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THE WHITE PINE INDUSTRY AND THE TRANSFORMATION OF  
NINETEENTH-CENTURY MICHIGAN

By

MARK EDWARD NEITHERCUT

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M.A., Michigan State University, 1977

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Department of

Geography

The University of British Columbia  
1956 Main Mall  
Vancouver, Canada  
V6T 1Y3

Date

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# THE WHITE PINE INDUSTRY AND THE TRANSFORMATION OF NINETEENTH-CENTURY MICHIGAN

Mark Edward Neithercut

The white pine industry dominated the initial settlement and subsequent development of the northern two-thirds of the State of Michigan's Lower Peninsula. Between 1860 and 1910 northern Lower Michigan was transformed from forest to cutover; during this same period industrial technology was utilized increasingly to cut, transport, and mill white pine. This study is a historical geography of a nineteenth-century primary resource region. It investigates the geography of the Michigan white pine industry, and analyzes the geographical implications of industrialization.

The evolving pattern of resource exploitation is examined, with detailed attention given to (1) environmental impact, (2) spatial organization, (3) patterns of land ownership, (4) scale of production, and (5) transportation of logs from stump to sawmill and of lumber from mill to market. Personal letters and diaries, newspapers, annual reports of government agencies, and account books and correspondence of lumber firms are used as primary data sources.

The widespread adoption of technological innovations was found to have dramatically transformed the lumber industry during the late 19th century. In 1860 lumbering was a small-scale, seasonal industry based on human labor and water, wind, and animal power. By 1880 the scale of production had grown significantly, logging was less dependent upon seasonal rhythms, and steam power had increased the dependability of log transportation. A mechanized, rationalized, capital-intensive industry had emerged.

Industrialization was found to have greatly enhanced the impact of lumbering on the landscape. Large contiguous tracts of timberland remained unbroken due to the growing scale of forest production and the frequent re-cutting of tracts. Logging became increasingly less selective as improved milling machines utilized smaller logs and woods other than pine. The use of railroads to haul logs and to supply camps extended the lumber economy throughout the region and facilitated the concentration of milling and wood manufacturing in lakeshore mill towns.

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## INTRODUCTION

In 1860 northern Lower Michigan was a wilderness, by 1910 it was a devastated wasteland. No farmer wrought this transformation; the rapid, spendthrift exploitation of forest resources was responsible. In the northern two-thirds of the Lower Peninsula of Michigan, logging fostered initial settlement and subsequent development. This development occurred with remarkable rapidity due to the area's enormous endowment of white pine. White pine, a soft easily-worked wood, was much in demand in eastern cities, but increasingly scarce there due to the depletion of stands in Maine, New York, and southern Ontario. By 1870 Michigan was the largest lumber producer in the nation; in 1880 over 4500 million feet of lumber was shipped from Michigan to eastern urban and western agricultural markets. During these years forest-related industries employed one-third of the state's industrial labor force despite the growth and industrialization of Detroit. Taken together these activities--logging, lumber milling, and shingle making--led the state's other industries in value added by manufacture, capital investment, and number of establishments.

Yet by the early 1890's little white pine remained in Lower Michigan. The Panic of 1893 hastened the industry's decline. Forest fires swept the old logging areas every few summers and erosion removed the thin sandy soils. Mill towns were abandoned, and hundreds of miles of railroad track were ripped up. Farmers, having lost their local markets, moved to

the growing factory towns of southern Michigan. By 1910 northern Michigan was a scorched wasteland. After centuries of British and French rule that had scarcely altered the land, the lumber industry had remade the face of northern Michigan in a few decades.

This abandoned, burned-over region, like much of the 19th century American West, was a byproduct of eastern industrialism. The Michigan white pine industry served urban-industrial markets. It grew as a part of an emerging, industrializing national economy. Moreover, the barren landscape of northern Michigan in 1910 was no incidental consequence of eastern demand. On the contrary, it stemmed directly from the introduction of industrial technology and industrial capitalism into the northern Michigan lumber economy. In short, the Michigan cutover was an industrial landscape, a direct manifestation of an industrializing nation.

This is a study of the geographical implications of industrialism. It argues that the forces of industrialization greatly transformed the white pine industry, and thus greatly enhanced its impact upon the landscape of northern Michigan. This transformation occurred directly, through the introduction of new tools, machines, energy sources, and modes of transportation, and indirectly, through the opening of new markets. The industrialization of lumbering made an indelible mark on the face of modern Michigan. Industrial technology greatly changed the nature of production and transportation in the industry; industrial capitalism transformed the organization

of production and the management of land and labor. This process fundamentally altered the environmental impact of the industry, the spatial organization of lumbering, and the patterns of land use and land ownership in northern Lower Michigan.

Broadly, this study is an investigation into the geography of an industrializing resource economy. As such it describes the nature of the Michigan lumber industry, with special emphasis upon the geography of lumbering, and its geographical impact. It details the evolving pattern of resource use, land use, land ownership, the spatial organization of production, settlement, and environmental impact. Given the study's special interest in the impact of industrialization, it will investigate its impact upon the industry and the resultant changes in the landscape. To assess the evolving impact of the Michigan lumber industry it will be necessary to describe 1). the nature of lumbering, 2). its relationship with, and impact on, the landscape, and 3). the changes fostered in the industry and, as a result, in the landscape by industrialization. That northern Michigan stood in the early 20th century as an abandoned wasteland has been widely documented. The purpose of this work is to chart the transformation from forest to cutover and assess the role of industrial technology, transportation, and management in that transformation. The study will argue that industrialism greatly affected patterns of land ownership, the environmental impact of logging, and the regional patterns of lumber manufacturing. Toward this end detailed attention will be given to timberland holdings, technology of forest production, spatial organization of production, and location of saw mills.

Chapter 1 analyzes the context of Michigan lumbering in the late 19th century. It surveys early settlement and lumbering in Michigan, the evolving patterns of forest exploitation in North America, the emergence of an industrializing national economy at mid-century, and the relationship of Western primary resource economies with Eastern urban-industrial centers. Three pairs of chapters follow Chapter 1, each given to an analysis of the geography of the lumber industry, and of northern Michigan, at a specific time and stage of development. Chapters 2, 4, and 6 investigate the nature of logging and focus upon patterns of land ownership, the environmental impact of logging and the spatial organization of forest production. Chapters 3, 5, and 7 describe the development of northern Michigan as a region, emphasizing the spatial organization of transportation, the location of lumber production, and the settlement of the region; these chapters also describe the nature of mills and milltowns and emphasize the use of the timber resource, the transportation of lumber to market, and the role of the lumber industry in the mill town economy. Chapters 2 & 3 describe Michigan lumbering c. 1870, the year Michigan emerged as the largest lumber producer in the nation. Chapters 4 and 5 (c. 1883) focus upon the industry at its peak. Chapters 6 and 7 deal with the industry in decline, c. 1900.

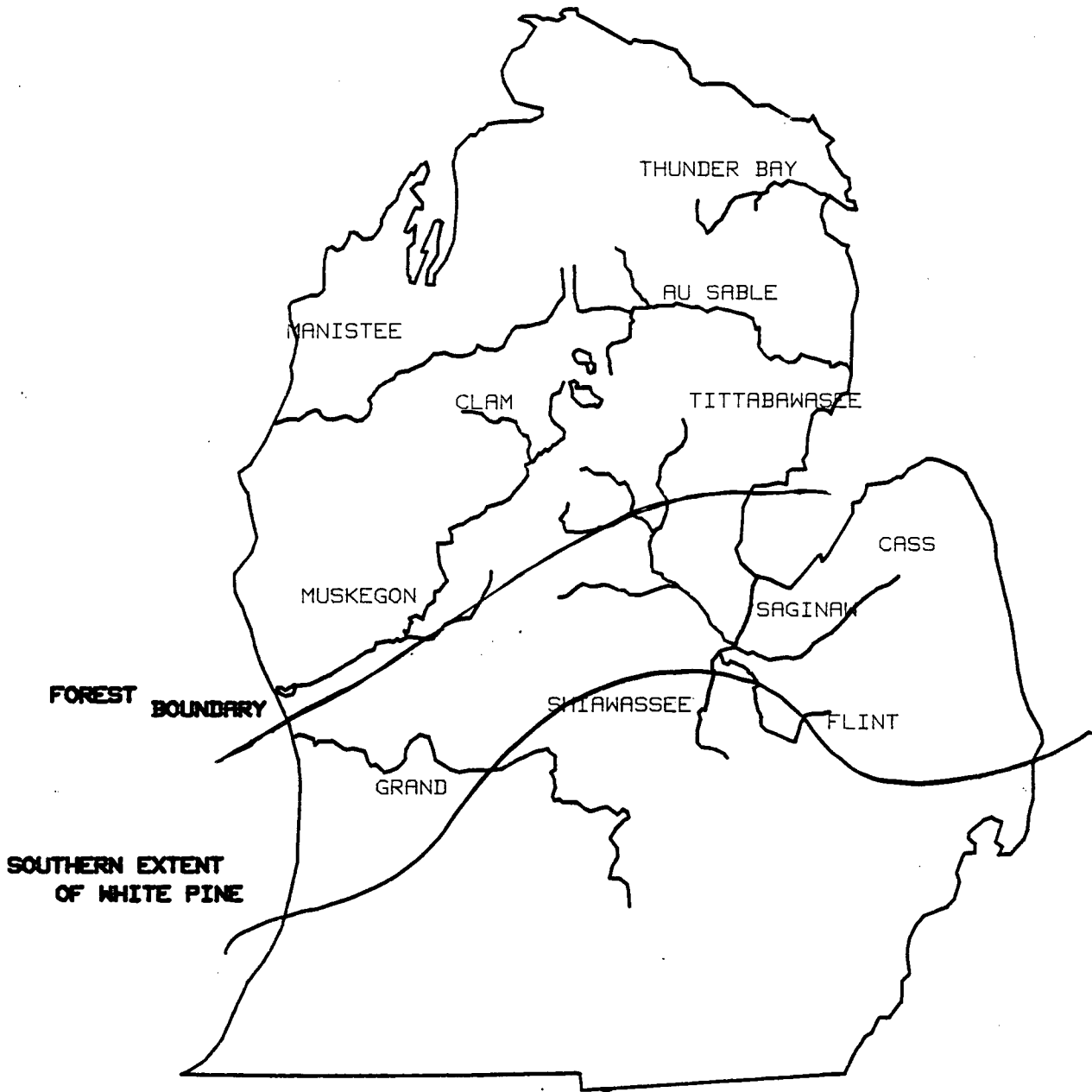
## Chapter 1

### MICHIGAN WHITE PINE AND AN EXPANDING NATION

The Great Lakes and the two peninsulas which comprise present-day Michigan were largely the creation of continental glaciation. Ice advanced through what is now the Midwest many times during the Pleistocene, progressively eroding parts of the Michigan Basin, and leaving behind a jumbled, erratic landscape. Lakes Huron and Michigan occupy ice-carved valleys,<sup>1</sup> and Michigan's present borders are formed largely by the shores of four of the five Great Lakes. The physiography of Michigan is a tangle of depositional features. Moraines, till plains, and outwash plains are interlaced through much of the interior of Lower Michigan, and lacustrine plains cover the shoreline areas.<sup>2</sup> Michigan's river system is consequently rather young; its pattern was largely influenced by pro-glacial drainage and the state's widely scattered moraines. A half dozen major rivers drain interior Lower Michigan; the Saginaw, Muskegon, Manistee, Grand, and Au Sable River systems are the largest and figured prominently in the development of the lumber industry (Figure 1).

Ecologically, Michigan spans two small-scale ecotones, or biogeographical regions. In southern Lower Michigan (or "southern Michigan") broadleaf forests predominate on clay or loam soils (mainly hapludalfs, that is well-drained alfisols), while in northern Lower Michigan (that is roughly north of a line

FIGURE 1  
RIVERS OF LOWER MICHIGAN  
(WITH FOREST ZONES)

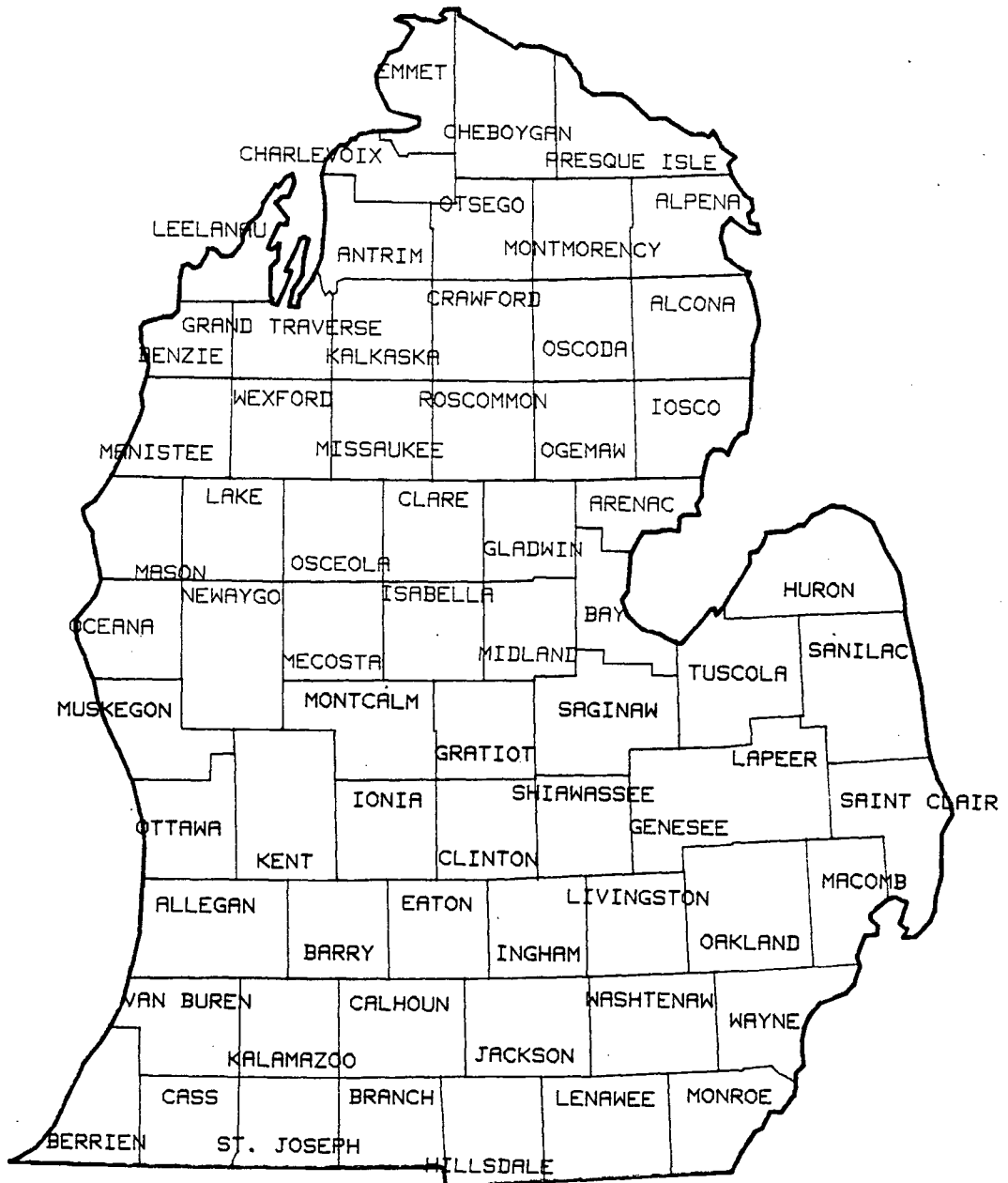


from Bay County to Muskegon County) and in the Upper Peninsula pine and mixed hardwoods occur on coarse sandy soils (largely haplorthods, or well-drained spodosols) (Figures 1 and 2). In southern Michigan the pre-settlement forest consisted of (A) black oak, white oak, red maple, and shagbark hickory on sandy upland soils, (B) basswood, beech, red oak, and sugar maple on the fine, moist upland soils, and (C) ash, American elm, silver and red maple, and swamp oak on low alluvial or muck soils.<sup>3</sup>

The boreal ecotone of northern Lower Michigan (or "northern Michigan") and the Upper Peninsula is characterized by coarse sandy soils, a cooler climate, shorter growing season, and a pine-hardwood forest. Haplorthods, that is spodosols that were formed under a conifer and mixed hardwood cover, predominate. The pre-settlement forest consisted of beech and sugar maple combined with white pine, yellow birch, and hemlock; on the driest uplands jack pine and oak dominated. In general white and red (or "Norway") pine dominated the lighter, sandy soils from Alpena and Montmorency Counties in the northeast corner of the Lower Peninsula to Oceana and Newaygo in the southwest. Yet white pine was found in large, though isolated stands as far south as St. Clair, Genesee, Gratiot, Kent, and Allegan Counties (Figure 1).<sup>4</sup>

This forested, glacial landscape was an untouched wilderness in 1825 when a northern migration route was created by the opening of the Erie Canal. Tens of thousands of settlers came west to Michigan on canal barges and Lake Erie steamboats, and the population of the state soared during the thirties and

# FIGURE 2 MICHIGAN COUNTY NAMES (LOWER PENINSULA)





nearly doubled each decade until 1860 (Table I). The Erie Canal was located due west of New England and the canal provided a route for migrants from New England to northern Ohio, Upper Canada, and Lower Michigan. Land had grown scarce and expensive in New England and many people left their stony farms for cheaper and more fertile land in the west. Initially these settlers sought land in western New York and Upper Canada, but as these areas were settled Lower Michigan became a common destination for northern migrants. By mid-century many settlers from New York (most of whom were New Englanders by birth or descent) and Upper Canada (born British, Irish or New Englander) also moved west to Michigan.<sup>5</sup> There was also a sizeable migration of Germans

TABLE I  
POPULATION OF MICHIGAN

1810	4,792	(Michigan Territory)
1820	8,765	" "
1830	31,639	" "
1840	212,267	
1850	397,654	
1860	749,113	

Source: U.S., Compendium of the Ninth Census (Washington: Government Printing Office, 1872), p. 58.

into Michigan at this time. In 1860 the largest population source outside of the state was New York which contributed 25 percent of the state's total population (Table II). To a large extent these migrants were farmers from New York and New England who recreated the landscape and society of their home states in Michigan. Farming practices, vernacular architecture, and the organization of local government were all distinctly Yankee. Indeed, popular support for public education, abolitionism, and prohibition, as well as a widespread willingness to experiment with new commercial enterprises, are evidence of the diffusion of New England culture into Michigan.<sup>6</sup>

TABLE II  
MICHIGAN POPULATION BY BIRTHPLACE, 1860  
(Percent of Total Michigan Population)

Native Born		Foreign Born	
MICHIGAN	39.4%	UNITED KINGDOM	8.2%
NEW YORK	25.5	IRELAND	4.0%
OHIO	4.6	ENGLAND	3.4
PENNSYLVANIA	2.3	SCOTLAND	0.8
VERMONT	1.8	GERMAN STATES	5.2
MASSACHUSETTS	1.3	BRITISH AMERICA	4.9
		HOLLAND	0.8

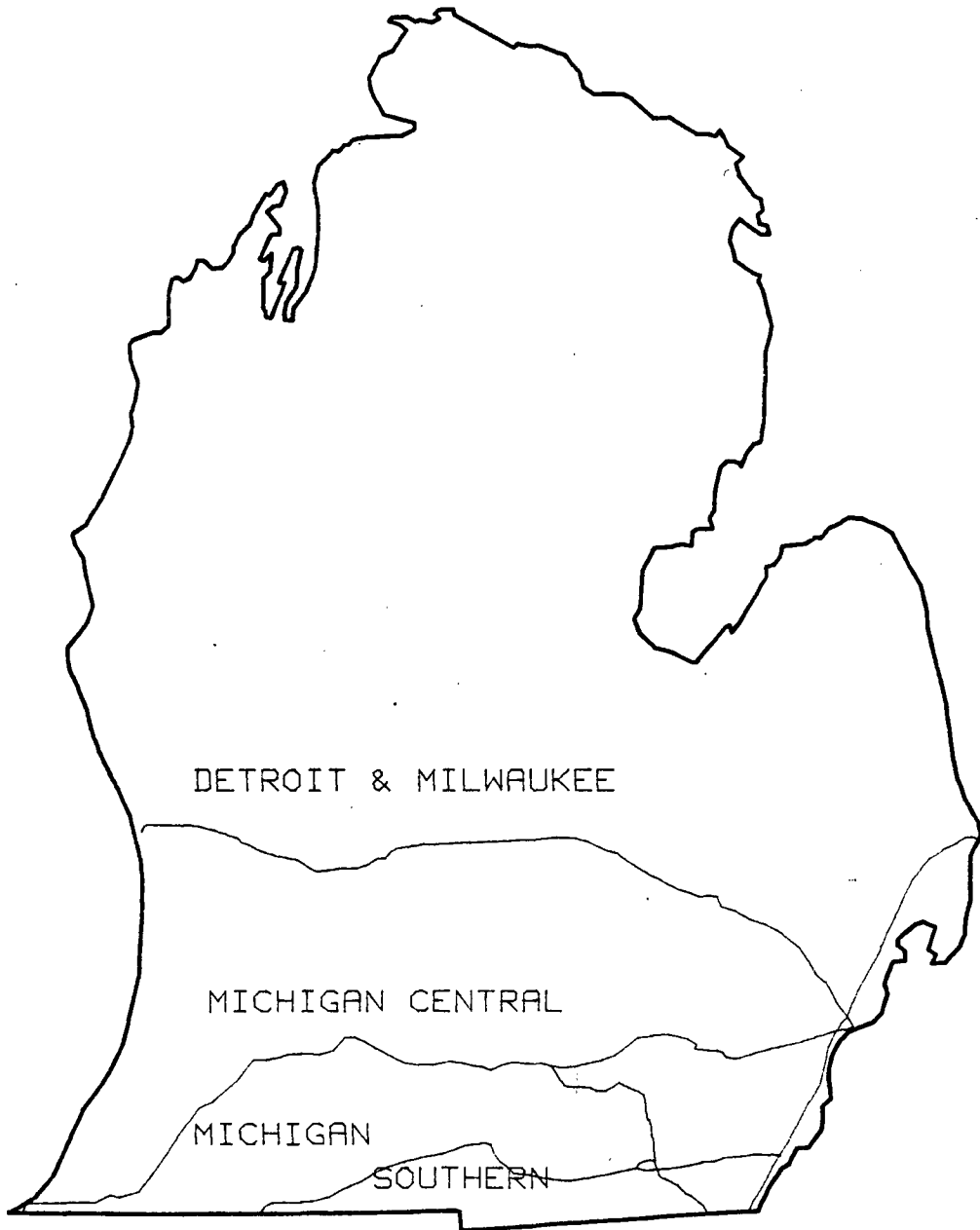
Source: U.S., Eighth Census of the United States, 1860, Vol. I, Population (Washington: Government Printing Office, 1864), p. 248.

