluth are famous gabbro masses used for harbor work. At Rockville are enormous quarries of porphyritic, light colored granite. At Cloquet and Thompson are quarries for roofing slate.

Minnesota is also rich in extensive beds of clay, from which excellent grades of building brick, tile, fire-brick and pottery are made. Cement of a superior quality is also manufactured largely. Among the locations of brick manufacturing are: New Ulm, Wrenshall, Grand Rapids, Princeton, Moorhead, Cannon Falls, Hastings, St. Paul, Minneapolis, Stillwater, Mankato, Shakopee, Carver, Chaska and Austin.

MINNESOTA MANUFACTURING.

As the results of the compiling of the census statistics relating to manufacturing in Minesota will not be finished for several months subsequent to the publication of this pamphlet, it is impracticable to give more than approximate information up to date on this topic. The census of 1890 gave the number of manufacturing concerns of all kinds as 7,505, with an aggregate capital of $127,686,616 invested. The increase of population since then has been 34.5 per cent, and corresponding increases in agriculture, commerce and other lines of development make it fair to presume that the number of manufacturing concerns is at least ten thousand.

Flour milling, and lumbering have been treated of elsewhere. Supplemented with these two leading industries, is the manufacturing of various cereal foods, for which Minnesota is famous in all parts of the globe, and the making of sashes, doors, and blinds, the trade in which extends throughout the country. Here is a brief mention of some of the other lines of manufacturing in which Minnesota takes prominence: The expenditures last year for live stock slaughtered at the Union Stock Yards of St. Paul amounted to $5,671.14. The aggregate business of Swift & Co. for the year was $5,150,000, with 997 employes on the pay roll. This spring a new plant of the same capacity is being added by Cudahy Bros. St. Paul has six hundred and fifty manufacturing plants with an output valued at $100,000,000. Minneapolis has nine hundred manufacturing concerns, with a product of $154,000,000. The state labor bureau in 1900 inspected 3,338 concerns, in which there were employed 83,237 people. These inspections, however, are confined to the precautions taken for safety of employes and the sanitary conditions of only the large establishments.

Minnesota has more boot and shoe factories than any other state with but two exceptions. It is the largest producer of lard pails in the world. In iron and steel manufacturing it may be mentioned that Minnesota has the largest and most successful threshing machine manufactories in the world. Structural iron for buildings and bridges is carried on by concerns whose trade encircles the globe. Minnesota has, too, the only plant manufacturing steel ceilings, sidings and portable fire-proof buildings. The manufacturing of twine, matting and rugs from the coarse, wiry swamp grasses, is the most extensive in the country. The clothing manufacture has

increased three hundred per cent in five years, and in the making of rough wear for the northwest, Canada and Alaska, Minnesota leads. Underwear and knit goods are also made extensively. Furniture manufacturing has grown one hundred per cent in five years and Minnesota supplies a territory which covers twenty-two states. Oils made from flaxseed, of which Minnesota and the Dakotas grow three-fourths of the country's output, constitute a leading industry. Among other lines of importance are: Woodenware, carriages and wagons, paper boxes, and flour packages, brooms and brushes. The stone quarrying and mining industries, described elsewhere, give employment to thousands, and yield products valued at many millions of dollars.

There are over 600 newspapers in the state, which are ably and intelligently advertising our resources as well as manufacturing public opinion. The liberal support accorded these publications is an evidence of the intelligence of the population.

The larger portion of the furniture in the Minnesota building at the exposition was made by the Northwestern Grass Twine Company of St. Paul, From Minnesota Swamp grass, which, until within a few years, has been considered a worthless product.

MINNESOTA IRON MINES

LEAD THE WORLD IN VALUE AND QUANTITY OF OUTPUT.

BY DWIGHT E. WOODBRIDGE.

In the brief space of seventeen years Minnesota has become the greatest iron ore producing state in the Union. It is led in its ore output by but two of the nations of the earth, Germany and Great Britain. Seventeen years ago the state did not mine a ton of ore, had no facilities for mining, no ore roads, no docks nor terminals, and indeed no one knew that it actually contained a quality of ore of any merchantable quality. This year it is producing enough ore to make all the steel that England smelts, and the trains that are this summer carrying its ore to Lake Superior at Duluth and neighboring ports would make a string of freight cars that would reach in a continuous line from Buffalo to Spokane, Washington, from Buffalo to Cuban ports, or almost from New York to Liverpool. This year $10,000,000 is being spent among the mines for labor, and nearly $9,000,000 more for carrying the ore to Lake Superior, and about all this expenditure is in Minnesota.

