

Chapter 24

Inland Waterways Spread Industry

INDUSTRY WENT WEST WITH THE PIONEERS

THE WESTWARD MARCH to the inland waterways really began when George Washington stood for the first time on the triangle of land where the Allegheny and Monongahela Rivers join to form the Ohio. This perilous journey to deliver Governor Dinwiddie's message to the French commander marked the beginning of Washington's adventures in this western wilderness where a county was named for him. Fur traders entered the country first, ahead of the land pioneers who pushed their clearings westward over the mountains to the Ohio Valley. Ironmasters soon followed.

After the War for Independence the iron industry along the seaboard went into a decline. The prewar British market was gone and money was scarce. Forges and furnaces were in need of repair. New inventions like the steam engine and the nail-cutting machine rendered the old equipment scarcely worth replacing. Ironmasters from New Jersey and nail makers from New England joined the returned soldiers in the westward trek to the Northwest Territory and Kentucky

and Tennessee. Their simple methods of smelting ore and cutting nails were welcomed by settlers opening up a wilderness.

Before the tenth anniversary of the surrender of Yorktown, a German immigrant was erecting the Bourbon Furnace on Slate Creek, a branch of the Licking River that flowed through his land in Bath County, Kentucky. Armed guards kept watch to ward off Indian attacks while workmen dug ore from surface mines, hauled it to the furnace, cut down trees, burned charcoal, and hammered at the forge. Early settlers in Kentucky were supplied with kettles, warming pans, bake ovens, stoves, and flatirons from this ironworks. Cannon balls and grape shot made in the Bourbon Furnace went by flatboat down the Licking to the Ohio, and on down the Mississippi. They were used against the British regulars by General Jackson's frontiersmen and pirate recruits in the Battle of New Orleans.

In the 1790's furnace smoke curled above the treetops in the mountain wilderness of eastern Tennessee where Daniel Boone had hunted as a lad. Customers were the settlers going west, following the valleys of the Wautaga,



United States Steel Corporation

A PIONEER FURNACE IN THE WILDERNESS

Since charcoal was used for fuel to smelt the iron ore, pioneer furnaces were located where trees were plentiful. In this sketch, a charcoal burner tends a turf-covered pit in which cords of wood are being slowly burned into sticks of carbon to fire the furnace. Air is forced into the furnace with a foot-operated bellows.

Holston, Clinch, Powell, and Tennessee Rivers. Traders went down these streams in flatboats and canoes, peddling their iron wares in frontier settlements. Some traders went all the way to New Orleans. With streams for water power, trees for charcoal, and ore for furnaces, the industrial pioneers under primitive methods made one or two tons of iron per day. This supplied the neighborhood blacksmiths who turned it into horseshoes, wagon rims, and harrow teeth for the soil pioneers. Bar iron was the same as money for paying taxes and buying salt, sugar, coffee, calico, and shoes at the country store.

In the Hanging Rock District iron ores were discovered on both sides of the Ohio River near the present towns of Ashland, Kentucky, and Ironton, Ohio. Early settlers in Michigan were supplied with potash kettles and stoves by forges and furnaces in northeastern Ohio near the shore of Lake Erie. Ironmasters and

plowmen walked side by side, pushing the frontier westward to the Great Lakes and the Mississippi River. The little charcoal forges and furnaces of the iron pioneers were the advance guard of the conquering legions of mills and factories that followed them when industry marched westward to the inland waterways under the triple banner of coal, steam, and steel.

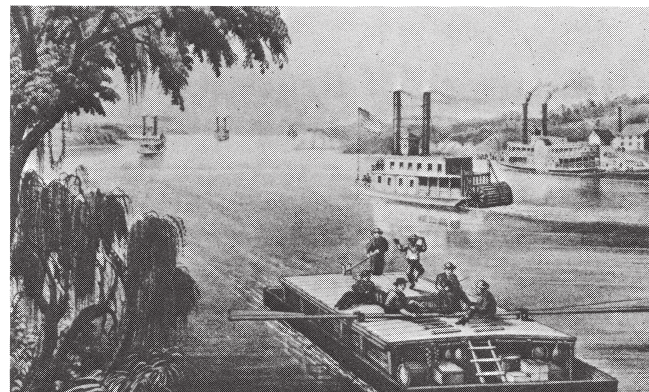
THE GREAT LAKES BASIN FORMS A NATURAL SETTING FOR INDUSTRY

INDUSTRY DEPENDS upon transportation. The farmer and the manufacturer without easy access to markets actually have little to sell. From the beginning, industry in the Great Lakes region was harnessed to the waterways. The first known white men to enter this country were French explorers and

“BOUND DOWN THE RIVER”

In early America, inland waterways were highways of commerce. Farmers in the Ohio Valley went down the Mississippi River in flatboats with bundles of furs, bushels of grain, and hickory-smoked hams to sell in New Orleans. Steamboats plying the rivers added tools and utensils made in frontier furnaces to cargoes of farm products. Families moving west needed cooking pots, frying pans, hoes, rakes, shovels, hatchets and plows. Plantation owners in Louisiana needed big boiling kettles to make a salable product from their sugar cane. Steamboats moved both passengers and merchandise westward on the rivers, and industry followed close behind.

Currier & Ives



missionaries who traveled mainly by water. Close on their heels followed the trapper and the fur trading business. The villages of Indians and half-breeds, with a sprinkling of Frenchmen, that clustered around the mission centers were little more than wayside camps for the swaggering voyageurs, coming and going on fur hunting expeditions.

The actual settlement of the Great Lakes region did not get under way until plowmen came to turn the sod after most of the territory was ceded to the United States by the Treaty of Paris in 1783. After the War for Independence pioneers paddled down the Ohio River to settle in the Northwest Territory. Others came later, filtering into the back country along the tributaries of the Ohio. They reached the shores of Lake Erie and farther north to the prairie strip of southern Michigan. During the War of 1812 supplies were furnished to soldiers and sailors from farms along the Erie shore. In August, 1813 six farmer boys rented an old French boat, loaded it with melons, beans, cucumbers, corn, butter, and other produce from their farms. Hearing that Perry's fleet was near Sandusky, they set out in the unseaworthy vessel to find it. Not knowing there were any settlements nearby, Perry was astonished when the boatload of fresh food arrived. The boys wanted to give the food to the crews, but Perry insisted on paying for it, asked for more, and gave the boys a better boat. Their boat was leaking.

After they returned, one of the lads rode horseback from farm to farm, collecting potatoes, vegetables, smoked meat, and homemade pickles for Perry's sailors. The day after the victorious battle on Lake Erie, the farmer boy hastily gathered a crew from the neighborhood and left the

shore with a boatload of potatoes. Rowing through the floating litter of broken spars and torn rigging, he came alongside Perry's flagship, the *Lawrence*.

In the beginning of settlement the basin of the Great Lakes showed signs of becoming the great food-producing center that it is today. As early as 1796 a ship captain, who had once been General Washington's gardener, delivered to a farmer in Windsor, Canada, a shipment of apple trees purchased in Montreal. The captain, a skillful grafter, took specimens from these trees across the border to improve the fruit growing in an orchard that then stood on land now covered with buildings in downtown Detroit. A traveler, going west by boat, wagon, and horseback, described the country along the Raisin River in southern Michigan:

Monroe Michigan
Dec. 3, 1833

It would delight an eastern farmer to see the magnificent pear trees which, tall as the trees of the forest, extend through orchards for miles along the stream. Here, too, are apple trees that were brought by the French in 1731. The grapevines, also, from which the river takes its name constitute a beautiful feature in the level landscape, as they hang in rich festoons along the banks of the stream, and climb wherever it is wooded to the tops of the loftiest elms.