Yet this expansion of European settlement into Michigan was limited to the southern third of the Lower Peninsula. By 1837--the year Michigan became a state--wagon roads had been built west from Detroit and Monroe (on Lake Erie) through the southern reaches of the state.<sup>7</sup> The Chicago Military Road reached Fort Dearborn (Chicago) by 1835, and became an important interior route.<sup>8</sup> During the 1840's Michigan's first railroads were built, again west from Detroit and Monroe, to Grand Haven, St. Joseph, and Chicago, all on Lake Michigan (Figure 3). Most settlers were experienced farmers who knew the importance of market access and purchased land along these routes with that in mind.<sup>9</sup> Detroit was by far the largest city in Michigan, and Wayne County, which includes Detroit, had 10 percent of the state population in 1860. The next most populous counties were also in the southeast, except for Kent, which contained the sawmill town of Grand Rapids, in the west (Figure 4). Although settlement had spread north into the southern margin of the pine forests, the great majority of Michigan's population was confined to the southern and southeastern counties of the Lower Peninsula.<sup>10</sup>

The mining communities of the Upper Peninsula were an important exception to this pattern of southern settlement. Copper and iron had been discovered in large quantities in the Upper Peninsula, and the completion of the St. Mary's Falls Ship Canal in 1855 gave a significant boost to mining in that region. The rapid growth of industrial manufacturing in the Northeast generated increased demand for the minerals of the distant Lake

Figure 3

## MICHIGAN RAILROADS - 1860



Source: Silas Farmer & Co., Farmer's Railroad & Township Map of Michigan, 1866; Michigan Railroad Commission, Annual Report, 6 (1877), 38, 408, 169.

Superior region; the mercantile capitalists of Boston invested heavily in Michigan's copper and iron mines.<sup>11</sup> These were the first real mining booms of North America but the isolation of the Lake Superior mineral ranges limited their impact upon life and economy in Lower Michigan.

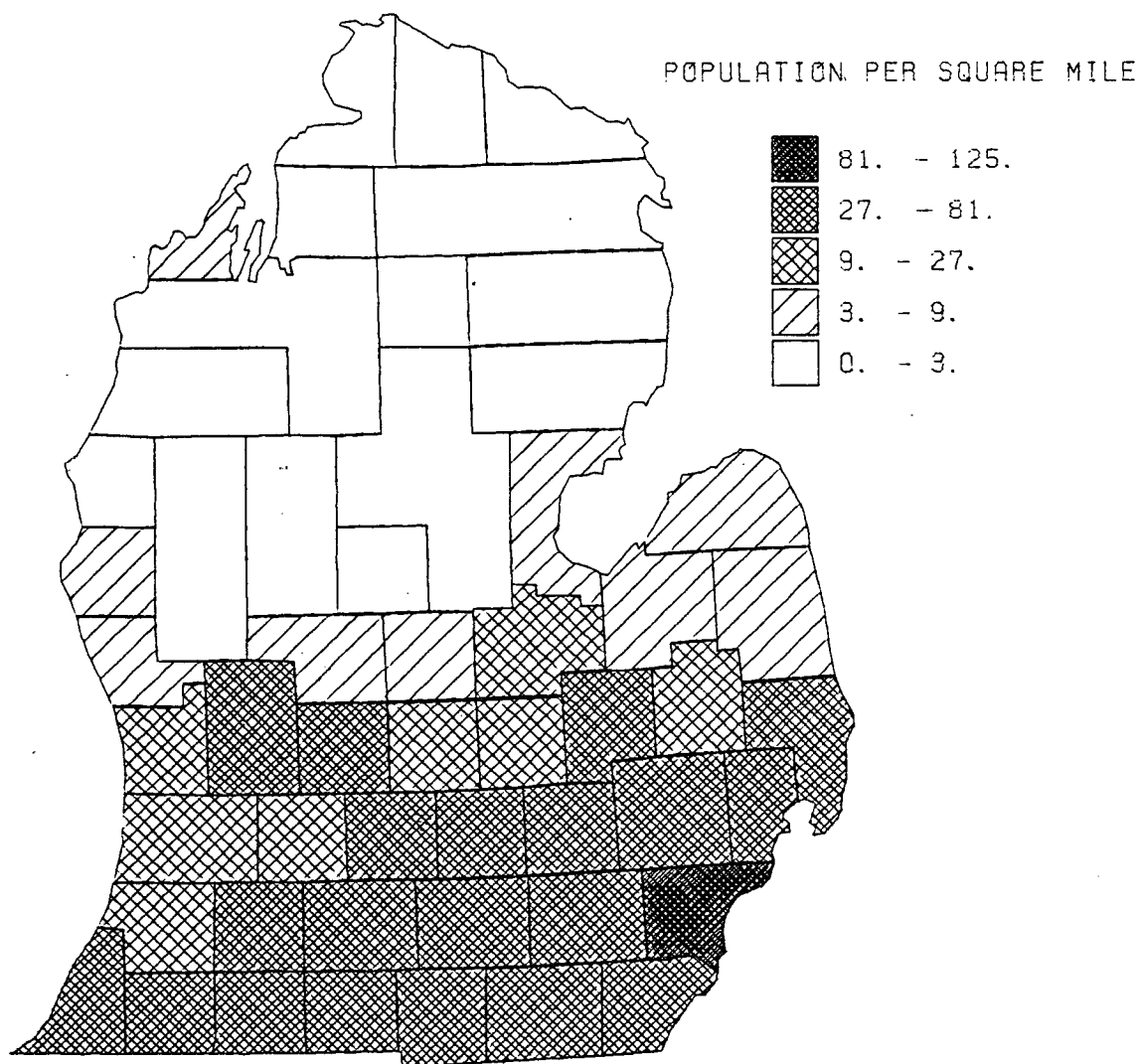
Agriculture thrived in southern Lower Michigan due to available markets and a favorable natural endowment. The soils of southern Michigan are generally suited to agriculture, unlike the sandy, acidic, less fertile spodosols common in northern Lower Michigan, eastern New York, and New England.<sup>12</sup> The southern third of the state has, on the average, a growing season of more than 140 days, and more than 3800 growing degree days.<sup>13</sup> Grains were the primary products of this period, especially corn, wheat, and oats. In the early years of settlement, agricultural products were floated down rivers to the coast and shipped on Great Lakes sailing vessels, or drawn by cart to nearby towns. Not until the spread of railroads did the whole of southern Michigan gain easy access to markets. Then goods were shipped directly to Detroit by rail, or, in the west, goods went by rail to Grand Haven or Benton Harbor and then by ship to Chicago or Milwaukee. Michigan's railroads facilitated the development of commercial agriculture, but limited its extent to the southern third of the Lower Peninsula.<sup>14</sup>

The state's first railroads were begun in the 1840's under state control. Both the Michigan Central and the Michigan Southern Railroads reached Chicago in 1852, and in 1854 the Great Western Railroad was completed from Windsor to Niagara. The

Figure 4

# POPULATION DENSITY --- 1860

(LOWER MICHIGAN)



bridging of the Niagara River in 1855 provided Michigan's first year-round link with the east coast and until 1858 Michigan railroads were Chicago's sole eastern connection.<sup>15</sup> By 1860 three railroads spanned the lower reaches of the state, east shore to west; Detroit had three eastern connections, including the recent link with Port Huron and the Grand Trunk Railroad. Here, too, eastern capital proved crucial; for example, Erastus Corning, a prominent eastern iron manufacturer, was a major shareholder in the Michigan Central Railroad, as well as President of both the New York Central Railroad and the St. Mary's Falls Ship Canal Company.<sup>16</sup>

The east-west pattern of Michigan's railroads reflected the state's important economic links and the cul-de-sac character of the Lower Peninsula, hemmed in by Lakes Michigan and Huron. Well served by railroads as southern Michigan was, the state's total rail mileage (799 in 1860) was far below that of Ohio and Wisconsin.<sup>17</sup> The northern two-thirds of the state remained unbroken by rail. By 1860 the same migration route that first brought settlers to southern Michigan passed through or around Michigan and into the prairies of Illinois, Iowa, and Wisconsin.<sup>18</sup> Southern Michigan was largely cleared and settled, no roads penetrated the northern pine forests, and land was available farther west. Though the soils were poor and the growing season short, most settlers avoided the northern two-thirds of the Lower Peninsula because of the lack of transportation routes and market access. The forests of northern Michigan were unappealing when there was better land near

reliable transportation farther west. The settlement of northern Michigan required the construction of dependable transportation routes. Yet with neither markets to serve nor towns to connect, there was little incentive to build them.<sup>19</sup>

Michigan was increasingly drawn into the sphere of the industrial Northeast as a result of improved transportation links, particularly the development of steamboat lines, canals, and railroads. Furthermore, improvements in telegraphy, newspaper distribution, postal service, as well as the spread of economic institutions, served to complement this pattern. Telegraph lines were strung along Michigan railroad routes as early as 1847, Detroit and Chicago were connected the next year, and by 1860 most Michigan towns had been integrated into a national telegraph system. During this same period postal costs had dropped dramatically. Postal services were becoming more widely available, and mail delivery was faster and more reliable than ever. These mail and telegraph improvements aided the spread of information and facilitated the emergence of newspaper publishing in small Michigan towns.<sup>20</sup> Moreover, important financial links had developed--as suggested by the involvement of eastern capitalists--between Michigan and the Northeast, particularly the development of the bank correspondent system. By 1860 nearly all Michigan banks were formally affiliated with one of the large New York banks.<sup>21</sup> In a matter of a few decades the state of Michigan had been incorporated into a rapidly expanding nation, largely as a result of a variety of cultural and economic ties to the industrializing Northeast. Yet



Michigan's tamed, agricultural region of the south contrasted sharply with the unbroken forests of the northern Lower Peninsula and the Upper Peninsula.

#### THE WHITE PINE INDUSTRY

After agriculture, lumbering was by far the most significant sector of the economy. It employed 35 percent of the industrial work force, and added 27 percent of the state's manufacturing value in 1860.<sup>22</sup> At this time Michigan ranked third, behind New York and Pennsylvania, in value of lumber production,<sup>23</sup> and the industry was concentrated in southern Lower Michigan, although there were small salients of development in the northern ecotone. Within this pattern the Saginaw River system (which includes the rivers Cass, Tittabawasee, Flint, and Shiawassee) in east-central Michigan was clearly preeminent. The Saginaw River system, like the prominent lumbering rivers that flowed west, drained both sides of the ecotone border. To the south, along the Grand, the Cass, and the Flint, the occasional pine stands in the broad leaf forest were being extensively logged and locally milled. After a parcel was logged, the land was usually cleared and farmed. To the north, white pine was more abundant. Logging occurred in occasional camps for 75 miles or more along the Muskegon and the Tittabawasee Rivers but rarely extended more than a mile back of the river. Manistee, Traverse City, and Alpena were northern outports of the lumber

industry at river mouths on lakes Michigan and Huron, but the northern interior was still largely untouched by the lumber industry.

In the 1850's Michigan lumbering was a simple seasonal activity.<sup>24</sup> Logging camps of some fifteen men and a few oxen cut logs that were driven two or three score miles downriver to a saw mill. The industry was characterized by an annual cycle of winter logging, spring drives, and summer milling. Due to the bulkiness of logs and lumber, water transportation was of great importance to the lumber industry. Logging was limited to riverside timber stands, and saw mills were located at river mouths to receive logs from upriver and to ship their product on Great Lakes schooners. Only the largest trees were taken from the forest. Techniques of felling, hauling, and river driving had been borrowed from Ontario, Maine, and New Brunswick. And the tools and machinery of Michigan's early lumber industry resembled those found in earlier exploited, now declining areas to the east. Though it supplied markets beyond Michigan, this was a simple industry which operated at a small scale.

Preparations for winter logging began early in the fall with the construction of log cabins ("shanties") that would house the workers and oxen. Crude pathways ("logging roads") were cleared to a nearby river. By the end of November logging was in full swing. Felled by two ax men, the pine trees were limbed and topped before being pulled to the river by a pair or two of oxen. The trees were skidded with the aid of a small sled that had two short runners and a heavy beam or bed to support the butt end of

the tree. The loggers used cant-hooks and the ox-chain to roll the tree onto the dray. Rarely were limbed trees skidded as much as a mile between stump and riverbank, even when frozen ground and six to eight inches of snow offered ideal conditions. At the river two men "bucked" the trees into lengths of 14 to 20 feet using a cross cut saw before piling them along the river in "rollways". Each log was measured or "scaled" to estimate the number of board feet it contained, and then its ends were marked with the owner's identifying symbol. It was essential that the season's cut be banked before the spring thaw. Logs that missed the spring freshets were lost; they were of little value after a year of rot and insects.

These forests contained the largest and highest-quality white pine on the continent. Only the best trees were cut, for the logging season was short, the forest seemed endless, and small trees were not worth skidding and driving to the mill. Also, timber theft was still common; logging crews trespassing on federal land were inclined to cut and remove the largest and most valuable trees as quickly as possible.<sup>25</sup> Thus the average white pine log was quite large, it contained about 500 "board feet" (that is enough timber to produce 500 linear feet of 1" x 12" boards), and relatively few--perhaps 15--logs were cut on an average acre. Over the three month logging season a single camp might cut an 80 acre parcel that would yield roughly 600 thousand board feet (that is 600 "MBF" or simply 600 M) of logs or an average of 7.5 M per acre.

The log shanties that housed the woodsmen and animals

were built from trees felled when the camp site was cleared. The logs were cut and notched, and then rolled into place with the aid of an ox team. The shanty walls were built to about shoulder height and mud, moss, and bark were used to chink between the logs. In each camp there were at least two shanties: the men ate and slept in one and the other served as a stable for the oxen. Often there was a third shanty for the owner or foreman and his family.

These small logging camps were often located within the advancing line of agricultural settlement and thus a small village was sometimes close at hand. During the 1850's both logging and farming continued to expand into the central upland of southern Michigan. A general store was often within a day's trip of a logging camp by foot or canoe.<sup>26</sup> These camps felt a continuing need for fresh provisions and for the replacement or repair of broken tools. In the years after mid-century the traditional logging diet of black tea, salt pork, and beans expanded to include fresh meat, dairy products, and baked goods, due in large part to the growth of agriculture in the region.<sup>27</sup> The more isolated camps were obliged to take an entire seasons's provisions along when they entered the forest in the fall.

The men of the logging camps--the Shanty Boys--were nearly all native-born Americans from the Northeast.<sup>28</sup> The winter logging camps offered newcomers a convenient opportunity to earn money in the off season. Some of the shanty boys saved their wages to buy land and establish a farm; others supplemented

their income during the first struggling years of farming. Logging skills were simple, easy to acquire, and familiar to most farmers. Winter logging was an efficient use of local labor, animals, and tools. A mutually beneficial relationship existed between the neighboring camps, farms, and mills. Logging helped clear potential agricultural land and provided off season work for the farmers. The mills found an important market in expanding agricultural settlement, and the farms, in turn, sold much of their produce to the logging camps. Yet not all of the shanty boys were farmers. As the lumber industry declined in Maine and Upper Canada many skilled loggers drifted west in search of work. These men constituted a small proportion of the industrial labor force, but they played an important role as the skilled, experienced men of the woods.

Shanty boy wages were \$15 to \$20 per month and were payable at the end of the season. In the spring a logger might have \$40 to \$80 due him, but the scarcity of cash in this frontier society often made it difficult for him to collect. If a logging concern sold its logs to a saw mill it might not receive the last of the money due it until late summer. Thus the shanty boys often had to wait months to receive their wages. In the meantime they might be given an order (or "time check") payable at the company's main office. This brought many shanty boys to the booming coastal mill towns of the region where the local merchants were happy to cash the time checks. The discounting of time checks was common and some saloons would extend a logger a line of credit equal to his discounted check.

The shanty boys worked long hours in isolated camps under primitive conditions. Many of them spent their season's pay on a hot bath and a new suit, and in the saloons and whorehouses. In the end, both the frugal and the not-so-frugal shanty boys returned to their farms to help prepare for planting, or they hired into the local mills, or they went to work on the river drive.

The spring drive began with the dangerous job of "breaking" the rollways. At the banking grounds logs were stacked as high as 10 or 15 tiers in such a way that the removal of a few key logs would send them cascading into the river. Once they were in the stream a "jam crew" drove the logs downriver. It was their job to keep the lead logs moving and to free any obstructed logs before a jam formed. These men skilfully rode the moving logs using their pike poles to jump from one log to another. Other "river hogs" were posted along the river at troublesome spots to keep the logs moving. At the rear of the drive more rivermen traveled in bateaux and they used cant hooks to remove stranded logs from the flats and sand bars. The cut was driven distances of 20 to 50 miles and lasted a few weeks. The success of the drive depended entirely on the availability of water. The amount and timing of spring rain and snow melt were crucial to its success.

On most of the larger rivers one company drove, boomed, and delivered the bulk of the logs. On the Muskegon River a co-operative association of the major lumber concerns contracted their driving to the lowest bidder each year. On the

Tittabawasee River a private company was the dominant force. Most such private driving companies were owned by a large lumber concern, which found it both advantageous and profitable to enlarge its own drive to include the logs of others. All river drives were integrated operations, and river driving was a separate, distinct stage in the lumbering process. In good years drive companies on major rivers might carry 50 to 100 million feet of logs to their large booming and sorting grounds, before delivering them to the millponds. There were, however, maverick drives on these rivers and there were many independent drives on the smaller streams. The maverick drives were conducted by lumbermen who hoped to take advantage of the river improvements made by the large drive companies. In the late 1850's the Michigan legislature acted to allow lumbermen's associations to operate chartered driving and booming ventures on Michigan rivers. In the Northeast and in other Lake States boom companies had been given certain monopoly privileges, such as the power to charge all drives a toll for use of river improvements made by the chartered company. Yet in Michigan these powers were challenged in court, and the state Supreme Court held that these were voluntary associations and that non-members could not be charged for river improvements made by the association, nor for the driving, booming, and sorting of their logs should they become part of the association's drive by chance or design.<sup>29</sup>

The growth in the number and length of drives, and in the volume of logs coming out of the forest put tremendous pressure on the driving companies and upon the rivers' finite flood water.