The ores of the state are the foundation of the organization of the colossal new corporation that is dominant in the steel making world, and but for its purchase of Minnesota ores this corporation could not exist. The men chiefly interested in that great organization defend its capitalization, not by its earning power, not by the steel making plants and coking works it owns, not by its patents and European trade, but by the statement that it owns a billion tons of iron ore, chiefly in Minnesota, that is worth a dollar a ton in the ground, and that the ore reserves alone are worth the entire capitalization of the corporation.

For ten years men have been exploring the iron ranges of Minnesota with feverish anxiety, looking for ores to add to the stores already held. In the past two or three years this search has been sharper and more earnest than ever. It is still going on, and is being rewarded by discovery. Last year more than 100,000,000 tons of ore were shown up; not all new ore it is true, for the existence of certain deposits were known to be where the drillers went to work, but the ore bodies were opened and measured last year to the amount of at least 100,000,000 tons. Let no man say that all the ore of Minnesota is found, when in one short year, after season and season of search, they are able to open deposits of such magnitude. Today explorations are going on more actively than ever,

and while the greater bodies have probably long since been found, as they are the easiest to discover, it is safe to say that the present year's work will add many million tons to the known deposits and that all the promising lands have not yet been gone over or thoroughly examined. There will be room for the explorer and drill man in Minnesota ore ranges for years to come.

Nobody knows the extent of the iron ore fields of Minnesota. No one knows how much ore yet lies undiscovered and undisturbed by drill or miner, nor how long the ores of the state will serve to supply the mills and furnaces of America. No one of those most intimately connected with the business believes for a moment, whatever he may say, that all the ore has been found. What Minnesota may do for the world of metallurgy in the future no one can tell, but its present importance is overwhelming.

A year ago estimates made as reliably as possible were that there were 400,000,000 tons of ore in northern Minnesota, in the county of St. Louis, of which Duluth is the county seat. Were this all, vast as it is, the state's mines would be exhausted in from 25 to 30 years. But since those estimates were made, changes have come in the ore in sight and in the knowledge of geological conditions affecting minerals. These have added many millions of tons. Then other changes have come in the manufacturing world that have permitted the mining and use of ores then considered valueless. Now the furnace men will buy and use ores that two years ago they would have made wagon roads of.

No one living will see the exhaustion of the iron mines of the two ranges that are known in Minnesota today. Mines are being worked in Michigan that have been active nearly fifty years, and new ores are being found within a stone's throw of mines that were opened before the days of the Civil War. If this is true of the Michigan ranges, what a light it throws upon the possiblities for the newer State of Minnesota.

Minnesota's iron industry is of recent date. In 1884 the first shipments were made, all from the Vermillion range. For years no other source of supply in the state was known of. These shipments were small and for the first few years averaged less than 300,000 tons a year. But the industry soon outgrew its swaddling clothes and with amazing rapidity became a giant. Now there is a stream of the richest ore in the world pouring out toward the east, in a volume unprecedented in history. Many thousands of persons in the state, and millions elsewhere depend for their bread upon the steady and incessant operation of the forces that furnish the material for feeding the ever-increasing furnaces of the east.

Should these forces linger or delay, mills, factories and centers of activity all over the world would stand quiet and useless; from the plains of Australia and the wilds of Siberia to the veldts of South Africa, enterprises now in full activity would cease. Minnesota ore is equipping the railways that Russia is building across Siberia

and Manchuria and south from the Caspian sea; it is arming the battleships of Japan; it is furnishing the miners in the interior of Australia with water without which they could not win the precious metals; it fills the machine shops and engine houses of the mines of Africa; it is building the bridges and supplying the railway cars of continents; it is constructing navies of war and commerce on every sea and is supplying half of Europe with articles of iron; it is civilizing and educating and reducing the waste places of the earth, and were its assistance denied, there is no pen could portray the direful consequences.

Analyses show that no quantity of such pure ore is shipped to any furnaces of the world, as Minnesota mines supply. Ore of the mines of Britain or of the southern United States is scarcely half as pure.

BEYOND COMPETITION.