In that same year of 1833, two pioneers bought fruit trees, berry bushes, and flowering shrubs in Rochester, New York, shipped them by way of the Erie Canal, across the lake, and overland by wagon to stock their nursery near Ypsilanti. Today Michigan is a fruit raising state, and famous for cherries growing along the shores of Traverse Bay. The miller and the sawyer trailed close behind the plowman in a new country. They came to grind the farmer's

wheat into flour for his bread and to saw the lumber for his house and his barn.

Since boats were needed to carry settlers and products over the inland waterways, the ship-building industry began to grow. The first steamboat upon Lake Erie was *Walk-in-the-Water*. When completed, the vessel lacked enough power to push its way against the current of the Niagara River where it was built. It took sixteen

yoke of oxen to pull it out of the stream and launch it in the lake. When the steamer entered the Detroit River, Indians swarmed along the banks and gazed in wonder. What paddled it? When the boiler blew off steam, the natives ran frightened into the woods. *Walk-in-the-Water* launched steam navigation that played so large a part in building an industrial empire along the shores of the Great

WALK-IN-THE-WATER IN HARBOR OF DETROIT

The first steamboat on the Great Lakes was named WALK-IN-THE-WATER for the chief of the Wyandot Indians whose name was Mier, meaning turtle. His tribe lived on the bank of the Detroit River in Michigan. The chief's totem or signature was the figure of a turtle walking in the water.

WALK-IN-THE-WATER, built in the Niagara River at Black Rock had to be towed to Lake Erie for launching, May 28, 1818. Boats anchored in the Niagara River and were pulled through the rapids by oxen until Buffalo developed a harbor. The sailors jokingly called this towing process, the "horn breeze."

In 1820, and again in 1821, this boat transported United States Army soldiers to forts defending frontier settlements. Among the notable passengers was a young officer who later gained fame as General Winfield Scott in the Mexican War.

WALK-IN-THE-WATER met an untimely end in a gale on Lake Erie on the first night out from Buffalo, bound for Detroit, October 31, 1821. Through high waves, strong winds, and heavy rain, the captain steered the battered, leaking boat to the shore not far from the lighthouse in the harbor. He wrecked the boat, but saved the lives of the passengers.

Buffalo and Erie County Historical Society





Buffalo and Erie County Historical Society

LIGHTHOUSE, STEAMSHIP "BUFFALO," AND HARBOR AT BUFFALO

After opening a harbor in 1820, Buffalo, New York became a port city in time to serve the people going west by way of the Erie Canal, completed in 1825. New Englanders traveled by stage to Albany, Erie Canal to Buffalo, and boat to Detroit and settlements along the shores of the Great Lakes.

At one time, the steamship BUFFALO was the fastest boat on the Great Lakes.

Lakes. Passenger vessels did a thriving business during the years of the westward migration. In July of 1835 the following news item was printed in the *Erie Gazette*:

No one who does not witness it, can have any just idea of the immense throng of people who are wending their way, by the route of Lake Erie, to the West. The steamboats and the schooners plying between the various ports on the lakes, are constantly crowded. More than 200,000 settlers will go west during the present season, and take up their abiding places on the fertile lands which border on the Great Lakes and their tributary streams.

The wharves at Buffalo were piled with barrels, boxes, and bundles for shipment to Cleveland, Detroit, and a frontier village, called Chicago, whose population grew from 54 in 1832 to 4000 in 1835. So many New Englanders were going west by way of the Erie Canal in 1837, that one editor declared: "the fever for emigration pervaded the whole region from Rhode

Island to Vermont." Popular songs of the day advertised the states bordering on the Great Lakes, with verses like the following:

We here have soils of various kinds
To suit men who have different minds,
Prairies, openings, timbered land
And burr oak plains, in Michigan.

You who would wish to hunt and fish
Can find all kinds of game you wish;
Our deer and turkey they are grand
Our fish are good in Michigan.

By 1840 Buffalo, western terminal of the Erie Canal, was a port of call for most of the fifty-three steamboats on Lake Erie. In July of that year the steamboat *Erie* made a record run of 1200 miles from Chicago to Buffalo in four days, "carrying a large number of passengers and 300 barrels of flour and pork." One of these steamers consumed, on an average, three cords of wood per hour. To provide this fuel, woodchoppers went into the forests,

and lumbering began in a small way. Another industry was then added to the Great Lakes region and a new kind of ship appeared on the inland seas – the lumber schooner.

LUMBERMEN INVADE THE WHITE PINE FORESTS

THE RAPID SETTLEMENT of the rich farm lands in the basin of the Great Lakes and the prairie beyond opened up a greedy market for timber. Poles for masts, lumber for hulls, pilings for docks, ties for railroads, boards for boxcars and siding for houses in town and country were in constant demand.

Trees growing near the rivers and lakes were the first victims of the woodsman's ax because water transportation was handy. The pilots who guided the log rafts down the Mississippi River were viewed with awe and wonder – so great was their skill! One slight error might cause a break-up that would crush and drown dozens of raftsmen maneuvering a float of logs around a treacherous bend in the river. These daring pilots, dressed in red flannel shirts, flowing black ties, and wide slouch hats earned \$500 a month and more during the busy rafting season. This sum was a fabulous salary in those days. The reign of the rafting pilot was colorful, but brief. The steamboat took over his job.

During the War Between the States the first steamboat rafter towed a shipment of timber from the Chippewa River in Wisconsin to a sawmill in St. Louis, Missouri. The largest raft ever towed down the Mississippi River by a steamboat was one third of a mile long, 270 feet wide, and contained 9,000,000 feet of

lumber. More logs could be handled at a time by a small steamboat crew than by pilots and their gangs. The daredevil raftsmen, with their fiddlers and cooks, faded out of the lumbering scene. As soon as the ice began to thaw in the rivers of Wisconsin and Minnesota, captains of the steamboat rafters headed north in the annual race. Each wanted to be the first to nose into the current of the Mississippi with a float of logs.

Sawmills in towns and villages along the Mississippi and its tributaries were busy slicing logs into boards to build houses for the western immigrants. The huge migration to the prairie state of Iowa in 1854 can be traced in the local newspapers.

The Keokuk Dispatch: No one can travel up and down the Mississippi without being astonished at the immigration pouring into Iowa from all parts of the country, especially from Indiana and Ohio. At every ferry on the river, crowds are waiting to cross. The land offices all over the state are unable to meet the demands upon them by those who are eager to enter lands.

The Burlington Telegraph: 20,000 immigrants have passed through the city within the last thirty days, and they are still crossing at the rate of 600 to 700 a day. We have these facts from the ferry folks. About one team in a hundred is labelled "Nebraska." All the rest are marked "Iowa."

There was plenty of government land selling at \$1.25 an acre. Town lots were often donated to men willing to improve them. For about \$2.50 per acre the settler could hire a man to "break the prairie" with a heavy plow, pulled by five yoke of oxen. This plow, which was ten feet long and turned a furrow two feet wide, was able to cut through the stringy roots of the native grasses on the buffalo plains.