There was constant scheming, legal posturing, sabotage, and brawling for the use of limited resources. Driving crews often came to blows over who would control, and thus have the first use of, a logging dam and its water. The rivers had been cleared of debris many years earlier, but more substantial improvements, such as the dredging of sand bars, the construction of dams, and the building of larger booming and sorting grounds were needed. It was impractical for a single driving company to invest in these improvements. Traditionally the state and federal governments had led the way in transportation improvement projects in the Old Northwest, and lumbermen lobbied for similar aid.<sup>30</sup> Both the lumber industry and the legislature had endeavored to bring order to the spring river drives. Yet in 1860 there were still serious problems due to the loopholes in the law. Lumbering was highly competitive and most lumbermen were highly individualistic, entrepreneurial Yankees. The continuing river drive problems illustrate the conflict between the interests of frontier entrepreneurs and the cooperation required by a growing, modernizing industry.

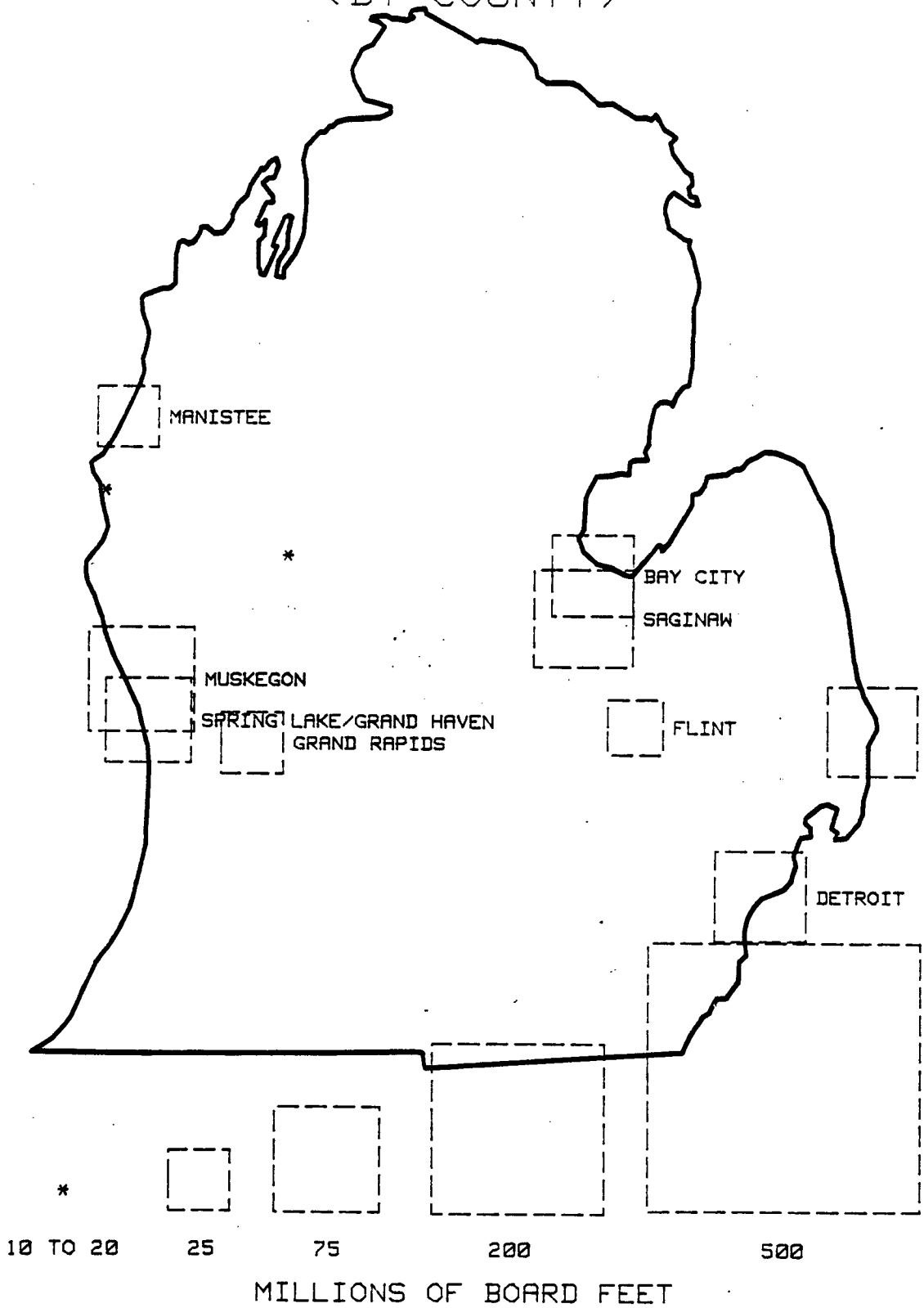
Although water-powered mills were common, the majority of Michigan's saw mills in 1860 were powered by steam. In the large coastal mill towns the saw mills were nearly all steam-powered, and they accounted for most of the capital invested in the state's saw mills.<sup>31</sup> Most mills had a number of different saws, each with a special use. "Mulay" saws--they had a single reciprocating blade--were standard, but circular saws were beginning to gain acceptance. A mill might also have a shingle



or lath machine. In the larger, most modern mills logs would be squared by a mulay saw; the resultant cant would be cut into boards by another mulay or by the faster circular saw. Such mills generally also had table edgers. In the older mills lumber was simply laid flat and edged by the same saw that cut it. Thirty thousand board feet (or 30 M) was a good cut for a twelve hour day. An average mill had a crew of fifteen men, and cut 1800 M a season. All of the mill work with the exception of the sawing was done by hand. Logs were rolled onto the carriage and the cants were moved and adjusted by men with cant hooks. Lumber was hand carried, sorted, and stacked; waste and refuse was carted away by men; and lath and shingles were hand packed and bound. The mill machinery itself was constantly in need of attention. Breakdowns were common, and sometimes days (even weeks) were lost as parts were repaired or while someone went to Chicago or Detroit for a replacement.

Lumber manufacturing was dominated by a few coastal saw mill towns located at the mouths of large river systems (Figure 5). The saw mills shipped their product directly from their docks by Great Lakes schooners. The few interior saw mills were small, water-powered mills that catered to local markets. Flint and Grand Rapids were important exceptions; these large, interior mill towns cut for local markets or shipped lumber down river by boat. The largest mill towns, such as Saginaw and Muskegon, had perhaps 25 saw mills and a total annual output of 50 to 100 million feet. The largest mills did not dominate local lumber production. Indeed, the largest 3 or 4 mills in a large mill

FIGURE 5  
LUMBER PRODUCTION - 1860  
(BY COUNTY)



SOURCE: Smith, "Lumbertowns in the Cutover," pp. 43-67.

town produced roughly one quarter of the total town output. Michigan exported 75 percent of its annual production. Most of this went west to Chicago and east to Albany. Lumber was shipped via sailing vessels, though a few steamers had begun to appear.

There was little concentration of ownership in saw milling and competition was fierce. An average mill required an investment of \$10,000 (perhaps \$25,000 for the large new steam mills), and it could pay for itself after a year or two of operation in a bullish market. As saw mills multiplied, local capacity soared. In a given year five or six new mills could increase the production of a mill town by 20 percent. The unpredictability of logging, with its dependence upon freezing temperatures, moderate snow cover, and spring flood-water, caused lumber prices to soar one week or one season, and to drop precipitously the next. Poor driving conditions might cause a shortage of saw logs and an advance in lumber prices. Lumbermen would typically respond by building new mills and expanding their logging operations to take advantage of the high prices. If ideal logging conditions prevailed, forest production would soar, and, if driving conditions were also good, prices would quickly drop.

In Michigan, mill owners had traditionally supervised the logging, driving, and milling of their logs. By 1860, however, they were increasingly inclined to relinquish direct control of logging and driving. Logging required little capital investment, but operating expenses mounted as the season progressed. Midway through the season a logging concern was in an extremely

vulnerable position and an untoward change in the weather could be disastrous. Many mills purchased logs from independent loggers, or they let contracts for the logging of their own land. At the same time mill owners increasingly let contracts for their log driving as well. Mill owners were unwilling to supervise isolated woods operations and wished to avoid the untenable financial position created by the unpredictability of logging. Rather, mill owners extended credit to jobbers and independents who chose logging because it was an easy-entry industry with low capital requirements. Thus the jobbers and independents assumed the risk of banking the season's cut by spring thaw, and the mill concerns were protected by logging contracts that required delivery by a specified date.<sup>32</sup>

Saw mill workers were also predominantly native-born Americans from the Northeast. As logging, driving, and milling became separate and more specialized stages of production, there was less overlap in the respective labor forces. Many native shanty boys returned to their farms in the summer, while recent immigrants tended to work in the mills and on the drives. French Canadians, for example, were known as talented river hogs, and they, and Germans, were found in greater numbers in the saw mills than in the logging camps.

In the years immediately after mid-century the Michigan lumber industry strongly resembled its Maine and New Brunswick antecedents. Lumbering was a simple, seasonal industry dependent upon winter snow, spring freshets, and the May to November shipping season. The tools and techniques were those brought

west many years before. Only mature trees were cut from small parcels near driveable streams. There were, however, developments in the industry that signalled future events. Total production in the region was growing rapidly, and the stages of lumber production were becoming more specialized and autonomous. And there was increased specialization in milling; saw mills began to use more saws, each of which was assigned to a specific task. Finally, though Michigan was slow, compared to other Lake States, to solve the growing problems of river driving, there were early signs of industry-wide co-operation and self-regulation on Michigan's rivers.

Despite the technological stability of lumbering, rapid expansion marked the Michigan white pine industry in the 1850's. Production and capital investment tripled during the decade.<sup>33</sup> As the industry expanded the logging frontier moved northward. This expansion was greatly aided by two related actions of the federal government. During the 1850's the United States drastically altered its policy on the sale of federal land and it provided a large subsidy for the construction of three railroads into northern Lower Michigan.

Before 1852 federal land policy was quite straightforward: once surveyed, land was put up for sale at \$1.25 an acre, in minimum parcels of 80 acres. Anxious to pay off the large federal debt, and sensitive to public opinion critical of the federal government's role as a land baron, Congress moved to divest the government of much of its land. Thus the price of some land was drastically reduced, and land was given to the

states to support internal improvements. In Michigan all federal land described as "wet" or "swampy" by surveyors was given to the state, most of this land being in the northern Lower Peninsula and in the Upper Peninsula. In addition, the terms of eligibility for veterans' land warrants were broadened and the warrants were made transferable. The Graduation Act periodically reduced the price of land that remained unsold, and 750,000 acres were awarded to the State of Michigan to support the construction of the ship canal at Sault Ste. Marie. Finally, in 1857 the U.S. Congress gave 3 to 4 million acres to the state to finance the construction of railroads in Michigan. These "land grant" railroads, the routes of which were specified by Congress, were to be built into the northern wilderness of the Lower Peninsula and in the Upper Peninsula for military, as well as economic, reasons.<sup>34</sup>

These changes precipitated a land boom. Tens of thousands of acres of northern pine land were sold as lumbermen and speculators scrambled to acquire stumpage. Much of this land was sold at substantially reduced prices by the state to raise money and attract settlers, or through the use of discounted military benefit warrants. The interest of the lumber industry in northern Michigan was fueled in large part by plans for the construction of the land grant railroads. Moreover, the land grants to the railroads and the St. Mary's Canal Company had included much of the prime timberland of northern Michigan. Eastern speculators, many of whom had accumulated large capital surpluses from manufacturing and mercantile enterprises, actively

participated in this land boom. In the panic and depression of 1857, however, the boom fizzled. The land market was depressed, lumber production slowed, and the construction of the northern railroads was postponed. The late 1850's were slow years for the lumber industry and the opening of the Civil War further depressed the Michigan economy.<sup>35</sup>

### CONTEXTS OF CHANGE

The growth of Michigan's 19th century lumber industry was shaped by the state's relationship to the spread of settlement in the trans-Mississippi west, and its place in the evolving national economy. After 1800 a flood of settlers came west into the Ohio Valley, the Great Lakes, and, later, into the Prairie states in search of cheap fertile land. Most of these people were experienced farmers intent on growing cash crops and requiring easy market access. By 1860 a rapidly developing railroad system connected New York and Boston with Chicago and Cincinnati. As commercial agriculture grew in the West, industrialization in the East had begun to remove the United States from the sphere of the European economy. By 1860 industrial manufacturing had transformed many eastern cities, and their growing industries looked west for new sources of raw materials.

During the first half of the nineteenth century an industrial core emerged in the American Northeast. This area had

a rich resource base, an established agricultural economy, hundreds of water-power sites, good trade links, and many inlets, harbors, and rivers.<sup>36</sup> Thus the geography of the Northeast, as well as a supportive federal government, offered a fertile context for the evolution from handicrafts to industrial manufacturing. And the opportunity did not go unexploited, due in part to the risk-taking inclinations of both Yankees and recent immigrants, an attitude that Thomas Cochrane has called "the optimistic, competitive temperament of American entrepreneurs."<sup>37</sup>

Early signs of mechanized production appeared in the late 18th century in a few Northeast towns, and these centers grew rapidly over the next decades. In general, urban growth was fostered by specialization of function and the multiplier effects of the urban-industrial economy. Once established, these urban centers tended to maintain their position in the urban hierarchy due to the inertial character of urban-industrial growth. An increase in manufacturing production or employment tended to result in increases in other industries, as well as in the service sector. As the effects of this increase were multiplied, towns reached new local or regional thresholds for additional economic activities. Moreover, crucial information feedback mechanisms existed whereby the intimate knowledge local businessmen, machinists, and other artisans had of manufacturing developments resulted in more informed business decisions, and increased the probability of local technological innovation.<sup>38</sup>



Improved interior transportation links facilitated the expansion of urban hinterlands and the specialization of functions therein. Canals, turnpikes, and steamboats reduced interior transportation costs and aided economic growth in several eastern cities.<sup>39</sup> This pattern is exemplified by New York City which rose to commercial prominence partly as a result of Erie Canal trade. As farmers gained easier access to urban markets, they devoted a greater proportion of their land to cash crops, and they were able to purchase more manufactured goods as a result. Urban population grew due to renewed European in-migration and the flow of young men and women to the industrial centers in search of new employment opportunities. After 1840 the spread of railroads linked Northeast industrial centers. Cheap transportation of products and the easy flow of information facilitated the continued concentration of manufacturing in these towns.<sup>40</sup> These railroad lines acted as "channels of interurban growth transmission."<sup>41</sup>

During the first decades of the 19th century a similar pattern of industrial development occurred in the Northwest (that is the area formerly known as the Northwest Territory), though on a smaller scale. Settlement of this region began in earnest after 1790 as migrants came down the Ohio River from the Mid-Atlantic states, and down the Cumberland and Kentucky Rivers from the southern states via the Cumberland Gap. Settlement moved north from the Ohio River into Ohio, Indiana, and Illinois. And in Ohio, settlement spread west from the Pennsylvania border along the National Road. After the opening of the Erie Canal in

1825, settlers from New York and New England moved in large numbers to northern Ohio, southern Michigan, northern Illinois, and Wisconsin. Cities emerged rather early in the Northwest; they were the leaders, or initiators, of local settlement.<sup>42</sup> These cities, such as Louisville, Cincinnati, Pittsburgh, Cleveland, and Detroit, acted as the manufacturing, trade and transportation centers for their local regions. Western industrialization was based primarily on the processing of primary products, and by 1860 it was well-established. Eleven Northwest and western states contributed 18.5 percent of the country's value added by manufacture in 1860, and roughly half of the total value added by the flour and meal, liquor, lumber, and meat packing industries.<sup>43</sup>

By mid-century many of the cities of the North had a strong industrial base,<sup>44</sup> and these cities were linked by an extensive railroad and telegraph system. Yet industries were slow to take advantage of new markets, and there was little inter-regional trade. Although local hinterlands had expanded into regional ones, and the industrial centers of each region were closely interlinked, inter-regional trade and regional economic specialization were still rather limited.<sup>45</sup>

Philadelphia, the major industrial center of this period, had grown to prominence as a result of enlarged local markets and occasional coastal trade.<sup>46</sup>

The major hindrance to the development of inter-regional trade was the nature of the transportation system. Although the railroad system appeared rather elaborate in 1860, most railroads

had been built to serve local rather than inter-regional transport needs. The most compelling evidence of this was the widespread disparity of railroad gauges in North America.<sup>47</sup> In 1860 the railroads of the Northeast, Canada West, the South, and the state of Ohio had different gauges. The railroads of Michigan, Indiana, Wisconsin, and Illinois had the same gauge as the Northeast (4' 8 1/2") but were separated from that region by Ohio and Canada West. In 1860 there were no rail links between Chicago (or Detroit) and the east coast that did not require transshipment twice. Moreover, in comparison to water-based transportation, railroad freight rates were quite high.

The Civil War had an enormous impact upon northern economic and industrial development. War production pushed economic growth to higher levels and industries mechanized in response to the growing scale of production and the shortage of labor. The logistics of military supply and transport emphasized the importance of a national railroad system and the problems of varying gauges. The Civil War marked a turning point in American regional economic development. Of course the Northeast and the Old Northwest were increasingly integrated during the 1840's and 1850's. Yet after the Civil War the scale of manufacturing had reached new levels, and many of the problems of inter-regional transport had been solved. The Northwest became, in essence, part of the expanding hinterland of the industrial Northeast. The same hinterland-urban center pattern that existed on a local scale before 1840, now emerged on a national scale. Regional growth in the West and South was largely dependent upon the

ability of those regions to supply primary products--food, minerals, and wood products--to the expanding industrial heartland.<sup>48</sup>

The growth of the Michigan lumber industry stemmed from this pattern of regional growth and industrial development. As America's eastern industrial centers expanded their hinterlands from local to regional to national scale, rising demand for lumber and other wood products in the industrial Northeast affected the location and timing of North American forest exploitation. White pine was the main product of 19th century lumbering. It occurred in the hemlock-white pine-northern hardwood forest region that reached from the Atlantic provinces west through the Great Lakes into northern Minnesota.<sup>49</sup> And the pattern of white pine exploitation evolved with changes in the economic and technological "frameworks" of 19th century development. Lewis Mumford has introduced the notion of "technics" or technological complexes as a means of conceptualizing the nature of these multifaceted changes. According to Mumford a technic is a phase or era of historical development characterized by a unique combination of power sources, tools, methods of production, social attitudes, spatial organization of production, intellectual trends, and construction materials.<sup>50</sup> Defined by their diagnostic construction materials and motive power sources the "Eotechnic", "Paleotechnic", and "Neotechnic" are respectively the wood, water-power, and wind complex, the coal, steam, and iron complex, and the electric, internal combustion engine, and alloy complex.

The first American regional economies based on lumbering emerged in Maine and New Brunswick after 1800 and were characteristically eotechnic.<sup>51</sup> Colonial lumbering was localized, part-time, and largely subsumed in the agricultural economy. In Maine and New Brunswick, after 1800, forest industries dominated regional economies and served external markets. These industries were characterized by small, seasonal operations. Logs were drawn by oxen over snow packed roads to the river bank. In the spring the logs were pushed into the rivers and the flood water was used to "drive" the logs downriver. Water-powered saw mills used a single saw held in a large, heavy "gate" or wooden frame. Cutting was slow and laborious. Though lumbering was pre-industrial (or eotechnic), the introduction of a wage labor economy into the forest and the lumber companies' dominance of land use affected the nature of life and landscape here, and reflected the relationship of these economies with distant industrial markets. Spread out along the north Atlantic coast, these industries grew in response to the demand for wood in the early industrial centers; New Brunswick produced thick planks (or "deals") and squared timbers for England, while Maine cut lumber for Boston and New York. Production peaked in these areas in the 1840's and by mid-century these economies were in decline.