Once upon a time wheat was king in Minnesota; and then came diversified farming and with it the production of beef, butter and milk that checked the supreme sway of No. 1 hard. The Dakotas may compete with us in the production of wheat, and Iowa, Nebraska and Missouri in other products of the soil, but no state—scarcely any nation—can long compete with Minnesota in the production of the mineral that is more precious than gold itself—iron. The story of the discovery, growth and development of the iron industry in Minnesota reads like a page from a romance, and were not St. Louis county lined and linked with the evidences of it, there would be difficulty in commanding belief.

It must have been a great strain on the credulity of the eastern capitalists whose aid was invoked, to be told that far back in the dense woods of the interior, a few miles from Lake Superior, there lay open beds of iron ore that would supply the furnaces and smelters of the world for generations to come. This great deposit of nature's best mineral had lain there for centuries unnoted by the white man and unthought of by the Indian.

It must have required supreme nerve and confidence for these capitalists to sink their millions in these unexplored mines. Many millions were sunk before the returns were favorable or before a single dollar could be realized. But capital was not lacking to develop the resources of these northern wildernesses. The men who discovered them took their little million or so and disappeared from the scene. They were pioneers, and the pioneer never does more than blaze the way. They had nothing to lose and all to gain when they pushed out over the marshes and swamps and rugged hogbacks of the ranges, watching the teeter of the polar needle that guided them and finally, more perhaps by accident than design, discovered the stronger local attraction that kept their needle from

settling on its star. They had discovered a great treasure—a treasure more precious than the diamond mines of Africa. It was a treasure not only for those who should develop and produce it, but for the whole state in which it lay. It was the beginning of Minnesota's second era of prosperity and of her first standing as a state of general and high productiveness. It was a signal bell that called a hundred million dollars into the state, there to remain for all time, to contribute not alone to the upbuilding of the iron region, but of the entire commonwealth.

Perhaps the most pleasing page in the history of the development of this great industry is the one which tells that in all its existence and throughout the course of its progress, from a straggling camp of prospectors and miners to the large and thriving mining cities of today, there has never been a conflict between employer and employes. When work has been plentiful and ore in demand the highest wages have been paid; when work has been slack the employer has co-operated with the employes, and what had been laid by in prosperous days has been husbanded and made to tide over the period of depression. When good times revived they found the men ready and willing to go to work and the companies ready and willing to employ them at an advanced scale of wages, few of the laborers in debt and all appreciative of the efforts of the companies to keep them and their families from want during the hard times.

THE FIRST DISCOVERY.

The Vermillion range was the first to be discovered, although it is more distant from the lake, but its hard ores were found in hills and knobs projecting above the softer rock of the surrounding country. Way back in 1866 state geologist Eames made a report on the range and it was known of from that time. It was not till Charlemagne Tower, in 1880, got possession of the property at what is now the city of Tower, that active developments began. He spent millions in building the Duluth & Iron Range road and in opening the mines. No one who travels to the mines today, in comfortable cars over a roadbed whose superior is not to be found in the United States, can have any conception of what initial construction meant, and of what financial nerve and strength were required in the undertaking. The mines at Tower were worked as open pits for several years. Their first ore was shipped in 1884. Four years later the road was extended 24 miles easterly to Ely, and the Chandler mine was opened. At Ely there are now five large and important mines producing ores of the highest grades and of very desirable qualities.

The ore of this range is what is known as hard hematite. At Tower it occurs in nearly vertical lenses that have been opened 1,000

feet deep and the cost of mining is large. Ore has been found by the diamond drill at considerable depths below the bottom of the mines, and there is no telling to what depth mining operations may be carried. At Ely the hard ore appears to have been crushed by the forces of nature, and it is found as small angular fragments, easily mined and very desirable in the furnace. Owing to the absence of phosphorus, these ores have been eagerly sought by the furnace men of the country, and have won for themselves as distinctive a place in the world of metallurgy as Minnesota No. 1 hard wheat has in the world of agriculture. The Vermillion range is reached by one railway, and its mines are more extensive than ever, though they have sent forth more than 15,000,000 gross tons.

THE MESABA RANGE.