Each new settler was a new customer for lumber. By 1854 the town of Davenport, Iowa, was becoming a lumber depot, with

six sawmills cutting about 20,000,000 feet of lumber a year to supply the needs of settlers in the surrounding territory. A spacious eddy in the river made it easy for rafters from the northern pineries to halt at Davenport. The loggers bartered with the sawmill owners for the sale of their logs. The cost of rafting timber from the Chippewa River to Davenport or to Rock Island on the opposite bank of the river amounted to only a dollar per ton for the lumber sawed from the logs. In all, about 50,000,000,000 feet of lumber, rafted down the Mississippi from the northern pineries, was used in building farm houses and city dwellings in the Middle West. This river output was only a part of the lumber industry. Another story of adventure and production was written in the woods of Michigan and on the timber schooners plying the waters of the Great Lakes.

The race for timber land on sale by the Government lured many a fortune hunter into forests where no white man had been

**LAST STAND OF WHITE PINE SOUTH OF
GRAYLING, MICHIGAN. ABOUT HALF
THE TREES IN THIS
PHOTOGRAPH ARE NORWAY PINE.**

Michigan Historical Commission

before. In the early 1870's two fishermen left a hamlet on the northern shore of Lake Michigan to search for unclaimed timber land on the upper peninsula which was wild country south of Lake Superior. It was midwinter. With packs on their backs, snowshoes on their feet, and a compass in one man's pocket, they plunged into the wilderness. Each night they chopped down a green maple tree, cut it into logs, and erected a shelter for their campfire. Rolled in blankets, they slept on a bed of balsam boughs in front of the fire. The bitter cold of the northern night settled down around them.

The fishermen located a forest of white pine well worth the government price of \$5 to \$10 an acre. The first man to file a claim on a specific section of land in a certain township became the owner of both the land and the timber on it. He must have the location correctly measured to hold his claim. In surveying with the aid of a compass the fishermen stumbled upon some snowshoe footprints in a swampy clearing. The tracks in the snow ran in a straight line. Only a timber cruiser walked like that and he was stepping off a claim. They followed the footprints until they turned toward Marquette on Lake Superior. The land office was there. These fishermen stepped off their claim as if no one had been there before. Their rival was at least a day ahead of them and they could not overtake him on land. He might travel slowly, stopping to hunt along the way, since he had seen no tracks in the snow. It was moonlight. In twenty-four hours the fishermen walked forty-five miles on snowshoes to reach the shore of Lake Superior, where they could travel faster on ice than on land. Here they parted. One man turned



toward home. The other raced over the ice, reaching Marquette ahead of his rival. The winner's feet were covered with painful blisters and bleeding cuts from walking on the jagged ice along the frozen shore.

The key man in the lumber industry was the timber cruiser. With only a compass for a guide, he trailed through the primeval forests, stepping off the sections of land and counting the number of white pine giants on every single acre of it. In following his compass in a straight line, the cruiser hacked his way through briars and brush and waded through swamps and streams. So keen was his judgment, he could glance at a tall tree and measure with his eye the number of board feet of lumber in it. He wrote down the amount in a pocket notebook. The successful timber cruiser was an uncanny mixture of surveyor, woodsman, and mathematician — strong, fearless, and efficient. Upon the reports of the timber cruisers the lumber companies based their logging operations.

By 1850 lumberjacks were trudging westward from the logging camps of Maine, to chop white pine in Michigan's upper peninsula, along with the French Canadians. Immigrants arrived from Europe — Irish and Germans, and later, Finns, Swedes, and Norwegians. In the heyday of lumbering 140,000 men were employed during the winter months cutting down the forests of Michigan, Wisconsin, and Minnesota.

The logger's workday was from daylight to dusk. His home was a bunkhouse, a rambling shack of logs with a sloping roof. His bed was a straw-filled bunk nailed to the rough, unplastered wall. In the center of the shelter was an open fireplace, a pavement of stone and sand in a wooden box about eight feet square and a foot



Michigan Historical Commission

WHITE PINE TREES IN MICHIGAN

A student of forestry uses calipers to measure a white pine tree, four feet in diameter, as the timber cruisers did during the great lumbering days in the state. The last stand of original white pine trees was cut in the summer of 1910.

high. There was a funnel of slabs for a chimney sticking through a hole in the roof. The smoky air reeked with the wooly smell of socks and shirts drying on hooks and wire clotheslines strung around the fire. Buried in the hearth under glowing embers was the everlasting beanpot, day and night, around the clock.

The lonely men, marooned in a frozen wilderness, hungered for amusement. An unwritten law of the lumber camps provided the only entertainment between paydays. A new logger, a timber cruiser, a mining prospector, and any passing stranger found a hearty welcome in any bunkhouse of a lumber camp. He must pay for his beans, bread, molasses, and coffee with a song or a story. He who could neither chant a ballad nor spin a

yarn was tossed in a blanket. Thus came into being the shanty-songs of the lumber camps and the fanciful tales of the Finnish comic, Big Matt, and the superman, Paul Bunyan. Many legends reflected the superstitions of the men to whom danger was merely a habit, like eating and sleeping. Who would cut down a poplar tree, change his bunk, or his place at the table? What teamster would change his horses? Bad luck! A tree might crash in the wrong direction, an ax fall from a partner's hand, or logs jam on the river drive. The everyday life of the lumberjack crept into the lore of the northern woods.

Timber from the woods of Michigan and Wisconsin went into homes and factories of the industrial cities rising on the shores of the Great Lakes, where lumber was king. Some of the square timber used in Chicago's first breakwater was cut in a forest that once stood on the streets of Escanaba. Special vessels had to be constructed to deliver the heavy piling on

A FIELD OF STUMPS IN NORTHERN MICHIGAN

Like tombstones in a graveyard, stumps mark the spots where trees were felled in a forest that covered the land before the lumberjack arrived.

Haines

Chicago's waterfront, where winter gales dashed waves upon the doorsteps of houses at the foot of Lake Street. Timber from the same woods went into ships that carried lumber and other products to ports on the lakes, and into ties for the railroads that transported grains and meats from the western prairie to the shipping centers.

When the trees were gone, the way of life changed in the northern country. The lumberjacks burned out the dead stumps, plowed the land, and planted beans, potatoes, oats, barley, and fruits. Many of the Scandinavian loggers became farmers and stayed in Michigan, Wisconsin, and Minnesota. Others moved on farther west to fresh, uncut forests in the Pacific states of Washington and Oregon. The prospector for ore and the cruiser for timber trailed through the same forests at the same time. Long before lumbering began to wane, mining stepped in to take its place as the backbone of industry in the Great Lakes region. Then came steel, like magic, creating new industries, new cities, and new patterns of living along the waterways, where the trapper and the trader once paddled their canoes with the murmur of the forests ever ringing in their ears.

STEEL ENTERS THE MARKET

DURING THE Revolutionary War, prizes were offered to increase the production of steel needed for armaments. This encouragement continued after the peace treaty that ended the war. In April of 1783 the state legislature of Pennsylvania lent a manufacturer about \$1300 for three years, to aid him in making steel from bar iron, "as good as in



England.” The steel industry of this country grew out of experiments by Americans to make from native iron “as good” steel as the British made from Swedish iron.