As Maine declined, New York and Pennsylvania emerged as the major lumber producing states.<sup>52</sup> Lumbering occurred along the upper Susquehanna; Williamsport, and Albany, New York, were the largest wholesale lumber centers on the continent. In

New York lumbering flourished along the Hudson River-Lake Champlain corridor, and along the Mohawk River. Lumbering in these two Mid-Atlantic states was a product of expansion in the resource hinterlands of Philadelphia and New York, as well as the decline of Maine lumbering. As in Maine this was an eotechnic industry; similar lumbering techniques had evolved throughout the Northeast due to similar environmental conditions and the relatively stable technological context. In 1849 New York led Pennsylvania and Maine among American lumber producers. By 1859 Pennsylvania narrowly nudged out New York for the top spot; Michigan, having tripled its value of production in the last decade was third.

Canada West was drawn into the economic orbit of the United States in the 1840's and 1850's as Northeastern wheat and lumber demands reached west into what is now southern Ontario with the completion of the Erie, Richelieu, and Rideau Canals.<sup>53</sup> In 1854 reciprocity between the Canadas and the United States allowed the free movement of primary resources across the border. Railroads spread north from Lake Ontario into the pine forests. Lumber and wheat flowed south to Lake Ontario, across the lake to Oswego, and by canal to Albany, New York. By mid-century demand for lumber in eastern urban centers continued to grow and lumber wholesalers looked west to the Lake States.

Pennsylvania and New York remained important lumbering areas until the late 19th century, but the Lake States emerged as the dominant center of lumbering after 1870. With the decline of lumbering in Maine and Ontario, and the development of Great

Lakes shipping the resource hinterlands of the industrial Northeast spread farther west. Moreover, the spread of agricultural settlement into the treeless prairies marked the emergence of another significant market for lumber and wood products. Michigan, given its proximity to eastern markets, emerged as the dominant lumber producing state in the nation in 1869 (New York and Pennsylvania followed as the next largest). The saw mills of the east shore of the Lower Peninsula typically sent their product by schooner east to Buffalo, and then to Albany. Saw mills along Lake Michigan sent their product to Chicago, which had developed into a major lumber wholesale center by 1860. From Chicago, lumber was sent by rail into the plains. The upper Mississippi Valley was also an important center of lumbering in the Lake States.<sup>54</sup> Lumber from the Chippewa and St. Croix Rivers was rafted south along the Mississippi River to towns such as Davenport, Iowa, and St. Louis, Missouri, to be shipped west by rail.

After 1850 technological innovations in metallurgy, steam engine design, and steel manufacturing had a tremendous impact upon lumbering. In the Great Lakes, where commercial lumbering was just emerging, there were unlimited opportunities to experiment with new tools and techniques in a new environmental context. By 1880 the paleotechnic phase of lumbering was fully developed in the Lake States. In Michigan, where most of this complex originated, saw mills were enormous manufactories with crews of 150 men or more. Each step of the milling process was mechanized; circular saws and gang saws had replaced the solitary

up and down saw, and an array of finishing machines hurried the product through the mill. Though much of logging remained eotechnic--trees were felled by cross cut saws, cut into logs at the stump, and pulled a short distance by horses--railroads were widely used to haul logs in the forest. The extension of steam power deep into the bush transformed the scale of production, logging's seasonal rhythms, and extended logging far from the navigable streams. In the Lake States industrial technology had transformed the nature of milling and logging, and this in turn had a profound impact upon the use of the resource, the pattern of land ownership, and the resulting landscape.

In 1900 the three Lake States led all others in value of lumber production, but it was the end of the region's dominance. The lumbering frontier had moved both south and west. Louisiana and Mississippi were important, although not dominant, lumber states during the first decades of the twentieth century.<sup>55</sup>

To a large extent southern lumbering was an extension of the Lake States' technic, modified to suit the unique conditions of the South. The logging railroad and steam-powered log loaders of the Lake States evolved into the pull boats and cable skidding systems of the southern cypress swamps, and the steam-powered aerial yarding systems of the coastal plains. Lumbering in the south peaked in the 1930's.

The Pacific Northwest emerged as an important lumbering region in the late 19th century.<sup>56</sup> By 1906 Washington led all other states in lumber production, with Louisiana second. In the ensuing decades Oregon, California, and British Columbia



emerged as important lumber producers as well, and this region, due to modern forest management and its enormous resource endowment, has remained the dominant lumber region in North America during this century. The forests of the Pacific Coast presented enormous new challenges. Logging generally occurred in mountainous terrain, often on steep slopes. The landscape, the availability of water-based transport, the nature of the trees, and the distance from forest to market were all very different from those of the Lake States or the South. The trees of the coast were typically larger and more resinous than the white pine, cypress, and southern pine. Once again the lumber industry encountered a new, and rather different region, as new energy sources and transport technologies became available. During the 1920's a new era of lumbering emerged; this neotechnic phase gradually developed in these western states and British Columbia, and it was characterized by gasoline-powered cable yarding systems, log transport by truck, electric saw mills, and transcontinental lumber delivery by rail.

Thus the development of the white pine industry in Michigan occurred within the large context of national economic development and depended upon the comparative advantage of Michigan over other sources of wood products. Although the northern forests of Lower Michigan were barely broken by 1860 the state was firmly within the Northeast's "investment frontier."<sup>57</sup> After the land boom of the 1850's nearly all of the good pine land within a few miles of Michigan's major rivers was privately held. In the ensuing decades the forests

and mill towns of northern Lower Michigan would be increasingly integrated into a northern industrial economy. By the early 1870's large, well-capitalized saw mills emerged, made more efficient by additional saws and finishing machines. Lower Michigan mill towns were incorporated into the commercial and technological sphere of the Northeast. By the mid 1880's this sphere had been extended deep into the forest as a result of the spread of railroads into the northern forests. In particular, the use of light, temporary railroads to ferry logs from distant stands to the riverside banking grounds extended industrial technology within a few hundred yards of the stump. As paleotechnic lumbering developed in northern Lower Michigan during the late 19th century, the application of industrial technology and modern business methods produced a unique industrial complex in Michigan and the other Lake States. More than just tools and techniques, this complex comprised unique patterns of land ownership, resource use, marketing, and transportation, as well as a unique landscape.

Because rising demand for forest products in the industrial Northeast prompted the development of the Michigan white pine industry, theories of economic growth and models of historical development which stress the importance of external demand are both useful and appropriate in an investigation of the Michigan lumber economy. These views were first developed in studies of Canadian primary resource economies, and have been expanded and refined as a result of studies of modern resource

regions such as the Pacific Northwest and British Columbia.<sup>58</sup> Gilmour, in his study of the spatial organization of manufacturing in 19th century Ontario, notes that an export base theory is appropriate if a region is (1) export oriented, (2) suffers from no population pressure, (3) has no inhibiting traditions, and (4) developed in a context of capitalist institutions and a prevailing management policy of profit maximization.<sup>59</sup> The Michigan lumber industry clearly meets these criteria. A recognition of the importance of exogenous factors in the growth of northern Michigan provides an important theoretical base to this study. Of equal importance is the emphasis this gives to the geographic situation of northern Michigan.

Though external demand was important, the location of both demand and supply centers, as well as the available modes of transportation set the context for the Michigan lumber boom. The demand for lumber in the growing cities and treeless prairies was the key to the region's growth. Michigan, in the midst of the Great Lakes, was well-placed to supply this demand. Water transport was cheap and schooners delivered Michigan lumber to Chicago, Cleveland, and Tonawanda, New York, from May to November. Of equal importance, of course, was the depletion of white pine in Maine, New Brunswick, New York and Southern Ontario. The development of national transport, marketing, and communication systems fostered the growth of the Michigan lumber industry. As regional economic specialization emerged, Michigan (and the other Lake States) acted as the nation's woodlot.

The importance of inter-regional trade and the location (and movement) of production factors provides another framework for the study of regional growth. This view focuses on regional specialization and the changing location of resources, labor, and consumers.<sup>60</sup> The spread of agricultural settlement, the development of an inter-regional transportation system, the growth of eastern manufacturing, and the depletion of white pine in the Northeast did much to foster remarkable growth in the Michigan lumber industry.

The forces of modernization and industrialization which contributed to the enormous growth in manufacturing, the development of inter-regional transportation, and the spread of commercial agriculture also had a significant impact upon the nature of lumbering itself. The Michigan lumber industry, like most primary resource economies of North America, was essentially an extension of an eastern industrializing economy. Northern Michigan, and the other Great Lakes resource areas of this period, experienced an industrial transformation similar, in many respects, to that occurring in older settled areas of the Northeast. As an extension of a modernizing, industrializing nation, the Michigan lumber industry was itself transformed. As industrial technology and industrial capitalism transformed the Michigan lumber industry, the impact of lumbering upon patterns of land ownership and land use, the forest landscape, settlement patterns, and regional development changed. In short, an industrializing resource economy carved out an industrial landscape in northern Michigan.

The terms "industrialization" and "modernization" are used in a variety of ways in the literature. Modernization is generally used to refer to the broad transition between traditional and modern society, emphasizing the development of mass culture, the doctrines of rationalism and self-interest, urban society, democratic political ideals, the nation state, and the spread of literacy.<sup>61</sup> Industrialization is at times taken to be one aspect of modernization, that is the rationalization and specialization of production. Other definitions of industrialization point to sustained economic growth, and in particular the rapid rise in real personal income, as its crucial characteristic. The emergence of new energy sources (e.g. steam power in the 19th century) and rapid technological innovations in transportation and manufacturing are strongly linked to this rise in economic growth. In North America the transition from a local, agricultural, heterogeneous society to that which is national, primarily urban, and homogeneous occurred at the same time that steam power was being applied to manufacturing and transportation. The forces of modernism and industrialism were widely intertwined and inseparable.

In general, industrialization (or industrialism) will be used in these pages to refer specifically to the transformation of transportation and manufacturing due to the application of steam power and the resultant sustained economic growth. In a more general sense, however, these terms imply important developments in the organization of work, the use of resources,

and business management that are perhaps more correctly identified with modernization (e.g. increased division of labor) but which occurred in America at the same time and are thus associated with industrialization.<sup>62</sup>

Scholars have been intrigued with the nature of industrialism, especially in the last decade or so, partly because of the implications studies of industrialization have for our views of modern society. Put simply, the conclusion that the industrial revolution greatly changed the nature of life, society, and economy, bolsters the argument that the character of society is largely determined by the organization of production and the relationship of social groups to it. Research which concludes that the industrial revolution was a part of a larger on-going process that did not fundamentally alter the nature of life tends to undercut the historical materialist argument. Investigations of the transformation of 19th century life have provided us with a detailed view of the impact of industrialism upon the timing of work (it was formalized and routinized),<sup>63</sup> the family (it ceased to be the focus of economic life),<sup>64</sup> technology (it was labor-saving, and resource-wasting),<sup>65</sup> ideas of work (it was perceived as purifying, rewarding, creative, and socially responsible),<sup>66</sup> worker-employer relationships (they became increasingly antagonistic),<sup>67</sup> and morality (increasingly bourgeois).<sup>68</sup>

Little attention has been given to the geographical implications of these processes. Of course much of the above-mentioned research has touched upon regional development,

inter-regional trade, and resource use. Yet the impact of industrialism on patterns of land use and land ownership, the location and spatial organization of production, settlement patterns, and the environment have received little attention.<sup>69</sup> Recent research has stressed the ecological and land-use implications of evolving waves of settlement,<sup>70</sup> as well as the significance of industrial technology, capitalist management practices, and rationalization of production in primary resource industries.<sup>71</sup> Yet the geographical impact of industrialization has not been directly addressed, and a primary resource economy such as the Michigan white pine industry offers an intriguing opportunity to investigate this theme.

## Chapter 2

### LOGGING c. 1870

The burgeoning lumber economy of Lower Michigan slowed to a standstill following the Panic of 1857 and again as the Civil War began. The scarcity of capital and the failure of many "wildcat banks" led lumber concerns to cut back or suspend operations.<sup>1</sup> Yet the depression of 1861 was brief; Michigan's lumber industry flourished in the wake of wartime economic expansion. The spread of settlement into the prairies and the growing urbanization in the East resulted in a rising demand for forest products. Lumber prices nearly doubled between 1862 and 1865. By 1873, when a new depression swept the United States, Michigan had emerged as the largest lumber producer in the nation.

Michigan's lumber industry prospered within a rapidly evolving national context. Advancing technology and the development of national transportation and communications systems profoundly altered the character of American life in the late nineteenth century. During the Civil War inflated prices increased profits, and the scarcity of labor redoubled the move towards new, efficient, labor-saving machinery.<sup>2</sup> Reapers, mowers, gangplows, and other innovations were widely adopted by Northern farmers.<sup>3</sup> In Michigan important technological advances occurred in the steel, drug, and shoe industries during the war years. Increased demand for lumber, copper, and iron



encouraged the expansion and modernization of these industries.<sup>4</sup> Michigan sawmills embraced industrial technology and emerged as production centers of enormous capacity. Logging, however, continued to be a seasonal enterprise dependent upon winter weather, simple techniques, human labor, and animal power.

Yet there were clear signs of industrial capitalism in the forest by 1870. The scale of production had increased--indeed it had nearly doubled--since 1860. Forest production was rationalized, and each step of the production process had become more specialized. Capital requirements, though relatively small, were growing due to the increased cost of stumpage. A wage labor economy dominated the region and altered the traditional agrarian rhythms of family and farm. Finally, nearly all of the pine land of northern Michigan was sold (or granted) by the federal and state governments in a market that was overwhelmingly dominated directly and indirectly by Eastern capitalists. Though the nature of work in the forest was preindustrial, the impact of industrial capitalism on the land market and production levels presaged the spread of steam power into the forest during the next decades.

## PATTERNS OF LAND OWNERSHIP

Innovative federal land policies continued through the 1860's, and millions of acres of Michigan land became available at low prices and on liberal terms. Two important initiatives passed by Congress in 1862 contributed to a rush for Michigan pine lands. The Homestead Act provided for the free transfer of 160 acres of land to individuals who lived on the land for five years and made minimal improvements. The Morrill Act was designed to establish state agricultural colleges. It granted each state 30,000 acres of federal land for each member of its congressional delegation. Because surveyed federal land was not available in all states, many states were given scrip to locate federal land elsewhere. Moreover, federal land policies of the 1850's also contributed to the widespread availability of cheap land during the next decade. Military land entitlements had been extended to an increasingly large group of people and these "Military Benefit Warrants" were made assignable.<sup>5</sup> Finally, the federal government granted the state an enormous amount of land during the 1850's to support internal improvements.

Between 1850 and 1870 roughly half of the land area of Michigan was sold or granted by the federal government. In 1850 25.4 million acres of Michigan's land area (70% of a total 36.5 million acres), remained in federal hands. Most of the 11 million alienated acres had been purchased during the 1830's by the thousands of settlers who came west to southern Michigan via the Erie Canal and little land had been sold during the next

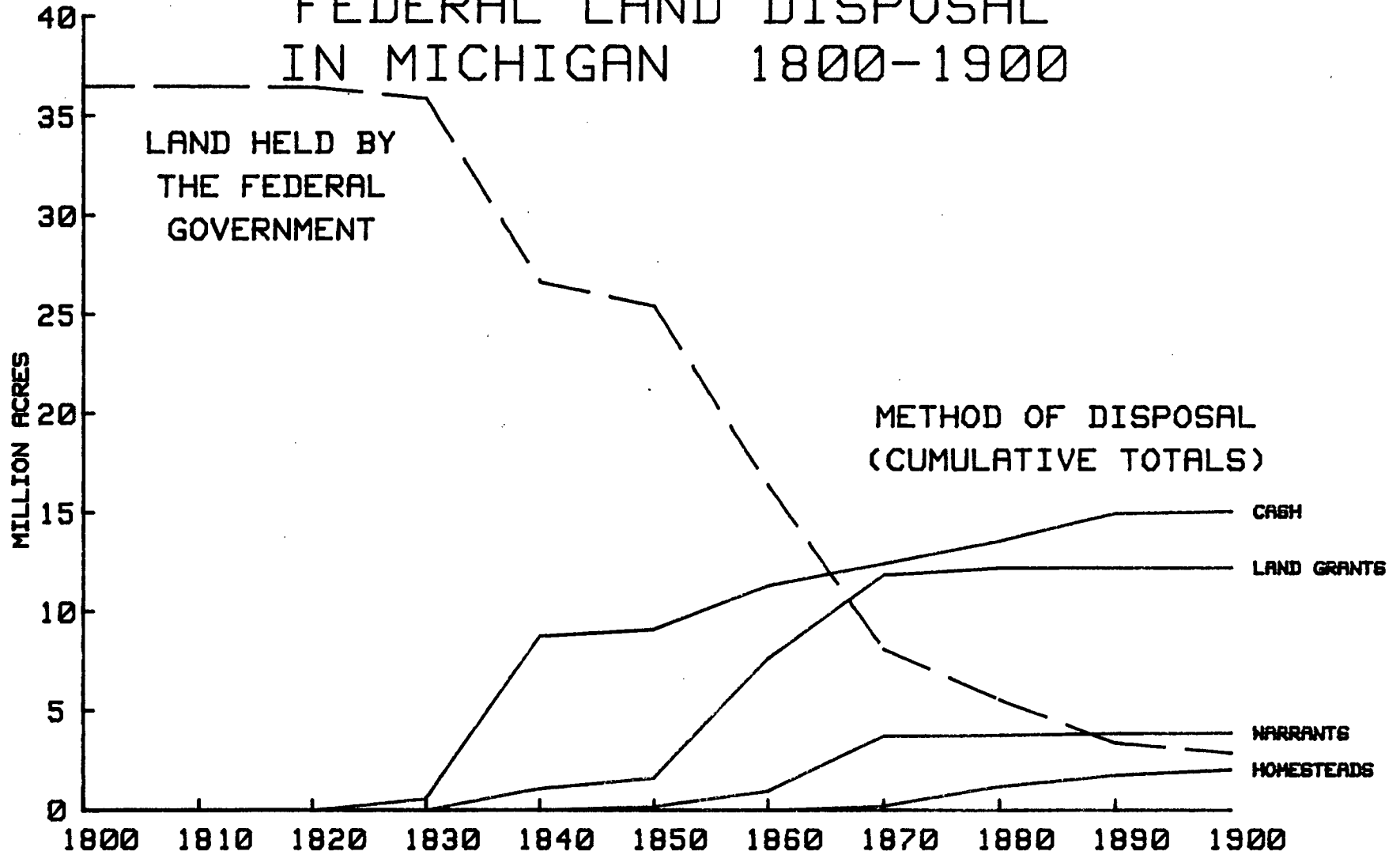
decade. In 1870 only 8.1 million acres remained in federal title. Almost half of the state's total acreage was alienated from federal ownership in 20 years.<sup>6</sup>

Federal land grants were the largest single method of alienation between 1850 and 1870 (Figure 6). Congress granted land to the state of Michigan to aid the construction of 9 railroad lines, three of which ran through the pine regions of northern Lower Michigan. For each route the state chartered a railroad company from competing groups of investors. These companies typically sub-contracted the actual construction and received their land subsidies from the federal government after the state certified that the line was officially open.<sup>7</sup> In all, the state received 3.1 million acres of railroad grants, roughly 2.4 million acres of which were located in northern Lower Michigan.<sup>8</sup> In 1852 Congress granted a 750,000 acre subsidy to the State of Michigan for the construction of a canal at Sault Ste. Marie, and in 1853 and 1854 the newly sanctioned canal company located nearly 500,000 acres of northern Michigan pine land.<sup>9</sup> A final federal land grant consisted of all the land described as wet or swampy in the original federal survey. These "swamp lands" were given to the state to support local improvements and totaled 5.8 million acres. Roughly half of these "swamp lands" were paid to surveyors and contractors for road construction, and 1.7 million acres were granted to aid the construction of more railroads in the state.<sup>10</sup>

Military warrants were the second largest method of land alienation between 1850 and 1870. They were used to acquire 3.6

FIGURE 6

# FEDERAL LAND DISPOSAL IN MICHIGAN 1800-1900



Source: Greffenius, 'Michigan Public Land Policy,' pp. 180,220.

million acres during this period. Cash sales, though down considerably, were still an important method of acquisition; 3.3 million acres were sold in this manner between 1850 and 1870. The continued importance of cash was due largely to the Graduation Act (1854), which progressively reduced the price of unsold land,<sup>11</sup> and to the government's acceptance of "greenbacks" at face value.<sup>12</sup> Agricultural scrip was also widely used during the 1860's; 1.4 million acres of federal land in Michigan were located with scrip.<sup>13</sup> Fewer than 200,000 acres were patented under the Homestead Act by 1870, although initial entries which were never fulfilled removed far more land from the market.<sup>14</sup> In sum, an enormous amount of land left federal hands in the years after 1850. A large amount was granted directly to the state, and nearly equal amounts were purchased with cash and warrants.