However important the Vermillion may be, it fades into insignificance when compared with the newer Mesaba, the "giant range" of the Indians. It is gigantic in all its proportions and characteristics. In length, breadth, thickness and number of deposits, in the favorable situation for exploration and mining, it does not possess an equal on the known extent of the globe. Discovered less than ten years ago, it has now three great railways of the highest class, with ample and costly equipment of cars, locomotives, docks and terminals and with a traffic that exceeds, per ton per mile, that of any other roads in the United States. It has reached the leading place as a producer of ore. Up to date it has shipped more than 31,000,000 gross tons, and is now mining at the rate of about 9,000,000 gross tons per annum. All ore shipped from this range runs over 60 per cent in iron, and there have been made from its output almost 20,000,000 tons of pig iron. It has the largest mines in the world, both as regards their stores of ore and their annual output.

The ores of the Mesaba are soft hematite, more like sand and gravel than the hard rock that is generally associated with the mention of iron ores. When uncovered at many mines they can be shoveled as one would shovel into a sandbank or a gravel pit. The miners drill holes into the ore for their powder by hand augers, with which they bore into the firm but soft material at a rapid rate. There is no need of powder except to loosen up the packed ore that has been lying for millions of years under a heavy covering of earth. The deposits of ore are turned broadside to the sky instead of nearly vertical as on most other ranges, and the ore is therefore easily found and easily mined. Single deposits contain many million tons, and are mined by steam shovels working into the banks as they would into a gravel pit. Some of these cuttings are so vast that whole railway trains may be run in them at once, and all the cars can be loaded by a shovel as they slowly pass beside it. It is these

methods of mining that have within the past five years made America the world's iron master.

There are now about 40 mines opened on this range, and most of them are large properties capable of immense shipments and of long duration under the stress of production.

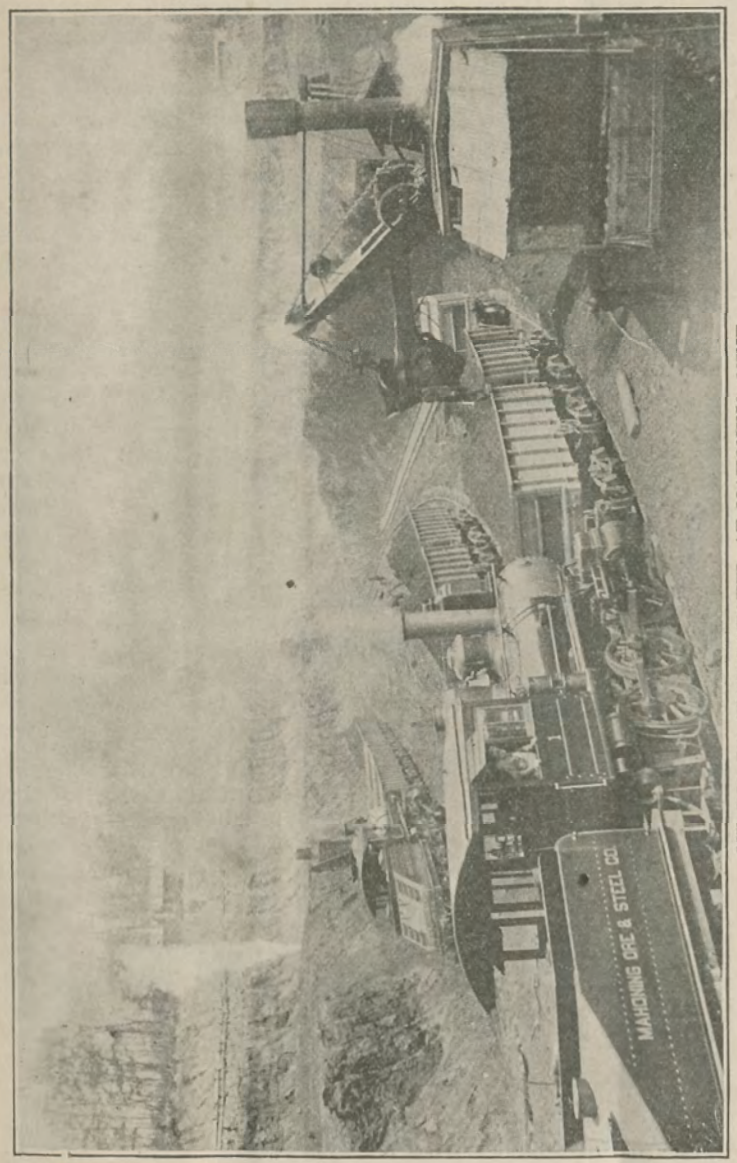
There are now three railways running to this range, two of which are the property of the United States Steel Corporation and the third is a part of the Great Northern railway system. Any one of these roads is capable of hauling to Lake Superior from 4,000,000 to 5,000,000 tons of ore in the short season of navigation, and each has docks and terminals that have cost many millions.