Since it was easier and cheaper to manufacture articles from iron than from steel, the iron industry continued to prosper for half a century following the war before steel loomed on the horizon as a strong rival for business. In 1832 near the close of President Jackson’s first term of office, two English emigrants, brothers, made crucible steel in Cincinnati, Ohio. One of the brothers, William Garrard, was a bricklayer, not an ironmaster, which explains why he succeeded in being a steelmaker. In West Virginia he found clay like the famous Stourbridge variety used by the British steelmakers. From this clay he made molds into which he poured a poorer grade of steel, first converted into the metal from iron ore in his own furnaces. The clay purified the steel. The process of making steel in clay molds, or crucibles, was probably invented by some unknown Hindu in ancient times, long before the Christian era. The famous swords of Damascus were forged from crucible steel made in Persia and India.

In the Cincinnati Steel Works the Garrard Brothers made a tool steel from Missouri and Tennessee charcoal iron. Manufacturers declared that this steel was “as good as in England” for saws, springs, chopping axes, files and tools of all kinds. With blades shaped from Garrard steel, Cyrus Hall McCormick, the young inventor of the reaper, cut grain on his father’s farm in Rockbridge County, Virginia. The Panic of 1837, following Jackson’s second term, put the Garrard Brothers out of the crucible steel business and left McCormick with only the patent for his reaper.

A decade later, farther west than Cincinnati, a new day dawned for steel in a village near the Cumberland River in the western part of Kentucky. In 1846 William Kelly made a trip through Ohio, Indiana, Kentucky, and Tennessee, selling dry goods for a wholesale firm in Pittsburgh in which his brother had an interest. Late in that same year William Kelly persuaded his brother to quit the dry goods business and become his partner in an ironworks in Eddyville, Kentucky. They purchased an old furnace and 14,000 acres of ore and timber land. From chunks of ore picked up on top of the ground, the Kelly Brothers manufactured kettles for boiling sugar and ironware to supply the needs of their neighbors. The business prospered. Soon it became necessary to dig ore from underground where it was plentiful. However, this buried ore was different and caused trouble in the furnace.

Kelly began to experiment, hoping to find a cheaper and less troublesome way to refine pig iron than the process used by ironmasters of the time. One day he noticed that a small spot in his iron brew was white with heat, although there was no fuel near it. Then he discovered that a draft of cold air was blowing on the spot. He concluded that oxygen in the air was burning out the carbon, causing the intense heat. Kelly reasoned that if he could burn out nearly all the carbon, he could make steel out of this very same brew. After a number of experiments he constructed a crude converter, something like an iron barrel with perforated holes in the bottom. Kelly invited the ironmasters of the Cumberland River Valley to be in Eddyville on a certain day to see his new process in action. Out of curiosity a crowd gathered.

First, workmen filled the bulging barrel with molten iron. When a bellows pumped cold air into the sizzling brew, there came a roar like a muffled thunder. The converter, spouting fire and smoke, splattered hot iron like hailstones over two acres of ground. No one was hurt. The ironmasters had come to laugh at “Crazy Kelly” but went away wondering how his experiments would affect their future.

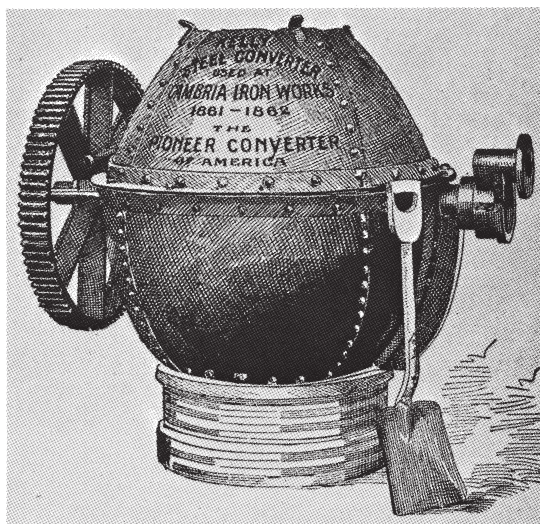
Kelly’s product, however, was really more a soft, carbon-free iron than a finished steel, but it could easily be pounded into shape. Seldom is a great

THE KELLY CONVERTER

Kelly’s converter was tested for the first time in a large ironworks in Johnstown, Pennsylvania, and found to be as usable in a large plant as in a small one. This same converter has been preserved. The words identify it as follows:

KELLY
STEEL CONVERTER
used at
CAMBRIA IRON WORKS
1861-1862
The
PIONEER CONVERTER
of America

United States Steel Corporation



invention the work of only one man. Like the steam engine, perfected by a number of inventors and mechanics, the process of making steel by blowing drafts of cold air through molten iron was achieved by combining the discoveries of several men. In 1856 Kelly was busy continuing his experiments at an ironworks in Johnstown, Pennsylvania, when he read in a newspaper that Henry Bessemer had arrived in the United States from England to patent his discovery of a steel process. The formula was the same as Kelly’s – hot iron and cold air. Since Kelly had failed to get a patent, he rushed to Washington and proved that his discovery had preceded Bessemer’s. Although Kelly received a prior patent in 1857, lawsuits lingered in the courts for some time. As a matter of fact both men followed the same formula but Bessemer had invented the better machinery for making it. At about the same time another Englishman, Robert Mushet, discovered an alloy to purify iron brewing into steel. Since Kelly’s process was not successful without Bessemer’s machinery and neither one could make commercial steel without Mushet’s alloy, the patents were consolidated. Steel men named the combination the Bessemer process, and the converter, Bessie.

In Wyandotte, Michigan, during the fall of 1864 occurred the first blow of Bessemer steel in the United States. In May of the following year, shortly after the death of Lincoln, the first steel rails produced in the Western Hemisphere were rolled in a Chicago mill from Bessemer steel blown at Wyandotte. The railroad boom that began to develop following the War Between the States created the first big market for steel. With the Bessemer

process came mass production of steel, which lowered the price of the metal. Like the touch of a magic wand, new markets arose from new discoveries and new inventions until the race for steel became as dramatic as a play upon the stage. In fact the steel industry of the United States owes much of its success to a mistake in geography and to Benjamin Franklin who shrewdly took advantage of it.

WON BY A MAP

WHEN THE Revolutionary War ended, Benjamin Franklin had been one of the commissioners sent to Paris to arrange a treaty with Great Britain. Franklin had advocated taking possession of Canada during the French and Indian War. He had made the journey to Canada urging the people there to join in the fight for independence. Then he went to Paris, determined to get all the territory he could for the new United States. Both the British and American commissioners agreed to a water boundary by way of the Great Lakes as far as possible. This rule worked well until the line reached Lake Superior.