Michigan land was available from a variety of sources during the 1860's and many methods of payment could be used. Prices were often lower than the standing federal price of \$1.25 per acre and the terms more attractive than full payment in cash. Though settlers in southern Lower Michigan availed themselves of many of the attractive methods of land purchase, pine land speculators and lumbermen used the innovative land programs and policies to dominate the northern Michigan land market. Many of these new policies were designed to aid agricultural settlement, but they were used by speculators to purchase enormous tracts of pine land at lower prices and on more liberal terms than \$1.25

per acre cash.<sup>15</sup> Land speculation was common in the American Northwest, but it was particularly heated in northern Lower Michigan where nearly all the pine land left federal hands between 1850 and 1870. By mid-century much of southern Michigan was settled; thus the railroad and canal grants, the Graduation and Homestead Acts, the swampland grant, and the agricultural college grants all focused attention upon northern Michigan. For example, the state's own grant of 240,000 acres for a Michigan agricultural college was located in northern Lower Michigan, much of it along the upper Manistee and the Au Sable rivers.<sup>16</sup> Agents for the state and the land grant companies were well aware of the potential value of isolated northern pine land. The purchasing power of land speculators was greatly enhanced by the new land policies, and they, as well as the land grant companies, the state government, and the lumber concerns, scrambled to acquire the best pine land.

Land grant railroads offered large parcels of pine land for sale at attractive terms. Michigan's land grant railroads received 50 percent of the land within six miles of their routes in alternate congressional survey sections. If this land had already been purchased, the railroad company was entitled to choose equal quantities of land up to 15 or 20 miles back from its route. The land grant railroads contributed to the growing pine land boom by introducing the prospect of future access to isolated northern timberland, and by removing much of this land from the market.<sup>17</sup> Although the railroads generally sold

their land for more per acre than the government they offered much better terms.<sup>18</sup> In the early 1870's, for example, the Grand Rapids and Indiana Railroad sold tens of thousands of acres of pine land at \$4.00 to \$10.00 per acre. They required 25 percent of the price down in cash and the balance in 5 to 10 annual installments at 7 percent interest.<sup>19</sup> On such terms single lumber companies were often able to secure numerous nearby sections.

The St. Mary's Falls Ship Canal Company sold much of its 500,000 acres of pine land at public auction in September 1863. This was a direct appeal to speculators. For example, the Canal Company divided its land into 744 large land groups, each of which consisted of a single, large parcel or a number of nearby parcels. The auction catalogue listed the stumpage value of each group according to a complex formula that considered timber quality and distance to a driveable stream, and it gave each group's timber scale down to the last foot.<sup>20</sup> Of the 87 Canal land groups in the Muskegon River Valley, the average group was 727 acres, or larger than a square mile, and had a minimum price of \$3.08 per acre. The terms of sale were quite liberal. All purchasers were required to pay the amount above the minimum selling price immediately after the auction in cash. The general public (that is, non-stockholders) was required to pay 50 percent of the remainder in cash, and the balance in one year at 7 percent, in cash or company bonds. Ship Canal Company stockholders, however, were able to pay 27 percent in cash or

company bonds within 30 days, and the remainder in company stock at par.<sup>21</sup> These terms were much better than cash, and favored the stockholders, many of whom were speculators.<sup>22</sup>

Pine land speculators and lumber concerns were also able to use agricultural scrip and military warrants to their advantage. Agricultural scrip granted under the Morrill Act could not be used by states to purchase land.<sup>23</sup> Thus speculators were able to purchase scrip representing millions of acres from a dozen or so eastern states at the low rate of 50 to 55 cents per acre.<sup>24</sup> Among the lumbermen who took advantage of these provisions, Henry Sage and John McGraw for example purchased roughly 75,000 acres in the Lower Peninsula primarily with scrip which cost them 55 to 60 cents an acre.<sup>25</sup> Settlers had little interest in scrip due to the passage of the Homestead Act, and a few land speculators soon controlled the national scrip market.<sup>26</sup> Military warrants, on the other hand, were issued over many years in small amounts to thousands of people, from all over the country. Thus it was more difficult for a few people to corner the warrant market. As a consequence warrant prices, at roughly \$1.00 per acre, were typically higher than the cost of agricultural scrip.<sup>27</sup> Overall however, warrants were the most important source of land for speculators and lumbermen in Michigan, due perhaps to their wider availability. Barbara Benson's survey of federal land sales between 1818 and 1870 tallied the purchases of 320 known speculators, lumbermen, and lumber firms in 147 townships in



Lower Michigan's timber district.<sup>28</sup> Agricultural scrip was used to acquire only 13 percent of the more than 304,000 acres purchased; 25 percent was sold for cash; the remainder was acquired with warrants. Eber Ward and Francis Palms, both large timberland owners, purchased roughly 65 percent of their land with warrants. Benson found that some land owners used warrants for up to 90 percent of their land.<sup>29</sup>

A more detailed picture of the costs, timing, and patterns of timberland sales is provided by the land purchases of two prominent lumber concerns, Hannah, Lay and Company, and Delos A. Blodgett. A large lumbering and merchandising enterprise based in Traverse City, Michigan and Chicago, Illinois Hannah, Lay and Company purchased over 44,000 Michigan acres between 1851 and 1886. During the 1850's they purchased land from the federal government and the St. Mary's Falls Ship Canal Company. In the 1860's and 1870's the Company relied upon a variety of sources, but after 1880 their land came from private individuals and the land grant railroads. Overall, Hannah, Lay & Co. purchased more land from the federal government with military warrants than from any other source, private, state, or federal (Table III). Private sources were the second largest, followed by the land grant companies, which were the largest source of land if taken together. Warrants lowered the cost of federal land, and the other sources of land typically offered attractive terms with payments spread over many years. Hannah, Lay & Co. did not use cash or agricultural scrip to purchase federal land.<sup>30</sup>

Table III

LAND PURCHASES OF HANNAH, LAY & COMPANY  
(1851-1886)

SOURCE	ACRES	% OF TOTAL
FEDERAL		
Military Warrants	13,774	30.7
PRIVATE SOURCES		
Warranty Deeds	9,651	21.5
Quit Claim Deeds	515	1.5
LAND GRANT COMPANIES		
Grand Rapids and Indiana Railroad	7,095	15.8
St. Mary's Ship Canal Company	7,039	15.7
STATE & LOCAL GOVERNMENT		
Tax Sales	4,495	10.0
Swampland	1,085	2.4
School Land	680	1.5
Sheriff Sales	464	1.0
	44,798	

Source: Wolfe, "Hannah, Lay and Company," p. 51, fn #1.

Delos A. Blodgett was a prominent Muskegon River Lumberman who came to Michigan in 1848 and steadily accumulated pine land over the next 25 years. The scale and organization of his lumbering activities suggest that Blodgett is representative of the few score or so large lumber concerns in Michigan in the 1870's.<sup>31</sup> Blodgett's first land purchases were from the federal government for cash. He bought small parcels and paid the government's standard rate: \$1.25 an acre cash for a minimum of forty acres. By 1857 Blodgett had acquired over 3000 acres of land, the great majority of which had come from the federal government. His purchases were limited to the middle range of the Muskegon River, from northern Mecosta County through Osceola County to northern Clare County. He owned small scattered parcels along the Muskegon River in nine townships. Nearly all of his land was within a mile or so of the Muskegon River.<sup>32</sup>

Blodgett's purchases slowed after the Panic of 1857, but after 1862 Blodgett increased his land holdings using a variety of methods. He began to acquire land in large tracts and his purchases were located further up the Muskegon River and its larger tributaries. By 1873 Blodgett's pine land holdings stretched across the north central part of the state, but they were concentrated along the Clam River in Wexford and Missaukee Counties, and along the Muskegon River in northern Clare County. Here he held 13,660 acres, about one-fifth of the land area in the three townships (Frost, Lake, and Haring) in which his holdings were concentrated. Like Hannay, Lay & Company, Blodgett relied initially on purchases from the federal government, but

his purchases diversified in the 1860's, with an emphasis on the economical warrants (Table IV). In 1857 nearly 80 percent of Blodgett's land had been purchased with cash, in 1873 only 5 percent of his holdings in Frost, Lake, and Haring townships were cash purchases. These three townships were largely alienated from federal ownership during the 1860's, and fifty-six per cent of Blodgett's purchases here were made with warrants,<sup>33</sup> while scrip was used to acquire roughly 26 percent.

Blodgett's land holdings along the Clam River in Haring and Lake Townships were large, concentrated tracts (Figures 7 and 8), and they exemplify the pattern of pine land ownership in northern Lower Michigan.<sup>34</sup> Michigan lumbermen sought concentrated pine lands for a number of reasons. The scale of logging was steadily growing; lumbermen wanted to keep a close watch on their land because of the threat of fire and theft; and lumber concerns found it advantageous to build farms and warehouses to serve their camps in a local area. Blodgett's purchases also illustrate the general trend of pine land purchases occurring further north and inland. Pine land had been cruised and purchased throughout northern Michigan after 1850,<sup>35</sup> yet at that time speculators were interested in only the very best or "cork" pine which was found in small scattered stands.<sup>36</sup> By the late 1860's the so called "sap" pine was in demand, and previously ignored timberland was being purchased. David Ward wrote later in life about his experience as a timber cruiser during the 1850's:

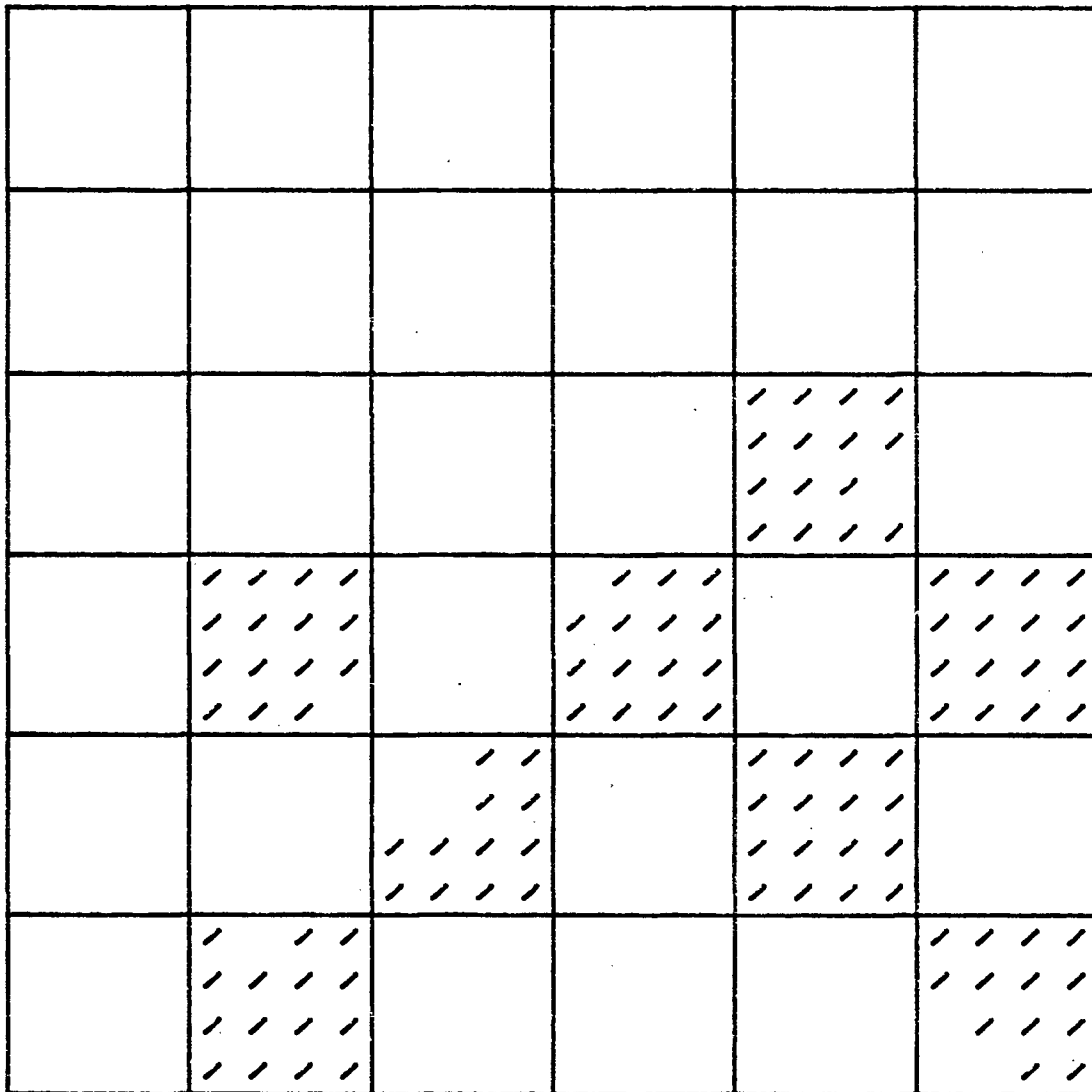
Table IV

LAND OWNERSHIP BY DELOS A. BLODGETT 1873  
 BY METHOD OF PURCHASE  
 (TOTAL ACRES IN 3 SELECTED TOWNSHIPS)

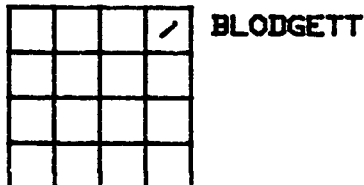
	FROST -----	LAKE -----	HARING -----	PERCENT
FEDERAL				
Warrants	1200	1369	5080	56%
Scrip	700	2872	0	26%
Cash	599	80	40	5%
STATE	1320	0	0	10%
PRIVATE	400	0	0	3%
	-----			
TOTAL	4220	4321	5120	

Source: Blodgett Land Books V. I & II, Michigan-California Lumber Company Collection; U.S. Land Office Tract Books.

FIGURE 7  
BLODGETT LAND OWNERSHIP  
IN HARING TOWNSHIP - 1873  
(WEXFORD COUNTY T22N R9W)

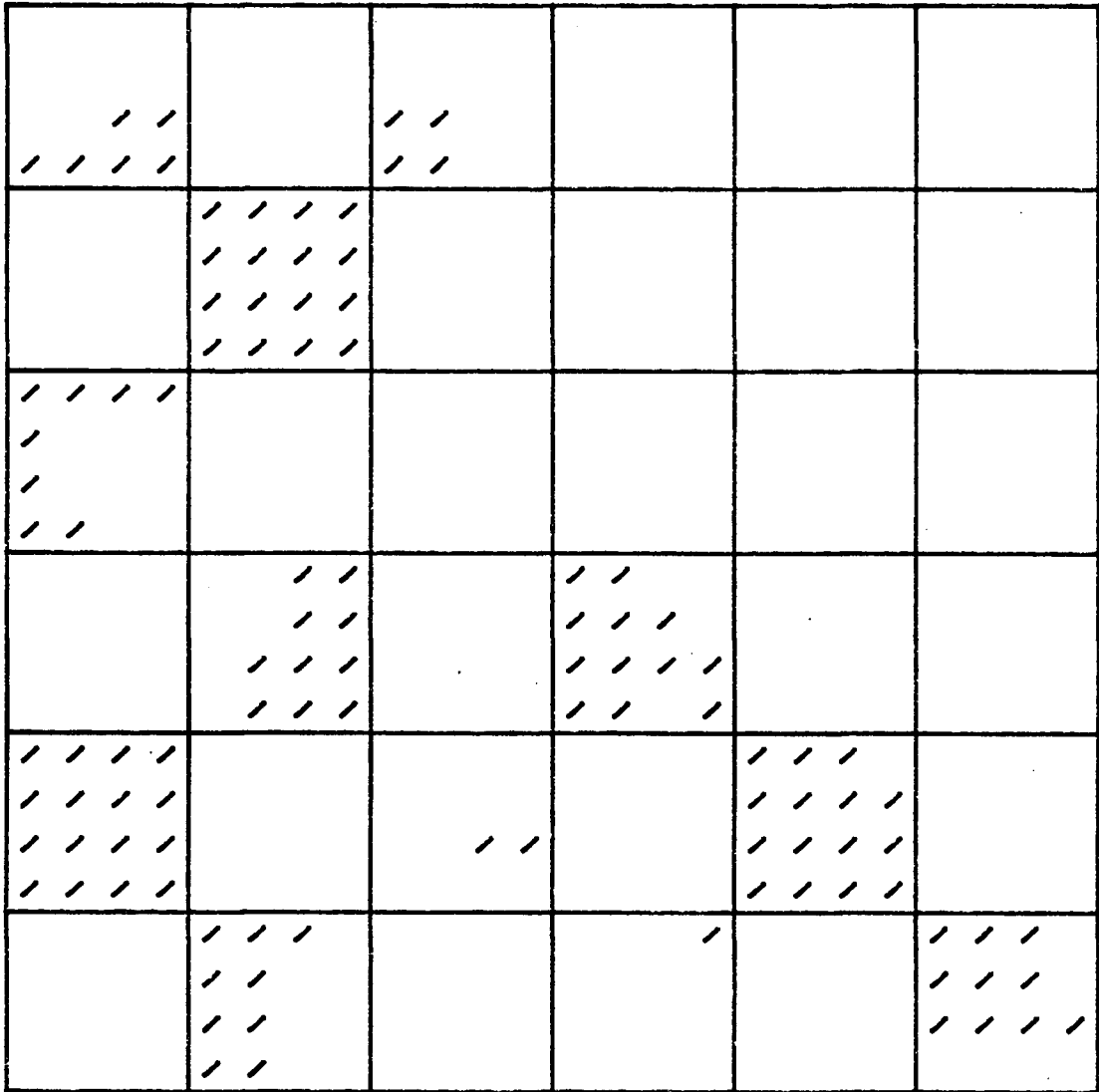


ONE MILE

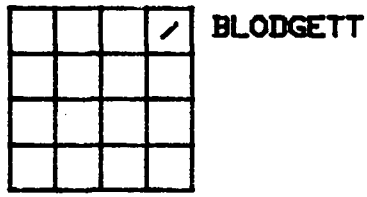


OWNERSHIP SHOWN BY 40 ACRE PARCEL

FIGURE 8  
BLODGETT LAND OWNERSHIP  
IN LAKE TOWNSHIP - 1873  
(MISSAUKEE COUNTY T22N R8W)



ONE MILE



OWNERSHIP SHOWN BY 40 ACRE PARCEL

. . . my patrons would only purchase cork and good bull sap pine. Let me say here that ninety-nine one-hundredths of the pine timber originally in Michigan was sap and Norway pine, but mostly sap, and the cork pine was generally in scattered patches, not large in extent, and usually located toward the head waters of the various pine timber streams. If I had been permitted to have also selected sap pine, I could have easily chosen hundreds of thousands of acres, usually in large bodies, which were afterwards located by other parties not so particular, and which were eventually worth more money per acre than the cork pine I did select on account of the comparatively large amount of sap pine on a lot.<sup>37</sup>

By the early 1870's speculators were purchasing second class pine land in large tracts many miles from drivable streams.