METHODS OF MINING.

Three methods of mining are in vogue in Minnesota: underground, steam shovel and milling, the third being to some extent a combination of the others. The underground is that which has been in use in all districts and for all minerals, and though the expert Minnesota mining captains have found numerous new devices and changes in detail that have increased efficiency and reduced costs, underground mining will remain the same in its essential features to the end of time.

The steam shovel method is usually regarded as an exclusively Mesaba device for winning ores. But it is not, though it has been expanded and modified to meet larger conditions until it differs greatly from the shovel methods used elsewhere. This method is possible at mines where the overburden of earth covering the ore is so little that it can be scraped off, exposing the ore below. Not more than fifty feet of a thickness of earth is seldom removed. The earth once stripped and the ore laid bare, railway tracks are put down in it, and shovels are stationed beside banks that are cut out and from which the ore is shoveled into the cars alongside. Explosives are not used except to loosen the ore so that the strain on the shovel may not be too great. From two to three minutes are necessary for the loading of an ordinary freight car, and this may be continued for a full train if it can be spotted to the shovel rapidly enough. Four or five thousand tons, perhaps more, can be loaded from the original bed of the ore by a single shovel in a ten-hour shift. Enormous quantities of material may be removed and handled by this method in a short time and the process is the most economical method of mining known.

In the milling method the overburden of earth is removed and the ore laid bare by the shovel. But shafts are sunk outside the stripped area and drifts are driven into the ore and under the stripping. Then raises are put up to the stripped surface of ore and ore is picked or shoveled down these raises to cars waiting in the levels below. These cars are trammed to the shaft and the ore is hoisted



MINING BY STEAM SHOVEL AT MAHONING MINE.

to the surface without having been touched by a human hand from the time it was loosened from the side of the raise by the pick of the miner. It is a system that makes the labor cost low by the great output per man, and it is the most picturesque method of iron mining.

In opening the mines of Minnesota, millions and millions of cubic yards of earth have been removed, and many scores of miles of underground openings driven. There are in these mines open streets and passageways, crossings and headings, in which men and horses and locomotives travel, that aggregate hundreds of miles; there are rooms 30 feet wide and a hundred feet long, with arched ceilings of ore. And there are more distances and spaces caved in and destroyed than are now open.

HOW IT IS HANDLED.

There is no such movement of freight on the globe as this of iron ore out of the western lakes and from Minnesota. It is all carried in the short period of between seven and eight months; is moved an average distance of 800 miles by water, as well as about 50 miles by railroad to the upper lake docks. At the lower end of the route, much of this ore is carried more than 1,000 miles to Pittsburg, and much only to the lower lake ports, where furnaces are going in year by year. It means a daily movement, by rail to the upper lake docks, by lake to the ports of Lake Erie and by rail to the furnaces, of about 85,000 tons of material. If the great lake portion of this movement alone be compared with all the freight carried by railways of the United States for the full year, including the rail carriage of the ore itself, the water tonnage of ore will be found one-seventh of the whole. In methods of handling, despatch and economical operations, the lake ore traffic, both by rail and water, exceeds anything to be found on the globe. That this is recognized all over the world is shown by the constant stream of experts from Europe and America, coming to the lake region to examine the methods in use and, the sincerest flattery of all, to copy them elsewhere.

In this lake ore mining and ore transportation business there is now an investment of not far from $300,000,000, which is growing by leaps and bounds year by year. This growth in capital invested is this season represented by the construction of 30 steel steamships for the ore trade, which cost not far from $6,500,000, and by the commencement of works at one of the Minnesota ports, that, when finished, will mean an expenditure of not less than $5,000,000 for the transshipment of ore from rail to water. Several million dollars are also being invested the present time in increasing the facilities of mines, in sinking shafts for a thousand feet through the hard rock of the ore foundations, in erecting steel shaft houses