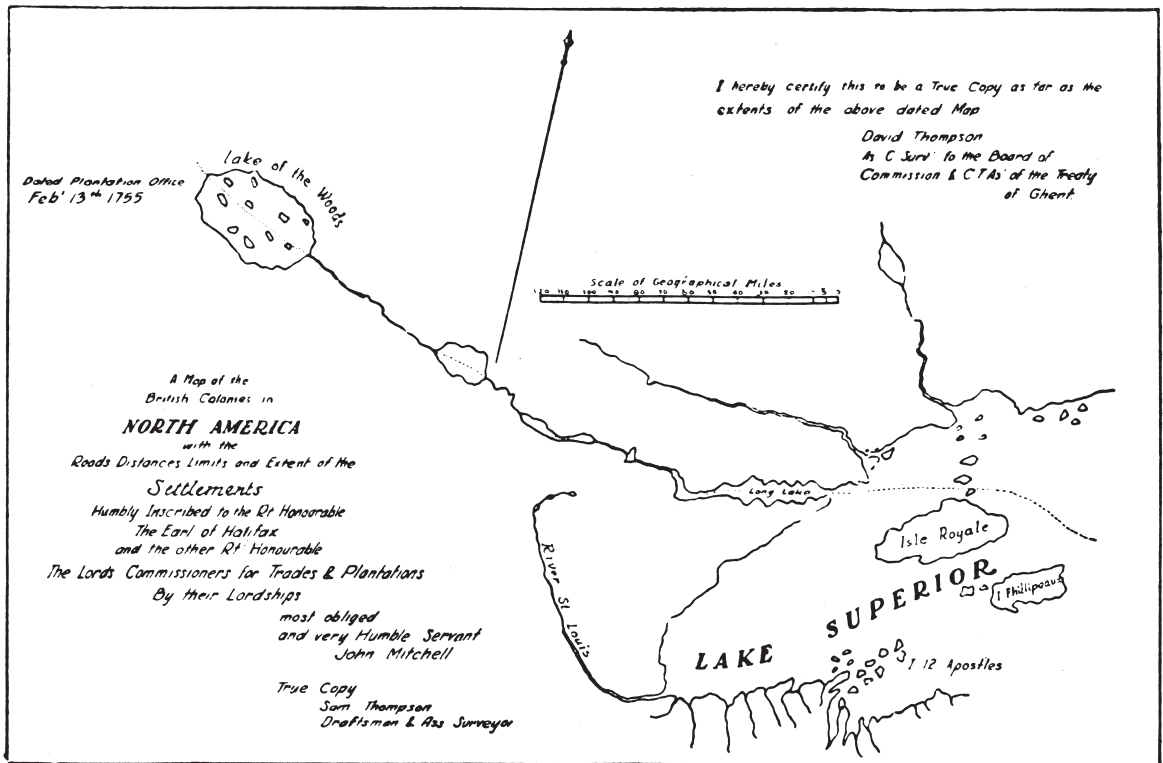
In 1783 maps of the Lake Superior region were few and faulty. The British and American commissioners agreed to accept, as the best available, a map sketched by a Virginian, John Mitchell, who had never seen Lake Superior. John Adams was most concerned with the Maine boundary and John Jay with the Mississippi River. This left Benjamin Franklin to barter for the mineral wealth in the western wilderness. Being a printer and publisher, Franklin was fond of books and read widely in both French and English. No doubt, he was familiar with the writings of French

missionaries who told of finding great deposits of iron ore and copper in the region of Lake Superior.

Beside Franklin at the peace table in Paris sat a rough-and-ready fur trader from Milford, Connecticut. The trader had tramped through the northern woods and paddled a canoe along the shore of Lake Superior. Although he could not draw a map of the region, he knew the resources of the country. The British also knew there were mineral deposits near Lake Superior.

When they met at the peace table, the British commissioners wanted the line drawn through the middle of Lake Superior to the mouth of the St. Louis River, the present site of Duluth. This plan would have given to Great Britain the rich iron ranges that later supported the steel industry of the United States in supplying armaments for two world wars.

Since trappers and traders paddled their canoes on a curving line north of Isle Royal and Isles Philippeaux to Grand Portage, fur center of the Northwest, Franklin suggested that Lake Superior be divided on this familiar route. Also, Long Lake, as shown on Mitchell's map, afforded a better water route than the St. Louis River. The Treaty of Paris, signed in 1783, defined the western boundary, "thence through Lake Superior northward of the Isle Royal and Isles Philippeaux to Long Lake, thence through the middle of said Long Lake, and the water communication between it and the Lake of the Woods to the said Lake of the Woods." Herein occurred the error that gave to the United States the fabulous wealth of iron ore deposits in northern Minnesota. There was no such body of water as Long Lake and the Pigeon River extended inland only a short distance. The Isles Philippeaux, mythical home of the



Had the border between the United States and Canada been drawn westward from the mouth of the St. Louis River, where the city of Duluth now stands, the United States would have lost the rich iron ranges of northern Minnesota.

The British agents in Paris in 1783 selected Long Lake for the border on Lake Superior, and this body of water was an error in the Mitchell map. In a later survey, the Pigeon River became part of the border between the two countries.

Great Spirit, existed only in Indian legend. The shadowy islands disappeared like magic, the natives declared, when they paddled their canoes in that direction.

Disputes soon arose over this boundary line. British trappers and traders complained bitterly because Grand Portage, the fur center, was in American territory and no longer free to them. Hoping to roll back this line, the British Government did not surrender posts in this northern country. Thomas Jefferson, Secretary of State in Washington's Cabinet, tried to settle the boundary dispute. He wrote to

Benjamin Franklin to verify what map had been used at the peace table in Paris. Franklin, then 84 years old, replied in a letter from Philadelphia, dated April 8, 1790:

I am perfectly clear in the remembrance that the map we used in tracing the boundary was brought to the treaty by the Commissioners from England, and that it was the same that was published by Mitchell.

Not until 1842 was the boundary line between Canada and the United States definitely settled by Daniel Webster,

Secretary of State in President Tyler's Cabinet, and Lord Ashburton, Commissioner from Great Britain. Today, the northern border of Minnesota follows the same line that Franklin traced on Mitchell's map in Paris.

MINERALS ON THE SHORES OF THE GREAT LAKES

A JESUIT MISSIONARY to the Huron Indians wrote in his report for the year, 1653:

The earth contains iron ores, and certain rocks which melt like metal, with an appearance of having some vein of silver. There is a copper ore, which is very pure, and which has no need of passing through the fire.

In the records of the Detroit mission is the copy of a contract between a blacksmith and the director of the mission:

On the 16th of July, 1733, Father La Richardie and Jean Cecile entered into the following covenant: the said Cecile, toolmaker and armorer, binds himself to work at the forge of the said Reverend Father at Detroit, in the Huron Village, for all the needs of the French and of the natives, in all matters connected with this trade. The said Reverend Father will give the assistance of his servant, when he has one, to the said Cecile for chopping wood and building his charcoal furnaces.

The profits derived from the forge were divided between the mission and the blacksmith. Although this contract was for six years, with permission for Cecile to leave at will, after due notice, the blacksmith remained a longer time, expanding his ironworks.

One French missionary, skirting the shore of Lake Superior in a canoe, wrote about seeing a large mass of copper from

which the natives cut chunks of the metal weighing from ten to twenty pounds. However, long before Indians inhabited this region, mound builders toiled in copper mines along the shore of this inland sea. Ten cartloads of their stone hammers, one weighing nearly forty pounds, have been found in mine pits they had abandoned centuries ago.

Commercial copper mining did not begin until after Michigan was admitted to the Union. To win statehood Congress demanded that Michigan cede a strip of territory along the southern boundary to Ohio, in exchange for the upper peninsula. A verse of a popular song told the feelings of the irate citizens:

But now the song they sing to us
Is – trade away that land,
For that poor, frozen country,
Beyond Lake Michigan.

A state geologist, Douglas Houghton, was one of the first appointments made by the first legislature of Michigan which convened in 1837. The discovery of

JACKSON PIT IRON MINE NEGAUNEE, MICHIGAN – 1860

Iron ore found along Lake Superior was first mined with pick and shovel. In two-wheel carts drawn by horses, the ore was dumped into rail cars.