The price of timberland varied greatly according to timber quality and location, but in general prices began to rise sharply about 1870. In the early 1870's cork pine near a major stream brought the highest prices, roughly \$15 to \$25 (or even, occasionally, \$50) per acre. Sap pine three miles or more from a drivable stream might be worth as little as \$3 per acre.<sup>38</sup>

Larger parcels, on which the quality of timber varied and within which accessibility differed, generally sold for intermediate prices. The Flint and Pere Marquette Railroad received roughly \$8.09 per acre for the sale of its lands in the early 1870's.<sup>39</sup> Hackley and McGordon of Muskegon offered Erastus Corning \$13 per acre for a former Canal Company parcel, with one-fourth down, and the balance over three years with interest.<sup>40</sup>

During the 1860's pine land sold quickly and lumbermen and speculators scrambled to secure as much land as possible. In this situation access to credit was of fundamental importance.



Lumbermen invested their last dollar in pine land and then borrowed more. Delos A. Blodgett borrowed thousands of dollars to purchase land from the federal government, and he bought more land on credit from the Jackson, Lansing, and Saginaw Railroad.<sup>41</sup> Market prices for pine land rose quickly after 1870. Many lumbermen had eastern commercial links, but if David Ward is representative, credit was available to poor young men who displayed a shrewd eye for the lumber business.<sup>42</sup>

Eastern capitalists avidly sought investment opportunities in western primary industry.<sup>43</sup> The railroad and canal companies were owned and run by eastern capitalists who were attracted by the generous grants of land.<sup>44</sup> For example, The state awarded the Sault Ste. Marie canal grant to a group of eastern businessmen, which included Erastus Corning of Albany, New York, and John Murray Forbes of Boston. The latter was also a central figure in the Michigan Central Railroad.<sup>45</sup> If they lacked expertise, loaning money to knowledgeable young men like Ward or Blodgett may have been attractive to eastern businessmen, especially if they retained a lien on the pine land.

Opportunity was also an important factor in the acquisition of pine land. Young men like Delos A. Blodgett who moved to the pineries in the late forties found themselves well-placed to locate and enter prime timberland. Eastern capitalists such as Henry Sage, who had been involved in the lumber business in New York and Ontario, brought their experience and wealth to Michigan at about the same time. Initially, men with both opportunity and credit were able to acquire large concentrated holdings of

land in northern Michigan. The outcome was soon clear. In 1872 the Lumberman's Gazette noted:

. . . the traffic in pine lands is now being reduced to a thorough system, the largest and most valuable tracts centering into the hands of capitalists, who, after a year or two of slaughter, now going on, will be able to control the market, . . . .

Ultimately the size and concentration of these holdings would decisively affect both development of Michigan's lumber industry and its impact upon the forest and the landscape of the northern part of the state.

#### TECHNOLOGY OF RESOURCE EXPLOITATION

Michigan loggers had improved upon traditional lumbering methods adopted from Maine and New Brunswick, yet logging remained a simple, small-scale activity, shaped by a preindustrial (or eotechnic) technology.<sup>47</sup> The cost of overland transport limited logging to pine stands within a mile or so of navigable rivers. Successful exploitation of the forests required favorable winter and spring weather. Furthermore, the scarcity of capital, especially cash, and the lengthy period (10 to 12 months) between initial logging and the final sale of lumber put lumbermen in a precarious financial situation if the weather was unfavorable. Despite such important innovations as the use of saws in felling and the use of sleighs

to transport logs from skidway to river, logging remained a simple, seasonal, small-scale enterprise.

Michigan felling crews commonly comprised two sawyers and an axman. After the latter had notched the tree, the sawyers felled the pine by sawing opposite the notch and a little above it. They then cut, or "bucked", the tree into logs while the axman limbed it. Trees were selected for cutting by the camp foreman or by the senior sawyer of the cutting crew. Michigan sawyers used wedges to keep the tree from binding on their saws and crude mallets to drive the wedges. Measuring poles were made in camp to aid the cutting of logs to prescribed lengths (Figure 9).<sup>48</sup>

Logging crews used cross-cut saws with newly developed raker teeth and removable handles. Raker teeth removed the sawdust from the kerf and reduced binding, fostering the replacement of the ax in felling. These saws had detachable handles that made repairs easier and aided in the removal of a saw if the tree began to bind or if wedges had been used.<sup>49</sup> Raker teeth, removable handles, and the use of cross-cut saws in felling all facilitated cutting; the work proceeded more quickly and with smaller crews than in operations depending upon more primitive saws or the ax.<sup>50</sup> Though previous research has suggested that the use of the cross-cut saw in felling did not begin in the Lake States until the mid-1870's, it is clear from the diary of Joseph Proctor—a jobber along the Flat River during the early 1870's—that they were used earlier.<sup>51</sup> Joseph Proctor's cutting crews varied from 2 to 5 men depending upon the



A cutting crew at work.

Source: Burton Historical Collection, Detroit Public Library.

terrain, weather, and quality of the timber, but three-man crews were the norm.<sup>52</sup>

Once felled and bucked, the logs were skidded to a nearby collection point, or skidway, from whence they were hauled to the river. Skidding was the work of the teamster and his oxen. They were assisted by one or more swampers who cut and cleared crude roads through the forest to the skidway and perhaps by a chainman, who helped chain the log to the skidding sled. Cutting and skidding operations were often integrated; a teamster might routinely skid the logs felled by a specific gang of sawyers. Thus logging crews characteristically comprised 6 or 7 men: 2 sawyers, one ax man, one or two swampers, a chainman or sled tender, and a teamster.<sup>53</sup>

Logs were first pulled free of the tree limbs and brush by the ox team with the aid of a swamp hook. This large iron hook could be pounded into the end of a log and a chain attached to it. One end of the log was then rolled onto a small sled called a dray or log boat.<sup>54</sup> These small sleds, termed bob-sleds in Maine,<sup>55</sup> were designed to support the leading end of a log. They were made by hand in camp and consisted of two short, stubby runners with a heavy bunk or cross timber. The trend was to larger sleds that could handle more than one log. Cant hooks were used to roll the logs onto the dray with the help of the ox team and chain. A cant hook had a relatively short wooden handle with an adjustable iron hook attached near one end. This was the common tool used to handle logs in the early 1870's. Logs were then skidded up to 2000 feet to a skidway.

Oxen provided the motive power for skidding. They were powerful creatures that were widely available on the frontier. Moreover, they were relatively cheap, at roughly \$85 per head.<sup>56</sup> Logs were usually skidded from stump to skidway by a single ox team of two oxen, or one yoke. Skidding was most efficient on frozen ground with a little snow, but these conditions were not mandatory. Hummocky terrain, common in glaciated Michigan, slowed skidding and necessitated more swamping. In December of 1871, at the end of a poor day of skidding, Proctor explained that "It was very poor place to get the logs out. Each team had two swampers."<sup>57</sup> Mud and deep snow were also troublesome. At the skidway logs were piled, often five or ten tiers high, on a log foundation using inclined poles, cant hooks, and a horse or ox team. Here they began to accumulate in the fall and early winter before sleighing got under way. Later in the season logs might be transferred directly from dray to sleigh.

From the skidway logs were hauled by sleigh along a prepared road to the rollway at the river's edge. In the 1870's a typical haul was roughly one mile; a haul of two miles was considered long.<sup>58</sup> The use of skidways as secondary collection points, and of sleighs to transport logs to the riverbank was the first major Lake State logging innovation. As logging extended farther and farther from the river banks the enormous Michigan white pines, which were often 150 feet tall, were simply too large and too heavy to be skidded directly to the river. A partial solution was to buck the trees at the stump;

still it was not efficient to skid each log over a mile to the river. After various experiments the skidway and sleigh-hauling system became common in the Lake States. The dominance of dimensional lumber in the Michigan market, as opposed to the thick planks ("deals") and the squared tree trunks ("ton timber") of the Northeast, facilitated this development. As a rule, Michigan logs were cut into lumber by local mills, and thus loggers did not devalue their logs by cutting them into lengths of 16 to 20 feet. Moreover, the sleighs were more efficient because they could carry more than one log at a time and because they could be hauled faster, and with less effort, over well-groomed roads.<sup>59</sup>

Logs were loaded onto sleighs at the skidway using the "cross haul" method. A cross haul was a runway perpendicular to the logging road, on the opposite side of the road from the piled logs. A team of horses moved up and down the cross haul pulling the logs onto the sleigh with chains. Two chains were anchored to the sleigh and ran towards the logs on the ground. Here each chain was looped around the end of a log using a cant hook. The chain then led back to the sleigh, over it, and attached to the horse team in the cross haul. As the team moved up the cross haul and away from the sleigh the logs rolled up a log incline onto the bed of the sleigh. The loaders could use a cant hook to slow one end of the log so that it would roll up evenly. A typical loading team consisted of three men: two loaders with cant hooks, and the top loader; the teamster also played an important role. The top loader commanded the operation from the

top of the sleigh, communicating with the teamster and loaders.

Early sleighs were small, and they were fashioned in the woods. At first, they were simply two sets of bobs chained together, but their design was refined with time. By 1870 sleigh bunks were perhaps 6 to 8 feet wide, and mounted on iron shod runners. Chains were used to secure the load to the sleigh and to prevent any shifting of the logs. Small saplings were used as binding poles to take slack out of the chain. The size of the loads were small, 700 to 1000 feet, or 3 to 5 logs.<sup>60</sup> Yet there were exceptions: an 1872 issue of the Lumberman's Gazette described a load of 10 logs measuring 7,686 feet which was hauled by a single team 1 1/2 miles in Wexford County.<sup>61</sup> Loads of this size became commonplace in the 1880's, but they were certainly extraordinary at this time. Good white pine logs weigh roughly six to eight thousand pounds per thousand board feet ("MBF" or simply M). Thus an average load might have weighed 3 tons.<sup>62</sup> Logging sleighs were pulled by horses, which were more expensive (roughly \$200 each) and less common than oxen.<sup>63</sup>

Logging roads were more elaborate routes than the crude pathways cleared for skidding. Oxen were used to pull stumps and to grade the terrain. Logging roads were laid out as far as possible with gentle downhill grades to minimize the work required once the sleigh was moving. The rollways were located at the river, and thus downhill routes were easily found. Indeed, sleighs often had to be slowed or restrained in some way when the gradients were too steep or too long. Sand or straw



might be put on the road; "snubbers"--ropes or chains wrapped around sleigh runners--were also used.<sup>64</sup>

Log hauling was a late-season activity. Logging roads were cut and graded early in the fall, and log cutting and skidding proceeded through November. But the conditions necessary for the construction and maintenance of good logging roads--freezing temperatures and an accumulation of snow--did not usually occur until mid-December. Snow was often collected in the forest and deposited on the road to build a good base and to limit the impact of daytime thaws. After a large snowfall, snowplows of the simple V-type were used to keep the logging roads clear. All logs had to be hauled before the spring thaw, when the logging roads began to melt away. Warm temperatures could terminate hauling or limit the size of sleigh loads. A January thaw disrupted operations and might ruin a lumber concern. In the early 1870's bad hauling weather continually plagued logging operations.<sup>65</sup> Proctor commented upon the problems in his own camp at this time:

Thawing yet  
they are not drawing  
logs yet & wont  
till it freezes up.<sup>66</sup>

The teamsters say  
that the road is  
geting very poor  
they cant draw  
logs much longer  
if it dont freeze  
harder.<sup>67</sup>

The construction and maintenance of logging roads became increasingly important as the distance between stump and river grew. Of course better roads allowed horse teams to pull larger loads.

At the banking ground or rollway, sleighs were unloaded, and the logs were put into large piles on the river ice or on the river bank. Bankside rollways were constructed in a manner similar to cross haul loading, and they rose a half-dozen or so tiers high. By design there were key logs that would release the logs into the river. Logs left in the river course, however, were often left akimbo.

#### LAND YIELD

With improved methods Michigan lumber concerns cut more of the forest. Average log size and average yield per acre are both useful statistics to indicate the intensity of logging and the quality of the forest. Average log size is usually expressed in terms of "logs per M" or the number of logs needed to produce 1000 board feet of lumber. Yield may be expressed as M/acre or 1000's of board feet per acre. In general, both logs/M and M/acre gradually increased between 1860 and 1900. Loggers were progressively less selective, that is they cut smaller and smaller trees, and thus the logs/M measure grew (and average log size declined). As loggers moved into the northern interior, the forests were of equal, or perhaps higher, quality than those of the south. As a result, yield per acre continued to grow as well, because loggers were simply taking more of the forest. If forest quality declined in the north, we would expect higher logs/M, but lower (or stable) yields per acre.<sup>68</sup>

Log size and yields changed significantly during the 1860's. In 1860 an average log ran roughly 2/M, while 11 M was

cut from an average acre. At this time the average parcel size was rather small, roughly 80 acres. Yields ranged widely (roughly 5 M to 15 M per acre) because small tracts are more likely to show extreme variations. Yet by 1870, 4 logs/M was the standard, while 13 to 15 M/acre was the average yield. Log size did vary of course; Delos A. Blodgett sold Hackley and Sons the total output of three of his camps in 1870/71, which averaged 5.34 logs/M, and a Blodgett & Byrne sale of two years later averaged 3.53 logs/M. Yet Joseph Proctor's 1871/72 camp of 1.2 million feet averaged 4.2 logs/M, and other Blodgett sales to Hackley and Sons ran 3.95 and 4.01 logs/M.<sup>69</sup>

In sum, four logs per M was the standard in the early 1870's, and 13 to 15 M per acre was cut on good parcels. In J. Proctor's Flat River Camp one forty acre parcel averaged 13.4 M/acre; this quarter-quarter section yielded 2316 logs, which ran 4.3 logs/M. On another parcel Proctor appears to have cut 19 M/acre.<sup>70</sup> On the other hand, Proctor cut three parcels with much lower M/acre figures. Assuming 4 logs per M, these parcels (2 forties and 1 eighty) had M/acre values of 9.6, 6.3, and 3.0; Proctor complained of rotten and poor timber on these tracts.<sup>71</sup> Thus, poorer stands yielded 6 to 9 M/acre, and high quality stands yielded perhaps 19 or 20 M per acre. The average log was half the size of the 1860 average, and the number of feet per acre had increased by roughly 25 percent. Though the yield per acre was increasing, the average log was still of moderate size (that is, not as small as it would become during the next decades), suggesting that the lumber concerns cut only

the mature trees and left small or poor quality white pine.<sup>72</sup>

Logging was fundamentally a simple, seasonal activity. New methods and tools had been developed, yet their effectiveness depended upon human labor, animal power, and favorable weather. Logging was limited to a few months each year due to its complete dependence upon winter weather. Both skidding and hauling required consistent, below freezing temperatures and moderate snow cover for efficient operation. Loggers used the seasons to their advantage, but unseasonal weather proved disruptive. Though the sawmills of this time had felt the impact of industrial technology, logging remained an enterprise of men with hand tools, straining oxen, and weather-induced bankruptcy.

#### THE SCALE AND ORGANIZATION OF PRODUCTION

Although logging was a simple, seasonal activity there were clear signs of its growing modernization as a commercial enterprise. The enormous growth of sawmill capacity had put great pressure upon logging operations to supply more sawlogs. The scale of logging was growing rapidly--average production per camp in 1870 was double that of a decade earlier--and lumber concerns supervised many more camps each season. The productivity of logging crews grew as new innovations, such as the crosscut saw, speeded operations. Another sign of the growing maturity of the lumber industry was the specialization of its stages of production. Mill men purchased a larger proportion

of logs from independent loggers, or they contracted the cutting of their own stumpage to a "jobber." In this way mill men relieved themselves of the problems of supervising distant, unpredictable logging operations. Furthermore, in the larger camps each step of forest production was rationalized and specialized.

Individual logging camps contained as few as five or six men, and as many as sixty. Large lumber concerns operated as many as 20 logging camps and generated a total seasonal cut of 10 to 15 million feet or more. Production in individual logging camps ranged from a few thousand feet to 5 or 6 million feet. Small independent loggers were often enterprising farmers who spent the winter logging their own wood lot, or bootstrap loggers who purchased 80 acres, cut and sold the pine, and then repeated the process the next year. The large sawmills relied upon small operators to bolster their log supply. In 1871 Hackley and McGordon purchased an average of 1.2 million feet from eight operators along Tamarack Creek, a tributary of the Muskegon.<sup>73</sup> On the other hand, the Lumberman's Gazette reported that Delos A. Blodgett had 6 camps in 1872-3 and expected to cut 16 million feet.<sup>74</sup> A modal camp of this period had 20 or 25 men and a seasonal output of 2 million feet, compared to the typical camp of 1860 which had 12 men and cut .8 million feet.<sup>75</sup>

Joseph Proctor's Flat River Camps were of an average size and provide useful illustration of the productivity and seasonality of logging c. 1870.<sup>76</sup> In his 1870/71 camp Joseph

Proctor was responsible for the cutting, bucking, and limbing of trees. During a six-week period in the fall of 1871 Proctor's crew varied between 4 and 7 men, and they cut a total of 2880 logs, for an average of 80 logs per day or 13 logs per man/day. Later, additional loggers joined Proctor, and his crews increased their productivity; an average of 15 logs were cut, bucked, and limbed per man/day during the entire season. Yet these average figures include men who were involved, at times, in other work.<sup>77</sup> Specific production figures for Proctor's cutting crews are available for two dozen days, during which the average yield was 19.1 logs per man/day.<sup>78</sup> On one of these days, January 28, nine men cut 210 logs--the seasonal high--for an average of 23 logs per man. Whenever Proctor expressed approval of a day's work the level of productivity was much the same (Table V). But there were bad days too. On January 5th, when six men had cut 90 logs, Proctor recorded "our days work was rather poor."<sup>79</sup>

In sum, Proctor's camp averaged 15 logs cut, bucked, and limbed per man/day, if we consider a seasonal average of all camp labor. An average 3-man cutting crew cut about 18 logs per man/day under unexceptional conditions. Occasionally, when conditions were favorable or when skilled sawyers were at work, a crew's production was pushed as high as 25 logs per man/day. Camp productivity in 1870 far exceeded that of a decade earlier, perhaps by 30 percent.<sup>80</sup> In skidding, Proctor's teamsters averaged about 45 logs skidded per team/day, or a little less than the average daily output of a cutting crew. Proctor

Table V

## PEAK PRODUCTIVITY IN PROCTOR'S 1870/71 CAMP

		LOGS	# MEN	LOGS PER MAN/DAY
16 November	"First rate days work"	100	4	25
3 December	"I think they done well"	135	6	22
6 December	"that is doing well"	60	3	20
3 March	"good days work"	73	3	24.3

Source: Proctor Diaries, Joseph Proctor Collection.

contracted to skid, as well as fell, logs on his 1871/72 job. During a two week period in October 1871 a single skidding team (i.e., teamster, swamper, and yoke of oxen) skidded 44.6 logs per day. During these two weeks the cutting crews averaged 18.1 logs per man/day.<sup>81</sup> Proctor added another teamster in November, and two skidding teams became the common practice in his camp. Between October 18 and December 29 a half dozen or so men worked as teamsters; Proctor shuffled his own crew and hired new workers in search of good, reliable teamsters. These men skidded a total of 3813 logs, for an average of 43.3 logs per day. Walt Willet and Wat Howe, both teamsters for Proctor, skidded the bulk of this period and averaged 41.3 and 48.2 logs per day respectively. The more skillful teamsters had daily rates of roughly 50 logs per day. Under exceptional conditions 70 or 75 logs were skidded per day. Indeed, Wat Howe skidded 60 logs on one day in January without the aid of a swamper.<sup>82</sup>

Much less is known of log hauling rates. The fluctuating weather conditions greatly affected the speed of hauling and the size of sleigh loads. Sleighs carried roughly 1000 feet at this time, and a modal camp had roughly 10 to 15 horses. If the hauling season was roughly half the length of the cutting season, daily hauling totals would have been much higher than (perhaps double) the daily cutting output.

A logging season was roughly 110 work days, or four months, and ran from early November until early March. Depending on the weather and the interest of the operator, logging could be drawn out on both ends of the season. In Proctor's 1870/71 camp



the cutting began on November 9 and hauling terminated on March 20, a season of 116 working days. On April 11 the rollways were broken. Table VI illustrates the seasonality of activities during the 1871/72 season in Proctor's Flat River camp. By late February all logging had stopped due to an early thaw.

Logging subseasons reflected the changing conditions from autumn through winter to spring. Cutting and bucking began early but were slowed by deep snow and frozen timber. Though skidding was aided by frozen ground, it too was hindered by deep snow. Sleigh hauling began late in the season and continued until the spring thaw damaged the logging roads. In Proctor's camp there was little change in the number of men active in each phase of logging. More men were hired when hauling began, and he had as many men cutting in late February as he did in November. Yet in most camps men were shifted to new jobs as skidding and then hauling conditions improved.