and installing great machines for hoisting ore and for pumping water. One large mining company is putting down a shaft 800 feet to reach a deposit of ore found a short time ago by the pin-push of the diamond bit: the same company is putting down half a dozen other shafts, from 500 to 1,500 feet deep to reach new deposits, or to make more easy and economical the winning of ore from old deposits, whose former shafts have become inadequate for the operation, or have been ruined by the delving carried on around the under them. One company has installed during the year a pumping plant that is lifting every hour more than 240,000 gallons of water, and in the year has required the hoisting 300 feet of 50 tons of water for every ton of ore that mine has shipped. Another mine in ten days was able to remove from its workings 86,000,000 gallons of water, though its entire pumping plant was drowned and forced out of commission. Another mine will deliver to the railway for seven months an average of 7,000 gross tons every 24 hours. These things involve problems of engineering and transportation that are of the highest and require the utmost skill on the part of those having them in charge.

The Minnesota mine manager and engineer is the best on earth. He has been taught in the best school, that of experience, and the daily facing of problems never before solved, has given him a skill and self-reliance attained in no other way. Mining and ore transportation men of the Minnesota ranges are in demand elsewhere, and during the present year many of them have been selected to carry out the plans formulated by the directors of the chief enterprises now under way.

The present witnesses the growth of individual mines to enormous proportions. Seven of the larger mines of the various Minnesota and Michigan ranges have shipped more than 750,000 tons each, and the total from the seven is nearly a million tons more than that of the entire 82 Lake Superior mines that were active during the year 1894. Up to 1892 there had never been a mine that approached the product of any one of the seven, and the number was only one up to 1896. It is significant that the past four years' shipments from the entire lake field are more than half of the sum for the preceding 40 years, being for 1897, 1898, 1899 and 1900, about 60,000,000 tons, while the preceding forty years produced 110,000,000 tons. It is entirely probable that the output of the coming five years will more than equal that of the first forty.

SOME COMPARISONS.

This entire business has been the growth of 45 years. It was in 1855 that the first development of the lake region was carried on, on the Marquette range, and for 23 years that range was the only producer. In those days a mine that would send out 50,000 tons a year was a large one. The methods were crude, costly and slow. Hand machines were used, hand drills, small hoists, black powder for blasting, and the cars that carried the ore to Lake Superior were of 8 and 10 tons capacity. These cars were run out on docks 30 to 35 feet above the water and the ore slowly discharged into the holds of vessels of from 500 to 800 tons. Today the mines are operated by compressed air and steam drills. They are equipped with hoists that pull up 6 tons at a load, and sometimes run at the rate of 40 to 45 loads from the bottom of the mine each hour. The workings underground are lighted by electricity, and compressed air and electricity take the place of the Finnish trammers universal in the early days. The cars that carry ore to the docks are from 25 to 50 tons capacity, drawn by locomotives heavier than any in use elsewhere in the world, and the ships that now carry ore take loads ten times as large as those of the early days. Instead of a production of a million tons or less it is twenty millions, and the price of ore that then prevailed would be prohibitive now. Thousands of dollars are spent ungrudgingly to save a cent a ton in the output of a mine, and the man who can make the slightest saving is paid a salary far larger than that given a cabinet officer of the United States.