Michigan Historical Commission



valuable ores in "the howling wilderness on the shores of Lake Superior" might soothe the wounded feelings of the people over the loss of Toledo and surrounding territory. Houghton's report of copper deposits on the tip of the upper peninsula started a mining boom there in the early 1840's. In frail canoes and sturdy mackinaw boats the copper hunters searched the bays and inlets of Lake Superior.

Copper Harbor on the far northern tip of the peninsula was the meeting place of these eager adventurers in flannel shirts and slouch hats. The noise of blasting powder and clanging hammers echoed through the woods where mining was pushing aside the old-time quiet industries of hunting and fishing. Towns began to rise along the Eagle and Ontonogan Rivers and on the shore of Portage Lake. Canadian voyageurs sang as they rowed their boats, loaded with fortune hunters, over the waterways of the copper country. The Cliff Mine, discovered near the Eagle River in 1844, was the first in the United States to tap a vein of pure copper.

However, it was iron, more than copper, that turned the "poor frozen country" of the upper peninsula into a mint of wealth for the state of Michigan. Since the natives who used copper never learned to smelt iron, this metal was not mentioned in Indian legend. Although the French missionaries made some use of iron ore found near their settlements, the rich deposits of the northern ranges were unknown until 1844. In September of that year a surveyor for the Federal Government noticed that his solar compass, his own invention, was behaving in a strange manner. The queer antics of the needle denoted the presence of iron

nearby. He showed the compass to the seven men in his party, two of whom were Indians.

"Boys," he said, "look around and see what you can find."

Within a mile of Teal Lake, with every turn of the sod the explorers found outcroppings of iron ore. The party went on its way surveying the country, making no attempt to realize any personal gains from the great discovery. Among the natives, to whom the surveyors spoke freely of finding ore, were a half-breed living at Sault Ste. Marie, and a Chippewa chief whose wigwam stood at the mouth of the Carp River. The following spring an adventurer from Jackson, Michigan, arrived at Sault Ste. Marie, looking for copper and silver in the upper peninsula. He chanced to meet the half-breed who told him about the Indian dwelling near the mouth of the Carp River where iron had been found.

The Indian guided the stranger and his party to two hills of iron ore, later called Jackson Mountain and Cleveland Mountain. Returning home with samples of ore, the adventurer organized the Jackson Mining Company. In February of 1848 in a forge on Carp River, this company produced the first iron made on the upper peninsula from Lake Superior ore. This iron was sold to a manufacturer who used it to make a ship's beam.

With cabins of miners, wood-choppers, and charcoal burners, a town sprouted around the Jackson mine and furnace. The people decided to give their camp an Indian name, Negaunee, meaning in Ojibwa, "I take the lead." The settlement around the Cleveland mine perched on the divide from which one could see the Carp River flowing toward Lake Superior and the Escanaba heading for Lake Michigan. It was named

Ishpeming, the Ojibwa word for a high elevation. The early French explorers were well remembered in naming the towns on the iron ranges. A little nest of log cabins and Indian huts was christened Marquette, after the Missionary who had explored the Mississippi River.

In 1852 it took four vessels to move a big shipment of iron ore, 152 tons in all, from Marquette to Sault Ste. Marie. Here, it was unloaded, hauled over the portage at the falls, and reloaded on other ships for the voyage to Erie, Pennsylvania. The ore was purchased by an iron works in Sharon, Pennsylvania, where it was made into bar iron, spikes, and nails of good quality. The freight cost was so high that it was almost prohibitive.

To get the Lake Superior ore to the furnaces in Ohio and Pennsylvania, a canal was needed to bypass the rapids in the St. Mary's River and to connect Lake Superior with Lake Huron. In 1852 Congress passed an act granting 750,000 acres of land in the state of Michigan to any company willing to build this canal 100 feet wide and 12 feet deep. Since land sold for as little as 25 cents an acre, bids would have been few without the privilege of selecting the allotted acres from any government lands offered for sale. The bid made by the St. Mary's Falls Ship Canal Company was accepted. On the first day of June in 1853, a young man only twenty-four years of age arrived at Sault Ste. Marie on a chartered steamer, the *Illinois* which was loaded with horses, lumber, tools, and supplies. His name was Charles T. Harvey, the man in charge of construction on the proposed canal. Three days later work gangs marched with their picks and shovels to the site. Harvey shoveled the first barrow of dirt,

wheeled it aside, and dumped it. The Soo canal had become a reality.

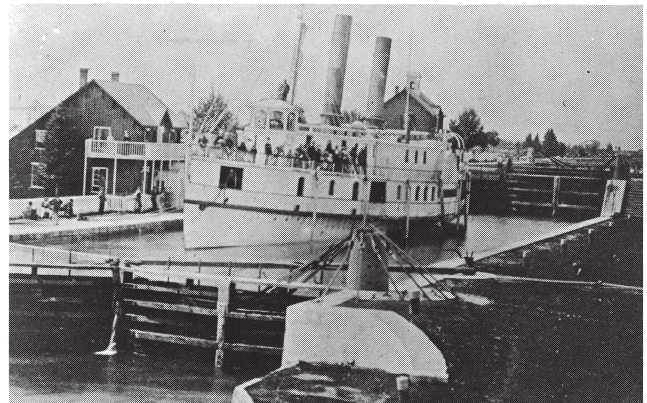
Labor was scarce in the wild unsettled country. The canal company dispatched agents to New York and other Atlantic ports to hire immigrants as soon as they landed, to buy railroad and steamship tickets for them, and to escort the laborers in gangs to Sault Ste. Marie. Sometimes as many as 2000 men were digging and hauling dirt within the space of a single mile. It took less than two years to hollow out a ditch 5700 feet long and 13 feet deep. On April 19, 1855, when Harvey opened the northern gate, the waters of Lake Superior gushed into the Sault Ste. Marie Canal. The brig *Columbia*, leaving Marquette on August 14, passed through this man-made waterway with the first shipment of Lake Superior ore. The cargo was delivered to a firm in Cleveland at a carrying charge of \$2.75 per ton.

With cheap water transportation direct from the mines to the furnaces along the southern shores of Lake Erie and Lake Michigan, it proved to be more profitable to ship the ore than to smelt it into iron on the upper peninsula. The iron and steel works of the Great Lakes region and the Ohio Valley were near the coal fields of Pennsylvania, Virginia, and Kentucky.

Soon a network of railroads was built to transport ore to docks on Lake

LOCKS IN THE SOO CANAL, BUILT IN 1855

Michigan Historical Commission





Materna Studio

A HIGH SCHOOL BAND SERENADES A WINNER AT SAULT STE. MARIE

Since the "Soo" Canal was opened in 1855, captains of ore boats, from time to time, have vied for the honor of being the first skipper to navigate his ship through the Canal into the icy waters of Whitefish Bay in the spring of the year. Crossing Lake Superior and loading the first cargo of iron ore was a coveted title. The captain of the John T. Hutchinson, 14,000 ton ore carrier, won the race in 1949.

During World War II, 16,000 soldiers were sent to guard the "Soo" Canal through which passed most of the iron ore consumed by the steel industry manufacturing the tools of war.

Superior and from docks on Lake Erie and Lake Michigan in all directions to mills in Pennsylvania, Ohio, and neighboring states. As industry moved westward into the Great Lakes region, the demand grew for more iron to make more steel. Then came the greatest discovery of all, the immense iron ore deposits in upper Minnesota. The deposits were north of the St. Louis River in territory that had been won by Benjamin Franklin with the stroke of a pencil.