#### LOGGING COSTS AND CONTRACTS

The cost of logging in 1870 is difficult to document, though it is clear that it increased through the 1860's. The cost of stumpage and labor had begun to rise sharply towards the end of that decade. In 1870 sawmills paid roughly \$6.75 per M for sawlogs; this price included stumpage, logging, driving, and delivery to millpond. Mills paid roughly \$3 to \$4.50 for sawlogs in 1860.<sup>83</sup> Though costs spiraled, profits kept pace. From 1862 until the Panic of 1873 lumbering was an enormously profitable enterprise.<sup>84</sup> Lumber concerns that acquired pine

Table VI

## J. PROCTOR'S 1871/72 LOGGING SEASON

OCT				NOV				DEC				JAN				FEB				MAR			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
.....CUTTING.....																							
.....SKIDDING.....																							
.....HAULING.....																							

Source: Proctor Diaries, Joseph Proctor Collection.

land for 55 cents an acre (or less) reaped large profits as the demand for pine lumber grew unceasingly for over a decade. Many lumber companies had paid as little as a few cents per M for their stumpage; by 1870 the average value of stumpage was estimated at \$.75 to \$2.50 per M.<sup>85</sup>

The capital requirements of logging were not small, but many first-time logging concerns were able to avoid, or at least reduce, them. An initial investment of roughly \$2500 was required for a modal operation, most of which was tied up in horses and oxen. One hundred and sixty acres of pine land could cost as much as \$1700 on the open market. Yet these figures are clearly the high end of a range, for many loggers would have had access to cheap stumpage, and many loggers borrowed (or hired) horses and oxen from local farms, or they hired teamsters who had their own teams. Moreover, when a mill company contracted with another outfit to cut its logs the company might provide the contractor, or "jobber", with all the required equipment and animals. And, despite the large expense of operating a camp, the owner of the logs (or the company that had agreed to purchase them) typically extended monthly payments to the independent logger or jobber. Of course a jobber's profit was not large, but a successful season or two as a jobber might be parlayed into an independent operation. Joseph Proctor, for example, was a subcontractor in 1870/71--he supervised the cutting, bucking, and skidding--and he earned a profit of roughly \$500, after having fed and housed his large family for the season. Proctor's profit was roughly equal to the annual average income at this

time.<sup>86</sup>

Logging remained an easy entry field because Michigan mill men were increasingly reluctant to engage in logging operations. The capital requirements of sawmilling were soaring, and it was difficult and time-consuming to supervise distant logging camps. The unpredictability of logging--an enterprise whose fortunes changed with the weather--further influenced the decision of many mill men to purchase logs from independent loggers or to hire jobbers. A large sawmill of the early 1870's produced roughly 10 million feet of lumber a year. To supervise the logging of ten million feet was an enormous task in and of itself, and for a mill man in a distant mill town it was often impossible. Contract logging allowed a mill concern to benefit from the rapidly increasing stumpage values, and it freed them from the headache of supervising the actual logging. Logging contracts passed the risks inherent in logging onto the jobber or independent.<sup>87</sup>

While there were reports of contract logging on a large scale, most jobbing contracts were for 1 or 2 million feet. Logging contracts usually required the logs to be delivered to the river by a specific date. Periodic reports of camp production were sent during the season to both parties by the camp scaler. The sawmill concerns made monthly payments to the jobber as long as logging proceeded on schedule. Despite the extension of credit, the jobber or independent did not receive his last payment until late summer, or even the next fall. In the case of Allen Macomber's contract with Hackley and McGordon,

for example, Macomber received roughly \$750 each month beginning in September 1871. Yet he did not receive his final payment of nearly \$1450 until September 1872.<sup>88</sup>

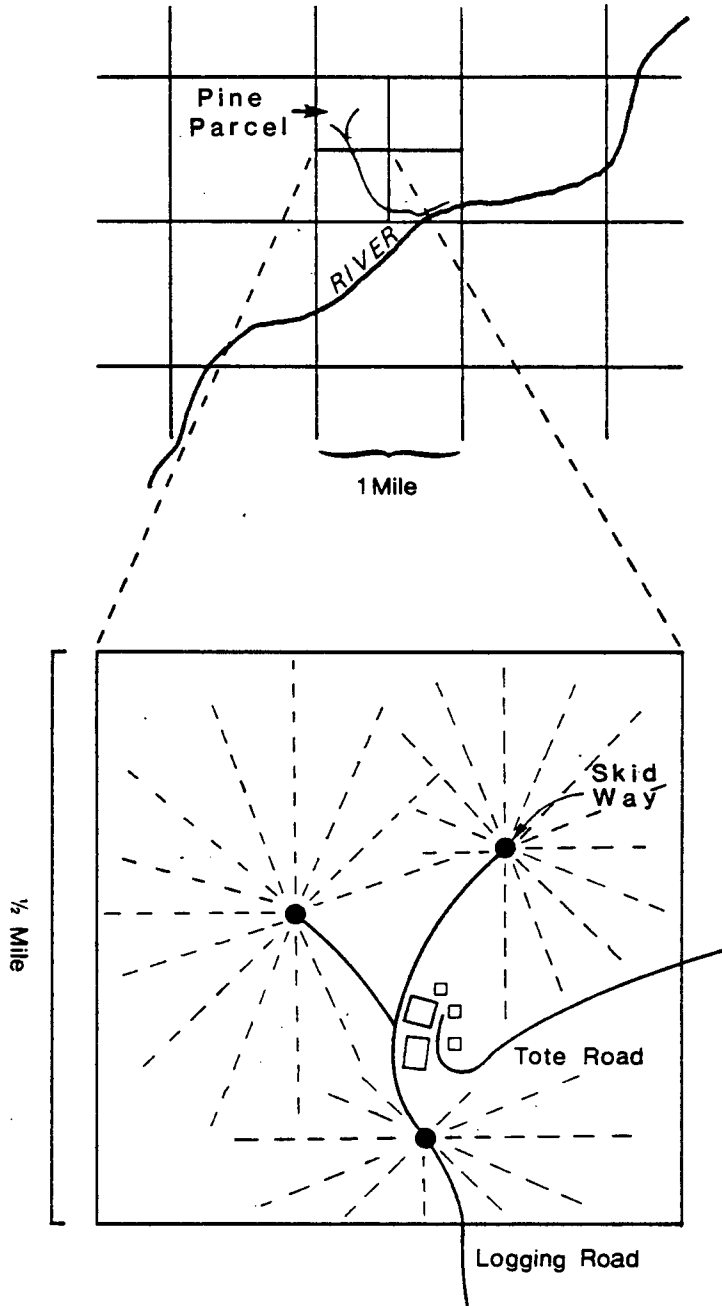
Credit was crucial to this system. Mill concerns were agreeable to extending credit if it removed them from the larger risks of logging. Contract logging was attractive to jobbers and independents because it required a small, often minimal, investment. Furthermore, the emergence of centralized river drives severed mill owners from distant logging operations. By 1860 logging, driving, and milling had become distinct stages of production, and in the next decade these stages emerged as separate spheres of business.

#### A MODAL LOGGING OPERATION

The characteristic organization of production in Michigan logging at 1870 can be represented by reference to a hypothetical modal operation. Such a camp was located on a 160 acre parcel of white pine roughly one mile from a drivable stream (Figure 10). The camp cut roughly 8000 logs, for a total scale of 2 million feet, over a season of roughly four months, or about 100 work days. The logs ran four to the M, or about 250 feet each, and 12,500 feet were cut per acre. Two three-man cutting teams felled and bucked about 100 logs a day. Two teamsters, each with a swamper and a yoke of oxen skidded the logs less than 2000 feet to a skidway. Each teamster skidded roughly 50 logs per day. At the skidway the logs were piled high by the loading crew to await transport to the river (Figure 11).

Figure 10

# Logging Camp Location c. 1870



# ORGANIZATION OF LOGGING PRODUCTION c. 1870

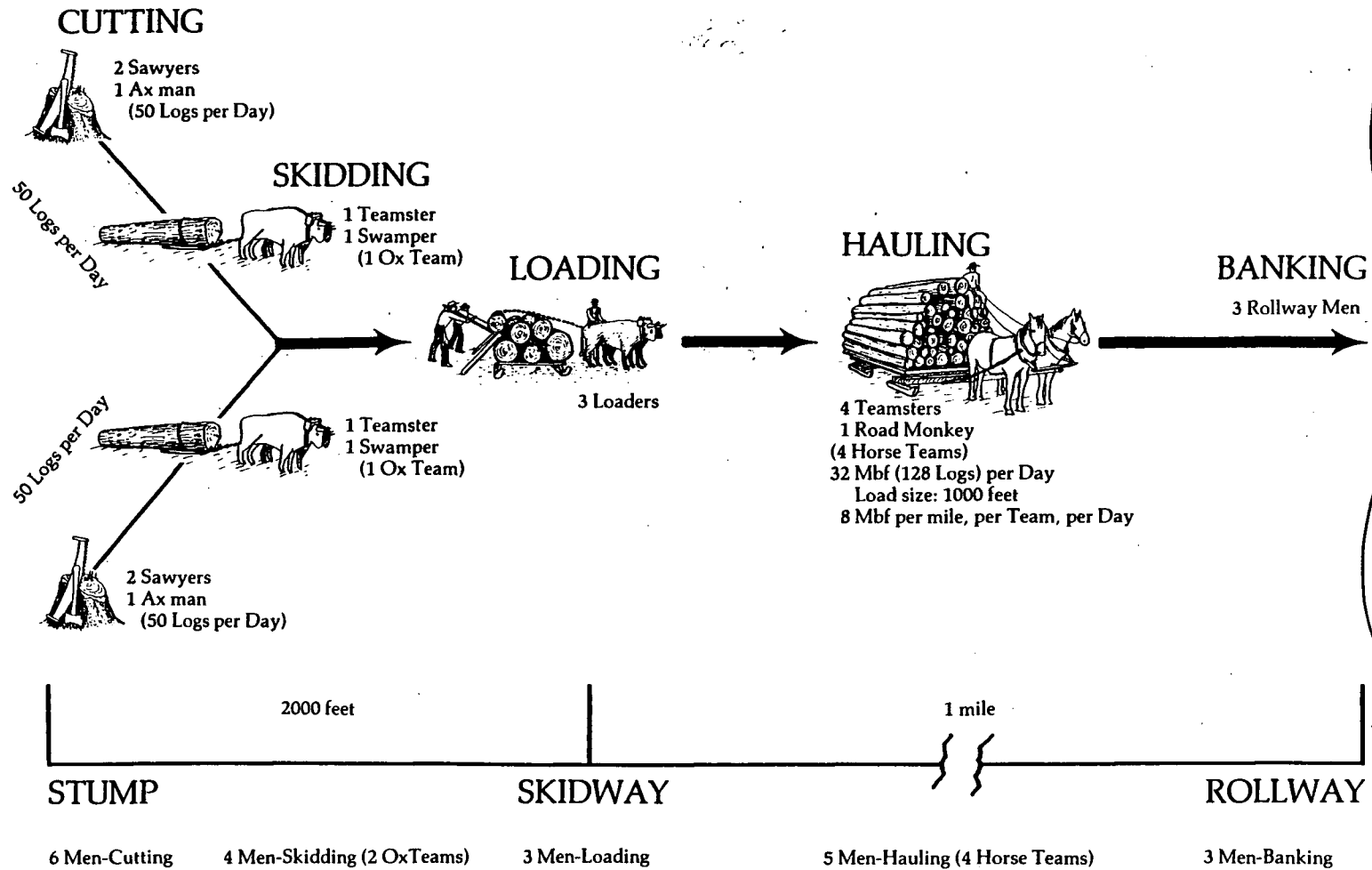


Figure 11

Log hauling did not begin until midseason because it required slick, frozen roads. The hauling season was about 10 weeks, or 60 work days. During this time four horse teams made an average of eight hauls a day to the banking grounds, a distance of about one mile. With an average load of 1000 feet the four teams moved roughly 32,000 feet each day, and nearly 2 million feet over the ten week hauling season. At the rollway three men unloaded the logs and piled them along the river to await the spring drive. Each horse team was used to load and unload the sleigh that it hauled. There were 21 men, 2 ox teams, and 4 horse teams actively engaged in logging. Including the cook, the cook's helper ("the cookee"), a carpenter-blacksmith, and the foreman, the total number of men was 25. Forest production was rationalized, and each stage became more specialized in response to the growing capacity of downriver mills.

#### LOGGING AND THE NORTHERN MICHIGAN LANDSCAPE

Logging had a limited impact on the landscape of Michigan during the 1860's. Although operations had spread deep into the northern interior, thousands of square miles of land remained untouched by ax and saw. Logging was limited to within a mile of the largest rivers, and cutting was selective: only the mature white and red (or "Norway") pines were logged. Furthermore, the logging camps were small, ephemeral settlements that were



abandoned each spring.

Fire was a more effective agent of landscape change, especially during the grave drought of the early 1870's. Fires were started by lightning, locomotives, or the careless burning of fields; they were often fed by logging slash. Tens of thousands of acres were burned, and thousands of people were left homeless in the early 1870's.<sup>89</sup> In October 1871, a number of Michigan communities, such as Manistee and Holland, and a large part of the "Thumb" area of Michigan were burned as fire swept through the slash from decades of logging.<sup>90</sup> In 1874 over 400 million feet of pine burned in Clare County's Lincoln and Freeman Townships.<sup>91</sup> These fires transformed parts of the Michigan landscape into charred wastelands, and they killed much valuable timber. They were less the result of logging practices than the consequence of a succession of dry summers and the increased presence of man.

#### LOGGING CAMPS

Logging camps were commonly situated in the center of pine land parcels. To minimize the travel required by both men and beasts they were located along a logging road and linked to a nearby village by a "tote road", perhaps 10 to 40 miles long (Figure 10). By 1870 the single shanty camp had given way to logging camps of five or six shanties, each of which had a specialized use. The men's shanty, the cook's shanty, and the barn were the largest, and the most common, camp structures. There were often an office, where the foreman and the scaler

slept, a blacksmith shop, a carpenter's shanty, and a hay barn.<sup>92</sup> The availability of water was an important consideration in the selection of a camp site. A well was dug if a stream or pond was not nearby.<sup>93</sup>

Shanties were log buildings. The men's and the cook's shanties were roughly 30 feet by 50 feet with thick plank floors and cedar shake roofs. There were a few windows, a large door, and the walls were commonly 5 or 6 feet in height. Generally a large, iron stove had replaced the open fire place or "caboose". Light was provided by kerosene lanterns hung from the bunks and rafters.<sup>94</sup> Though post-bellum camps provided greater comfort and protection against the elements than their counterparts of 1860, costs were kept to a minimum. Camps were built with materials that were cheap and at hand.

Michigan logging camps were easily constructed each fall, and then abandoned the following spring. Five or six shanties could be built in a week or two by a small crew of men. Joseph Proctor spent roughly 45 man/days in the fall of 1871 building a camp that comprised a shanty for 20 men, a stable, a hay barn, and a shanty for his family.<sup>95</sup> After the spring thaw the logging camps were abandoned: the stoves, tools and supplies were removed; the lumber was stripped from the shanties; and the camps were left to rot or burn. After a few years little evidence remained. The ephemeral nature of logging camps and the selective cutting of the forest minimized the impact of logging on the landscape of northern Michigan.

## SETTLEMENT

Though the direct impact of logging on the landscape was slight, the lumber industry had a profound effect upon the development of northern Lower Michigan. Railroad systems expanded, settlement spread, and local service centers emerged in response to, or in anticipation of, the unfolding of the logging frontier. Though the termini of the land grant railroads had been specified by Congress, the routes of these roads and their many branches were influenced by mill concerns and pineland owners.<sup>96</sup> In many areas of southern Michigan logging had been the first step in clearing the forest, and by 1870 many former lumber counties such as Kent, Montcalm, Genesee, and Sanilac were devoted to agriculture. As railroads expanded into northern Michigan in the early 1870's, agricultural settlement again followed the expanding lumber industry.

Michigan was primarily an agricultural state in 1870, and many of Michigan's shanty boys were farmers and farmers' sons. The population of Michigan consisted primarily of people who had migrated west from Upper Canada and from the American Northeast in search of cheap, arable land.<sup>97</sup> Despite the large numbers of "professional lumber workers" in Michigan--most of whom had come from Maine, the Canadas, and New Brunswick--roughly half of the labor required for winter logging was drawn from the farms of Michigan, Ohio, Indiana, and Ontario.<sup>98</sup> For example, Joseph Proctor's 1871 diary listed the addresses of four members of his crew. Geo. Lewis and Orange Tingley were from Williams County, Ohio, and Elias Fender and Geo. Felty were from Barry County in

southern Michigan.<sup>99</sup> "The great majority" of David Ward's shanty boys, according to his son Willis, were farmers' sons from the southern Michigan county of Oakland.<sup>100</sup> Clearing land was not an uncommon activity for farmers; they were often skilled in the handling of horses and oxen and in the use of ax and saw. Furthermore, there was a convenient, seasonal relationship between winter logging and spring-summer farming. The lumber economy supported local agriculture by providing a market for goods and by renting local horses and oxen. And, most importantly, the camps offered the farmers cash wages for their labor.

Logging wages rose dramatically between 1862 and 1873. Fitzmaurice, a former Saginaw journalist, recalled that wages in the woods were \$35 to \$45 per month in the early 1870's.<sup>101</sup> Wages were less, about \$1.06 a day in Proctor's Flat River camp in 1870,<sup>102</sup> but this was a small jobber's camp that probably represented the lower end of the wage range. In contrast, Michigan farm laborers earned an average of \$16.91 per month (with board) in 1870, and \$46 was the average in the Upper Peninsula copper mines.<sup>103</sup> After a season of work in a Michigan camp a shanty boy might have accumulated \$100 to \$200 in back pay.<sup>104</sup> The cook, scaler, and foreman, as well as skilled workers such as a top loader, might earn twice this amount. Wages dropped after the Panic of 1873; Proctor reported that men were offering to work in the woods for \$15.00 a month.<sup>105</sup> Delos A. Blodgett reduced wages in his camps to a range of \$20 to \$26 per month.<sup>106</sup> Wages had roughly doubled

during the Civil War decade, reaching heights that would not be repeated until the 20th century.

For Michigan farmers work was an important part of an agrarian ethos that stressed family, farm, and, for some at least, God.<sup>107</sup> The lumber economy greatly aided the expansion of the agricultural frontier and aided settlers in the acquisition and maintenance of farms. Yet the economy of northern Michigan was tied directly to the fortunes of the lumber industry. As the logging frontier moved slowly north, economic decline often followed in its wake. Moreover, the wage labor economy fundamentally undermined agrarian life. The focus of economic life was removed from the family farm and even from the local community. As both father and son found it profitable to be away from the farm for extended periods, the family ceased to be the focus of life.

John Vogel and Joseph Proctor illustrate this case. John Vogel came to the United States from the Netherlands in 1847, settling near Holland, Michigan.<sup>108</sup> Vogel enlisted in the Union army at the outbreak of the Civil War and, at its close, used his accumulated pay to bring his parents and sister to Michigan. Land was scarce in the Dutch settlements in Ottawa County. In October 1868, after lengthy discussion in the Dutch community, John Vogel led a handful of settlers north into Missaukee County, where they became the county's first white settlers. Vogel recounted later in life:

We built log shanties on our homestead property, planted some potatoes and corn and were happy. On Sundays we met and

read sermons and passages from the Bible and sang psalms. During the following fall my wife's parents and my own parents followed us and so our settlement grew.<sup>108</sup>

Vogel Center was found in 1869 by members of the Dutch Reformed Church in an attempt to recreate a Dutch agricultural community in the New World wilderness. Yet poor soil and a short growing season hindered their efforts. Many of the homesteaders worked in the winter logging camps.<sup>110</sup> At various times Vogel operated a small store, a farm, and a logging outfit. His attempts at lumbering consisted of purchasing a small pine tract, logging it, and then selling the logs to Muskegon mills. As a lumberman Vogel lost money as often as he earned it. His occasional profits aided his agricultural and retailing efforts. Yet in the end Vogel moved with his family to Muskegon. "Northern Michigan being too far north for profitable farming I eventually changed my residence," wrote Vogel many years later.<sup>111</sup> The profits from logging offered some, but not enough, support for Vogel's attempt to farm in a marginal area.