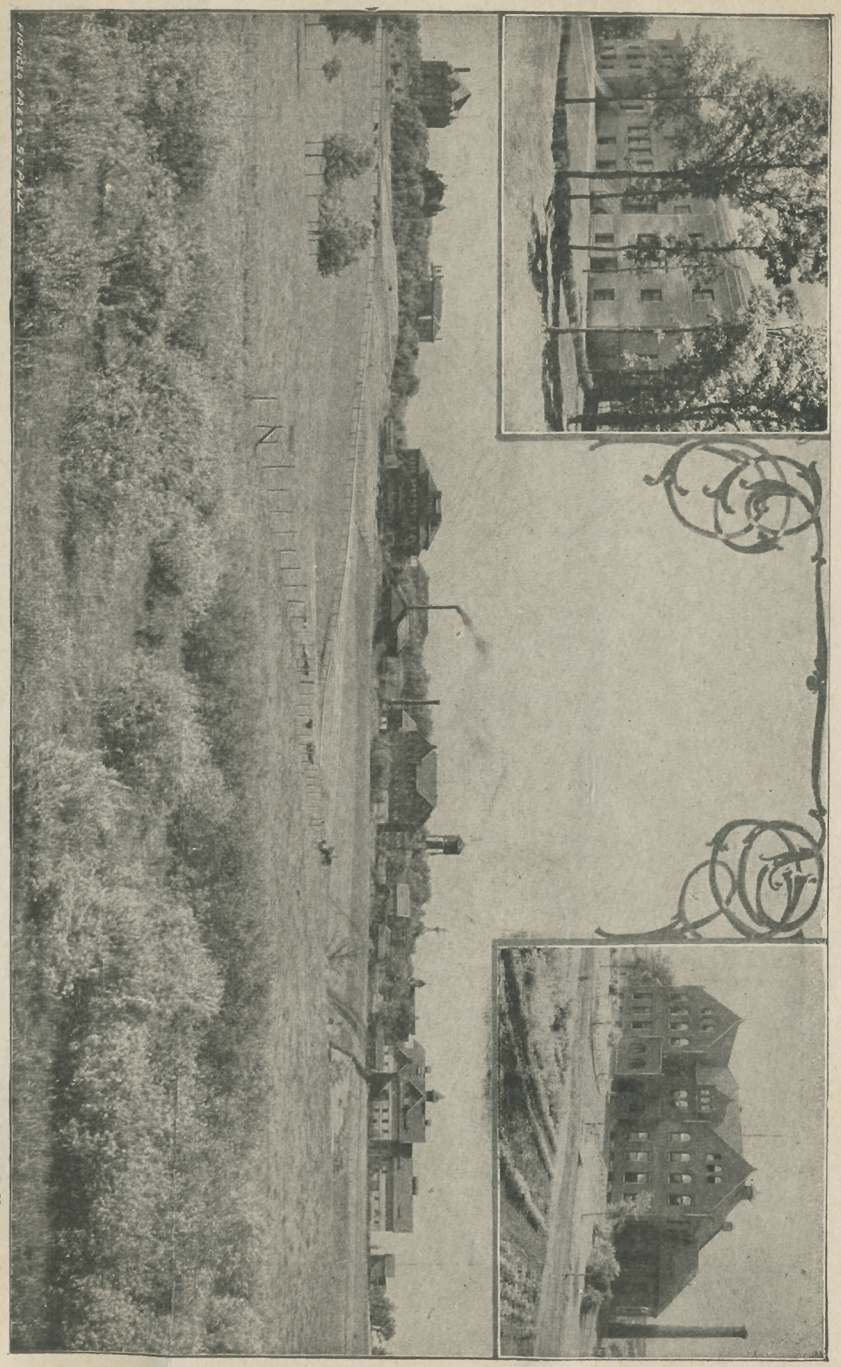
Iron ore shipments from Lake Superior ranges for the past two years, and in total, have been as follows:

State. Range.	1898.	1900.	To Date.
Minnesota—Mesaba	6,626,384	7,809,535	31,400,077
Michigan—Marquette	3,757,010	3,457,522	59,592,793
Michigan—Menominee	3,301,052	3,261,221	34,015,979
Michigan—Gogebic	2,795,856	2,875,295	31,216,635
Minnesota—Vermillion	1,771,502	1,655,820	15,191,180

The Mesaba range has been active eight years, the Marquette 56, the Menominee 21, the Gogebic and Vermillion 17 years. A small portion of the ore shipped off the Menominee and Gogebic ranges comes from the state of Wisconsin.

The active mines of Minnesota made the following shipments in 1900:

Adams	777,346	Mountain Iron	1,001,324
Auburn	263,692	Ohio	172,597
Biwabik	924,868	Oliver	244,876
Chandler	644,801	Penobscot	146,641
Clark	63,071	Pillsbury	101,032
Commodore	278,416	Pioneer	450,794
Duluth	128,587	Roberts	41,965
Elba	121,707	Sauntry	68,560
Fayal	252,500	Savoy	175,116
Franklin	168,524	Sellers	56,280
Genoa	253,651	Sparta	202,144
Hale	32,901	Spruce	101,675
Kanawha	64,218	Stevenson	56,031
Lake Superior	284,023	Union	8,297
Mahoning	911,021	Williams	18,238
Malta	65,346	Zenith	60,089
Minnesota	325,020		



Girls' Building. *General View.* *Dairy Hall.*

MINNESOTA STATE EXPERIMENT STATION.

ST. ANTHONY PARK.

MINNESOTA CORN FIELD 175 MILES NORTHWEST OF ST. PAUL AND MINNEAPOLIS.