DULL RED DIRT AND SHINY BLUE STEEL

LUMBERING PAVED THE WAY for mining in the Great Lakes region. The

timber cruiser knew iron when he saw it and was usually able to fish a specimen of ore from his pocket at any time. Some of the richest mineral deposits were found accidentally by lumbermen.

During the severe winter of 1851, along the Escanaba River in the upper Michigan peninsula, a logger struck slate ore when shoveling dirt to coat an icy road. Where there is slate, there is probably iron not far away. Later, only a mile from this spot, the Princeton mine was located on a bed of ore lying near the surface of the ground.

In the lush forests along the Menominee River, separating Michigan from Wisconsin, a productive iron range was discovered by chance. It happened in the 1880's. Three prospectors, shouldering knapsacks with blankets and food, plunged into the wilderness one summer to search for ore. In crossing a dense cedar swamp one man became separated from his companions and lost his way. Emerging finally from the spongy bog, he climbed a hill and halloed loudly. While waiting for his comrades to overtake him, he sat down on the knoll and began to probe the leaf mold with a small exploring pick. The point came out tipped with red hematite. Eagerly scraping away the leaves, he uncovered a vein of iron ore. Thus was discovered the rich deposits of the Menominee range in Michigan, extending across the border into Wisconsin.

On board the first vessel passing through the Soo Canal in 1855 was a sawyer from Chautauqua, New York, enroute to the head of Lake Superior to erect a mill. His name was Lewis H. Merritt. He settled with his large family of boys on a homestead near the place where the village of Duluth was soon to appear. Shortly after his arrival the sawyer made a trip into the woods to locate choice timber for his mill. Upon his

return he told his sons that he believed there was iron on the Mesabi Range because his compass acted so strangely when he walked over the ground. During the summer months the Merritt boys sawed lumber in their father's mill. When snow covered the ground, they cruised the northern woods for timber, following their father's advice to keep one eye on the ground.

In the same year that President Lincoln was assassinated, the elder Merritt joined the gold rush to Lake Vermilion in the Arrowhead district of northern Minnesota. Over rough trails hundreds of miners and prospectors carried drills and supplies on their backs, only to learn that the yellowish mineral was "fool's gold." They had been deceived by pyrites, a compound of sulphur and iron ore that glitters like the precious metal. Thus was discovered another supply of iron ore, the Vermilion range deposit near the border

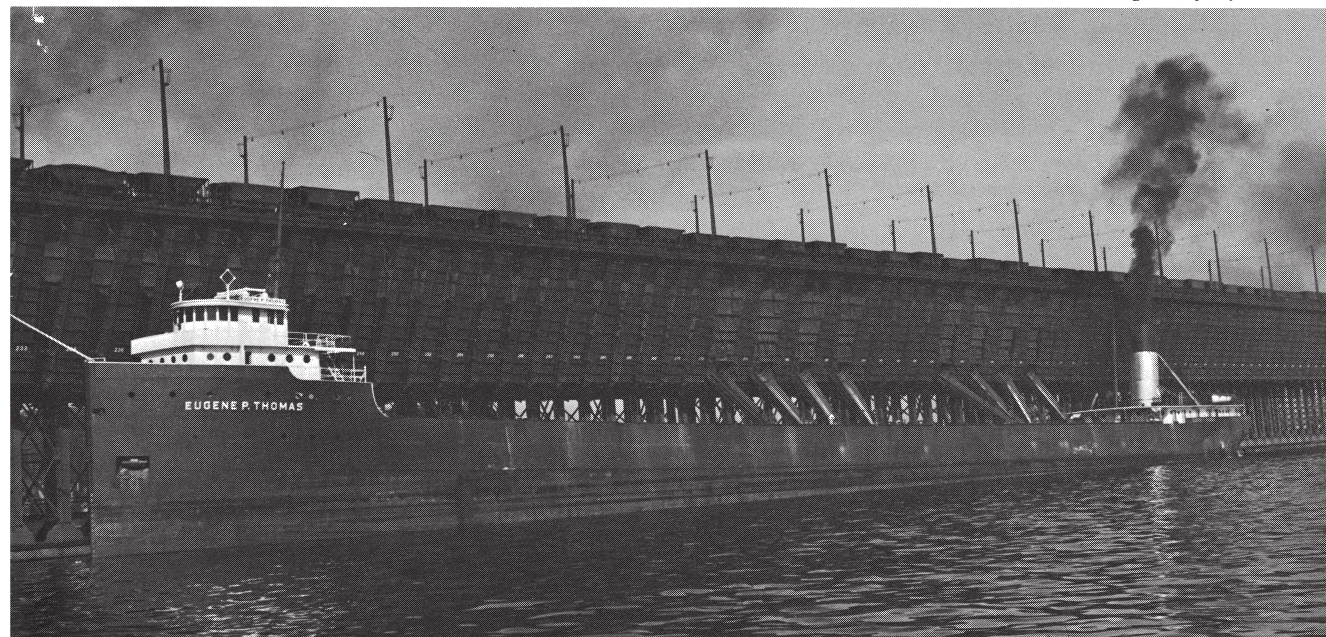
of Canada. From this foolhardy gold rush Merritt returned with only a package of dull red dirt that he kept in his log cabin for many years. Every once in awhile he would open the box and sift the heavy grains of dirt through his fingers, wondering if the soil had iron in it. Not being a geologist, Merritt reasoned that iron might have been washed into the soil ages ago because the region had once been under water. His boys remembered what he had told them.

Ten years after their father's death, four of the sons and three nephews began prospecting for ore in the queer, rocky hills that the Indians called Mesabi. In thrusting a shovel only one length into the ground, they struck soft hematite, dull red in color, with only a mat of pine needles hiding it from view. Confident that they had made a great discovery, the Merritt Brothers, as they were called, set out to raise capital to mine the ore and to

A TRAIN OF LOADED ORE CARS ATOP THE DOCKS AT DULUTH, MINNESOTA

At the mines, iron ore was loaded into cars with huge shovels and then hauled by train to the docks in Duluth, a port on Lake Superior. There, the sandy ore was dumped from the cars into loading spouts to fill waiting carriers, long boats built for this trade on the Great Lakes.

Oliver-Iron Mining Company



transport it to mills in Pennsylvania, Ohio, Indiana, and Illinois. The public was slow to invest money in ore that was scarcely more than dust. Miners and geologists, sent to investigate the site, did not make favorable reports. The experts were looking for ore that was hard and firm, not soft and loose. They solemnly declared that the Mesabi ore was quite ordinary and at the time they were walking over millions of tons of sixty-six percent ore, almost as pure an iron as has ever been found.

In 1890 with little outside help, the Merritts opened the first Mesabi mine. Two years later, over their own railroad, the first shipment was hauled to docks on Lake Superior and shipped for trial in steel mills. When the reddish-brown dust turned out to be superior Bessemer ore, steel men rushed into the northern country to homestead and buy sections of land. The Mesabi Range, one hundred and ten miles long and one to three miles wide, has produced three times as much ore as the Marquette, Menominee, Gogebic, Vermilion, and Cayuna ranges put together. The place was well named by the Indians, Mesabi, the Chippewa word for giant, whence came the dull red dirt that made the shiny blue steel for industries established in the basin of the Great Lakes.

SUPPLIES AND MARKETS FOR STEEL

WITH RANGES near Lake Superior supplying iron ore, the southern shores of Lake Michigan became a natural setting for the steel industry and for manufacturers using the metal in their products. Steel became the main support of navigation on

the Great Lakes. During the free season, a speck looming on the horizon might be an ore carrier bound for steel mills in northern Indiana and Illinois. In the distance, these long boats with smokestacks in the rear resemble Indian canoes with stovepipes.

Other ingredients needed to make steel were also found nearby. Limestone came from northeastern Michigan where cliffs of Dundee limestone hugged the shore of Lake Huron, from Kelly's Island in Lake Erie near the site of Perry's victory, and from Marblehead on the Ohio shore. Water transportation from mine to mill encouraged location of steel plants in the region of the Great Lakes. Coal, another necessity, was abundant in Pennsylvania, Kentucky and West Virginia, but much of it was shipped by rail to the mills.

Water played a large part in the developing industry. Steel works need plenty of water and acres of ground. A desolate waste of sand dunes and stagnant pools along the southwestern shore of Lake Michigan was redeemed by the steel producers. Swamps were drained, canals were dug, lake front was filled in, harbors were dredged, and the Calumet River was deepened for navigation of the huge lake freighters and ore carriers.

The labor supply, too, favored this location near the rapidly growing city of Chicago. As steel employees wanted to live within a reasonable distance and not spend too much time going to and from their work, towns grew into cities around the mills. In less than twenty years, the city of Gary, Indiana rose from the dunes and marshes along the Michigan shore. The suburbs of Chicago crept steadily southward.

Located in the heart of the continent,

the Chicago area attracted manufacturers of steel products wanting to locate near sources of supplies. Markets were easy to reach from Chicago, and this was an added inducement to manufacturers. The first steel plant in the area was built to supply rails for lines leading out of Chicago in all directions. Being a transportation center for boats and trains, the city was a natural place to make locomotives, coaches, freight cars, wheels and all kinds of railroad equipment. Trade on the Great Lakes was responsible for the growth of the shipbuilding industry in Chicago. Settlement of the rich prairie lands created a demand for plows, reapers, cultivators and every kind of farm implement from a hoe to a harvester. Hogs, cattle, and sheep from mid-western farms supplied the developing meat-packing industry in centrally located Chicago. The canning industry bought land for packing meats, fruits and vegetables.

Before long, structural steel was needed for skyscrapers rising along Michigan Boulevard, and for the factories being started in smaller towns in the Middle West. Then came an entirely new industry to patronize the steel industry. It was a new invention destined to revolutionize transportation — the automobile. The new business centered in Detroit and vicinity, near steel plants in Pittsburgh and on the shores of Lake Michigan.

Benjamin Franklin had predicted that the time would come when future generations of Americans would feel that his greatest patriotic service to the country was rendered at the peace table in Paris in 1783, where the new-born nation gained the rich iron deposits in northern Minnesota. Lake Superior mines furnished most of the iron ore that made the steel for armaments in two world wars. From 1940

to 1945 steel plants in the United States consumed 482,000,000 gross tons of iron ore from this northern mining area. Much of it came from the fabulous Mesabi Range, won through an error in the Mitchell map.

The nation's two world wars within twenty-five years cut deeply into the supply of high-grade iron ore left in the Lake Superior region. While new processes were being developed to use lower-grade ore, steel companies were searching for iron deposits elsewhere.

IRON DEPOSITS ARE DISCOVERED IN THE WESTERN HEMISPHERE

STEEL COMPANIES began to explore in other countries of the Western Hemisphere for new iron deposits. Iron of good quality exists in Labrador, where open-pit mining is possible for only about six months out of the year. Winters are

CERRO BOLIVAR — MOUNTAIN OF IRON ORE IN VENEZUELA

This dome of rich iron ore was located 150 miles east of the mouth of the Orinoco River. "Bolivar's Hill" is a rounded dome of reddish earth, six miles long, rising 1800 feet above grasslands in sparsely settled country. It is one of the richest deposits of high-grade iron ore ever found.

United States Steel Corporation





Orinoco Mining Company

OPEN-PIT MINING OF CERRO BOLIVAR

Huge electric shovels take big bites of iron ore from man-made cliffs to fill trains of cars on the railroad tracks winding around the mountain on man-made ledges.

long and severe in this far northern country. However, since the opening of the St. Lawrence Seaway, more iron ore from eastern Canada is being used in steel plants in the region of the Great Lakes. Much of this ore still enters through Atlantic ports.

Men searching for ore turned to South America. In 1939 a rubber tree hunter discovered iron ores six miles from the Orinoco River, near the place where the stream branches to flow through its wide delta to the Atlantic Ocean. Mining engineers and geologists hacked their way through country along the Orinoco never visited before except by native Indians and rubber hunters. The search in the grasslands with scattered trees was made by air. Pictures were taken with aerial cameras of an area of about 11,000 square miles in Venezuela. These photographs were divided into sections and enlarged for study of the rock formations and the rolling hills.

Engineers and scientists poring over these pictures of the landscape noticed a

dark rounded hill which looked as if it might have iron deposits. Traveling in a jeep and on foot over rugged ground, two ore hunters reached the hill and climbed it on April 4, 1947. They found huge outcrops of iron all over the hill. When they reported their rich find, drills were moved in as fast as roads could be blasted out of the ore deposits. Deep drilling proved that the rounded dome was made of iron, more than half a billion tons of high grade open-pit ore.

After arrangements had been made to acquire the necessary amount of territory, and to pay taxes to the government of Venezuela, work began. To ship this ore to steel mills in the United States, it was necessary to dredge channels for ore carriers, span rivers with bridges, lay tracks of rails for hauling ore and supplies, construct good roads for trucks and tractors, and build an airfield for landing big planes. Permission was granted by the Venezuelan government to rename the dome-shaped mountain, "Cerro Bolivar" (Bolivar's Hill), in honor of the great liberator born in that country. His armies had camped in this area preparing for the daring march across the Andes to Bogota, Colombia. In 1951, construction began on a steel mill along the bank of the Delaware River near Trenton, New Jersey. Today, huge ore carriers unload the treasure of Cerro Bolivar on the docks of this steel plant, located for water transportation from mine to mill.

STEEL AFFECTS THE PATTERN OF INDUSTRY

IRON WAS LITTLE BUSINESS. In places where trees provided charcoal for fuel and ore lay buried near the surface of

the ground, it took only a small amount of capital to engage in the iron business. A new steel age arrived with the converters developed by both Kelly and Bessemer at about the same time, one in the United States and the other in England. What did the ironmasters do? Owners of large ironworks either financed their own steelmaking plants, or merged with other companies to raise enough capital to enter the steel business. The little man kept his furnace going as long as he could sell his wares, and then put out the fire, leaving his works to rust in the sun and rain.

Steel was big business. New inventions for making steel and new products to use the metal sometimes rendered a plant obsolete in a short time. Changes came so fast that steel became a race of “the

survival of the fittest.” By the year 1900, sixty-five percent of the 10,000,000 tons of steel was produced by the Bessemer process, and thirty percent of this amount was rolled into rails. Thirty-seven years later, when the output was 54,000,000 tons, only five percent was purchased by the railroads. Even the Bessemer process has been largely replaced by newer methods of making steel. Customers want a certain kind of the metal for a certain product. To please them, ingredients of steel are measured as carefully as a housewife mixes a cake. New inventions create new products that develop new industries that bring new customers to the steel mills. Factory orders may include anything from a toy to a truck. Industry in the United States is constantly renewed and expanded by new inventions.