In contrast, Joseph Proctor benefitted from his involvement in the Michigan white pine industry. Proctor's parents had moved west from Vermont, via Upper Canada, to Ionia County, Michigan.<sup>112</sup> In 1855 Joseph Proctor, age 21, married the daughter of a neighboring farmer. That year Joseph and Mary Proctor moved north onto a forty acre parcel in Montcalm County.

Years of hardship and deprivation followed. Everything was high priced and no work to be had. But there were the pine forests all around us. Like many others we commenced to make pine shingles, by riving them with a frow, and shaving

them with a draw shave.<sup>113</sup>

A few years later Proctor moved onto a larger parcel where he built a "little board house."<sup>114</sup> Proctor recalled, years later, "I was now out of debt and ready to begin on a new farm."<sup>115</sup> As the sole provider for his large family, now grown to seven, Proctor was fearful of the successive military drafts during the Civil War, and he eventually sold his farm and moved in an attempt to avoid being drafted. Proctor spent the next twelve years struggling to support his family and seeking another farm. For a few years he worked in small, local sawmills as a head sawyer. "It is an up hill business to be poor and not own 40 acres of land," wrote Proctor at this time.<sup>116</sup>

Joseph Proctor was a hard worker, dedicated to his family and his goal of a family farm. He was anxious to work. "I am sick of this idleness," Proctor once wrote when he was between jobs.<sup>117</sup> And at another time, when a mill closed where he was employed:

So I am set adrift with  
nothing to do and a large  
family to support but I am  
not going to give up yet.<sup>118</sup>

When Proctor received his first logging contract he was quite pleased at having a home for his family and a steady job.

I like my  
 business first  
 rate. It is  
 some satisfaction to  
 know that we  
 have a home for  
 the winter &  
 my work all around  
 me.

In the spring of 1872 Proctor was hired by Delos A. Blodgett to run the latter's sawmill in Hersey and to act as foreman and scaler in his camps. Proctor worked for Blodgett for eight years, and with his steady income and a little credit from Blodgett he was soon able to acquire a farm in the Hersey area. The happiness and security that Proctor gained with the acquisition of his farm is evident throughout his diaries, for example:

At home reading  
 and looking about the farm  
 Everything is growing finely  
 . . .  
 It seems pleasant to  
 be all together  
 and at home. 120

Proctor was able to support his family and purchase a farm by working hard and by following the logging frontier north.

Despite the aid Proctor received from the lumber industry in acquiring his farm, the lumber economy undermined the very ideal he sought. Drawn north by job offers, he settled in an area of low agricultural potential. Though Proctor's farm soon began to produce food, it could not support his family of nine. Even if



his farm had been successful, its output would have paled in contrast to the wages Joseph and his sons were able to command in the camps and mills of northern Michigan. During the 1872/73 logging season Proctor worked as a camp foreman and he was paid \$60 a month, for a seasonal total of \$304.60. The preceding summer he worked in a sawmill as head sawyer for \$4.00 a day, earning a total of \$611. Proctor's four sons, aged 11 to 15, also worked in the mill, contributing \$224 to the total family income of \$1139.60 for the year.<sup>121</sup> This was more than twice the average annual (nonfarm) income at this time.<sup>122</sup>

The wage labor economy removed the focus of economic life from the farm for many northern Michigan settlers. Furthermore, these tempting wages kept men away from home for months at a time and threatened the strength and cohesiveness of the family unit. As Joseph Proctor struggled to raise money for a farm, he bid on logging contracts and, at times, took his family with him into the forest for the winter season. Yet after he acquired his farm, Proctor and his sons were often away from home. He was inclined to farm in the summer and work in the camps, away from his family, each winter. Moreover, it was difficult for Proctor to pass up lucrative employment in the local sawmills during the spring-summer mill season. The Proctor males were often absent from home, at work in the camps and mills of the region.<sup>123</sup>

In April 1877 Proctor recorded:

Sunday at home. Our family are all together to day. The first time since the <sup>124</sup>first of September last and a happy gathering it is too.

The wage economy subverted the role of the family as the traditional focus of rural life, and it also undermined those values typically associated with the family. Joseph wrote to his wife, Mary:

I wrote to the boys in Hersey. I am afraid they will go to that saloon for the mill boys are in the habit of going there. I wish you would talk to them and find <sup>125</sup>out if they do go there. I hope they wont be drawn to it.

At work in a distant mill, Proctor's sons were outside the sphere of their parents' discipline and guidance.

The agrarian ideal seems to have been held by many people in the lumber industry. Often lumbermen, such as Delos A. Blodgett, Josiah Littlefield, and E.L. Pratt, had large farms where they lived and engaged in "scientific" agriculture. These men were often leaders in the state and county agricultural societies. Other, less successful, men were able to acquire their own farms in Michigan due to the prosperity of the regional lumber economy and the high wages paid by the industry. As the logging frontier moved north, however, settlers were attracted into areas unsuited for agriculture. The industry dominated the land market and withheld large areas of land from settlement. This greatly affected the patterns of settlement and inhibited development. Many men went north in pursuit of the agricultural ideal of hard work, family, and farm, and some were successful.

Yet their success was usually the result of hard work in camps and mills, separated from their families and their hardscrabble farms.

The character of logging and life in northern Michigan was simple, seasonal, and small-scale at 1870. During the previous decade nearly all of the pine land in northern Michigan had passed into private hands. Improved tools and new techniques had replaced those borrowed from Maine. The scale of the industry was growing, forest yields were increasing, and logging had emerged as a separate sphere of the lumber economy. As the logging frontier moved into new areas the industry overshadowed local development and greatly affected the lives and aspirations of the local settlers. Despite these developments, life and work in the forest continued to be largely dependent upon the seasons, human labor, and animal power; it was, in a word, preindustrial.

## Chapter 3

### GROWTH AND EXPANSION OF THE LUMBER ECONOMY

Lumber manufacturing and marketing set the context within which logging developed in northern Michigan. The spatial dynamics of log and lumber transport fundamentally affected the movement of the logging frontier. The size, type, and number of trees cut each year were influenced by the nature of lumber manufacturing. And the location of lumber markets had an impact upon the development of Michigan transportation systems. Moreover, the demand for lumber in eastern cities and on the western prairie grew tremendously between 1860 and 1873, and the Michigan lumber industry expanded to supply this demand. Lumber manufacturing spread up both shores of the Lower Peninsula and, later, into the interior as railroads were extended north.

Industrial technology and modern business methods aided Michigan mill owners, many of whom were eastern capitalists, in the exploitation of a rapidly expanding market for lumber. Average mill production soared as sawmills added more saws, large steam engines, and an array of finishing machines. There was an uninterrupted flow of wood through the mill as specialized sawing machines were dedicated to each step of the production process. Increased capitalization boosted output and held costs per M down. Moreover, centralized drive and boom companies replaced the dozens of competing drives on all of Michigan's major logging rivers, providing an important, stable link between forest and

mill. These boom companies were an efficient, cooperative solution to the growing volume and length of river drives.

#### REGIONAL PATTERNS OF TRANSPORT AND MANUFACTURING

During the 1860's the Michigan lumber economy expanded into the northern interior of the Lower Peninsula. Burgeoning mill towns, such as Cheboygan, Alpena, and Oscoda/Au Sable, appeared at the mouths of northern rivers, and logging spread upstream. Lumbering moved into the unsettled north as a result of soaring demand for sawlogs in Michigan mill towns; this expansion was aided by the emergence of chartered river drive associations and the construction of land grant railroads into the north. In the decade or so before 1873, the logging frontier moved up Lower Michigan's major rivers, such as the Muskegon, Tittabawassee, Au Sable, and Manistee. Logging was limited to within a few miles of drivable rivers, and logging operators, pressed for more and more logs, moved upstream. By the late 1860's logging was widespread along the Muskegon River in Osceola County and the northeast corner of Clare County, along the Tittabawassee and Tobacco Rivers in Gladwin County, and along the Chippewa into Isabella County. By 1873 the logging frontier had spread up the Muskegon River to Houghton Lake in Roscommon County, and up the Clam River (a Muskegon tributary) into Missaukee County. In the Saginaw River system logging had spread along the Tobacco into southeast and northeast Clare County.<sup>1</sup>

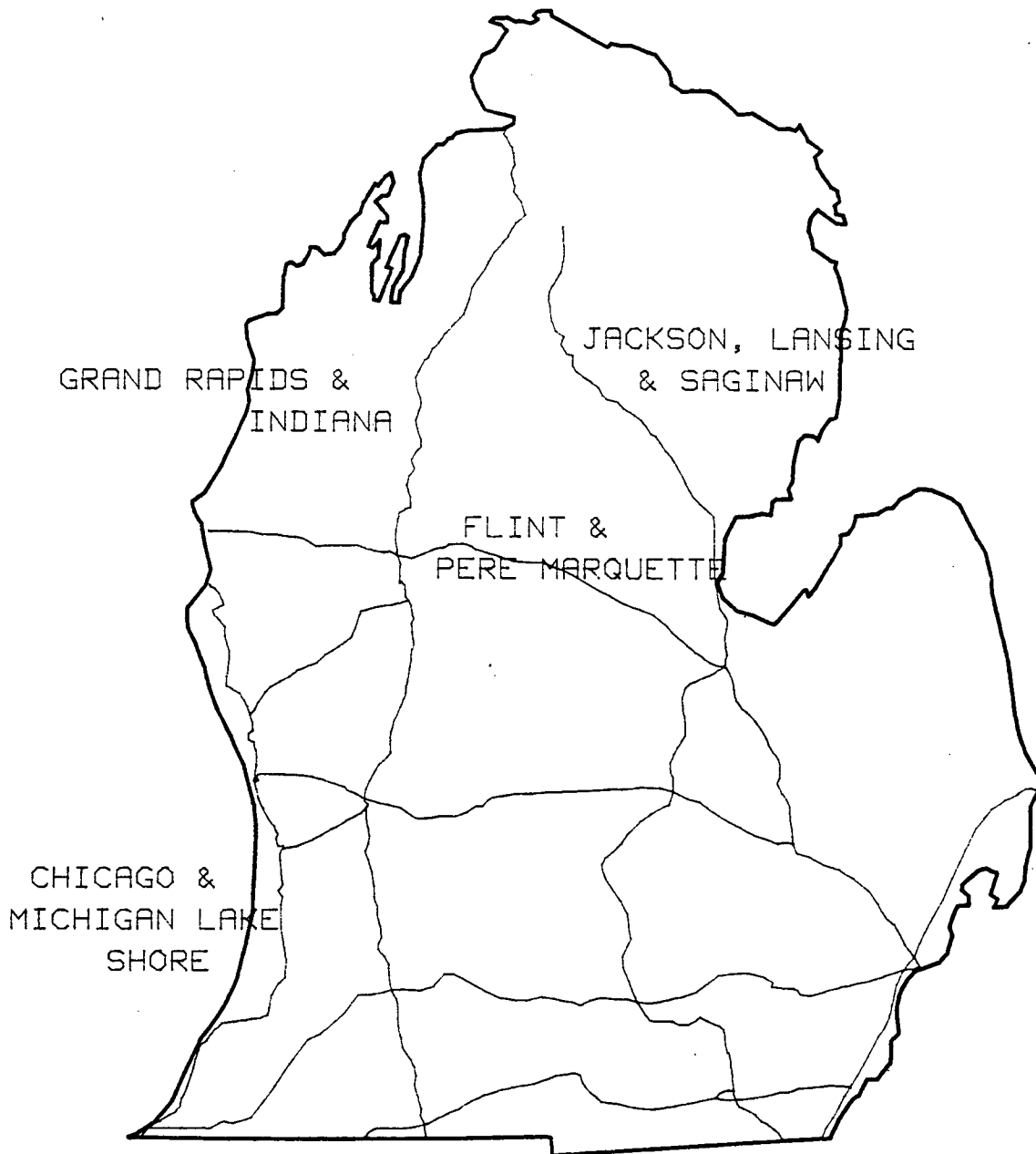
The spread of railroads into the relative wilderness of northern Lower Michigan had an enormous impact upon the lumber industry and the development of the region. Delayed by the Panic of 1857 and the Civil War, construction began on the land grant railroads in the mid-1860's.<sup>2</sup> By 1874 three railroads had been built through the best pine country in North America (Figure 12). The Flint and Pere Marquette Railroad (F&PMRR) stretched east-west from Saginaw to Ludington, while both the Grand Rapids and Indiana (GR&IRR) and the Jackson, Lansing, and Saginaw (JL&SRR) Railroads ran north-south. These railroads allowed easier, more dependable supply of northern camps; logging spread into new areas and the scale of production grew as a result. John Nelligan, a logging operator along the Menominee River in Michigan's Upper Peninsula, captured the essence of what the new railroads meant when he said of the extension of a rail branch into the pinery:

This was much appreciated by the lumber companies as it made it possible for them to get their men, equipment, and supplies close to the scenes of their operations along the upper tributaries of the Menominee with ease.

The territorial implications were profound. In Osceola and Clare Counties, for example, Delos A. Blodgett limited his logging to the Muskegon River until the GR&IRR reached Clam Lake (now Cadillac) and offered easy supply of his Clam River holdings.

At the other end of lumbering operations, many river mouth mill towns lost their dominant position within their river basins as rail networks replaced river systems as major arteries

Figure 12  
NORTHERN MICHIGAN RAILROADS  
1874



Source: Rand McNally, Michigan, Northern Michigan and Lake Superior, 1876; Silas Farmer & Co., Railroad & Township Map of Michigan, 1871.

of transportation, communication, and supply. Muskegon, Manistee, and Ausable/Oscoda were no longer called upon to supply the needs of upriver logging camps. As early as December 1869 the Muskegon Chronicle remembered better days when

. . . we had the river all to ourselves, we could take our time about it, and let those who run camps up stream wait our Royal Sovereign American pleasure.<sup>4</sup>

These towns lost their upriver mercantile hinterland, and the mill town merchants complained. Yet mill production rose as a result of upriver expansion, and the towns grew rapidly despite the loss of this business. In contrast, Saginaw and Grand Rapids--first and foremost mill towns-- flourished as service and secondary industrial centers due to their location on the main railroad lines.<sup>5</sup>

As the logging frontier and the land grant railroads moved into northern Michigan, villages grew up to serve the needs of the lumber industry, and agricultural settlement followed. Between 1860 and 1870 the first white settlers moved into Lower Michigan's northern interior; by 1874 lumbering outposts dotted the area. Economic development was centered in riverside mill towns and railroad villages. The village of Evart, for example, grew up around a sawmill and store built by Blodgett and Kennedy where the Flint and Pere Marquette Railroad crosses the Muskegon River.<sup>6</sup> Northern Michigan counties served by rail showed tremendous growth in population and agricultural production during this period. By 1874 many counties of northern Lower



Michigan had exceeded 3 people per square mile, especially those with lakeshore mill towns, such as Cheboygan and Alpena, and counties, such as Wexford and Osceola, which were recently traversed by railroads (Figure 13).<sup>7</sup>

Despite many new mills along the northern railroads, lakeshore sawmill towns continued to dominate lumber production in Lower Michigan (Figure 14). In 1860 lumber manufacturing in Lower Michigan was concentrated in southern lakeshore counties; Saginaw County and Muskegon County led production. In 1873 lumber manufacturing was still dominated by these counties, but Manistee had emerged as an important mill center as well.<sup>8</sup> The city of Muskegon's production had grown rapidly during the 1860's, and by the early 1870's Muskegon had outstripped the Saginaws as the major production center.<sup>9</sup> Yet the Saginaw River, with Bay City, East Saginaw, and Saginaw City along its lower reaches, was clearly the center of the industry. Alpena, Au Sable/Oscoda, and Ludington were new northern mill centers, all of them at river mouths.

Lumber manufacturing remained in coastal mill towns because there was little advantage in manufacturing lumber at an interior location. Although lumbering can be considered a "resource-oriented" industry--one in which the point of manufacture tends to locate close to the raw material due to the large proportion of waste attendant on manufacturing--the dispersion of the timber supply required that mills be located where they could draw timber from a region. In 1870 river driving and lake shipping were the cheapest modes of wood

Figure 13

POPULATION DENSITY --- 1874

(LOWER MICHIGAN)

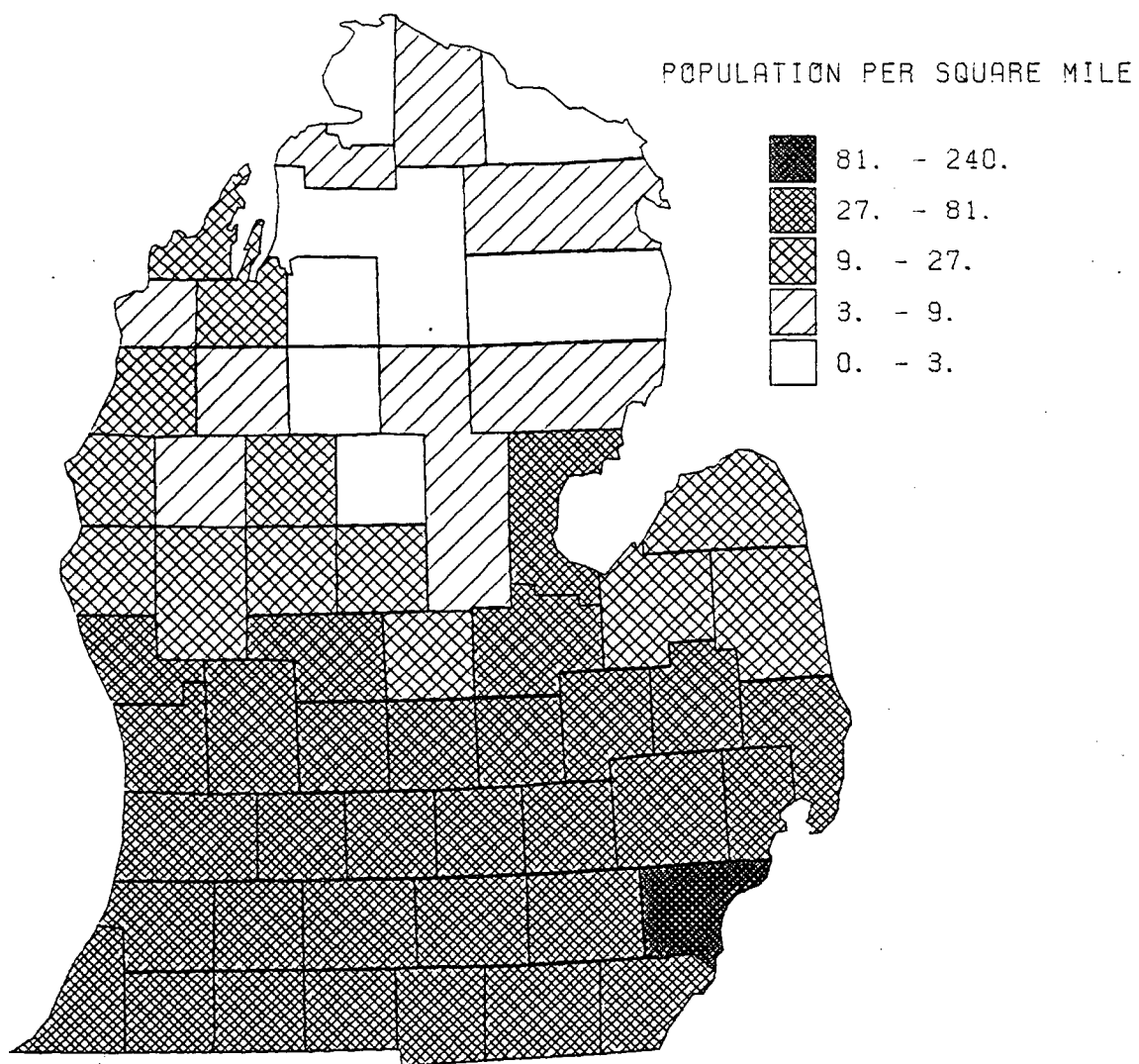
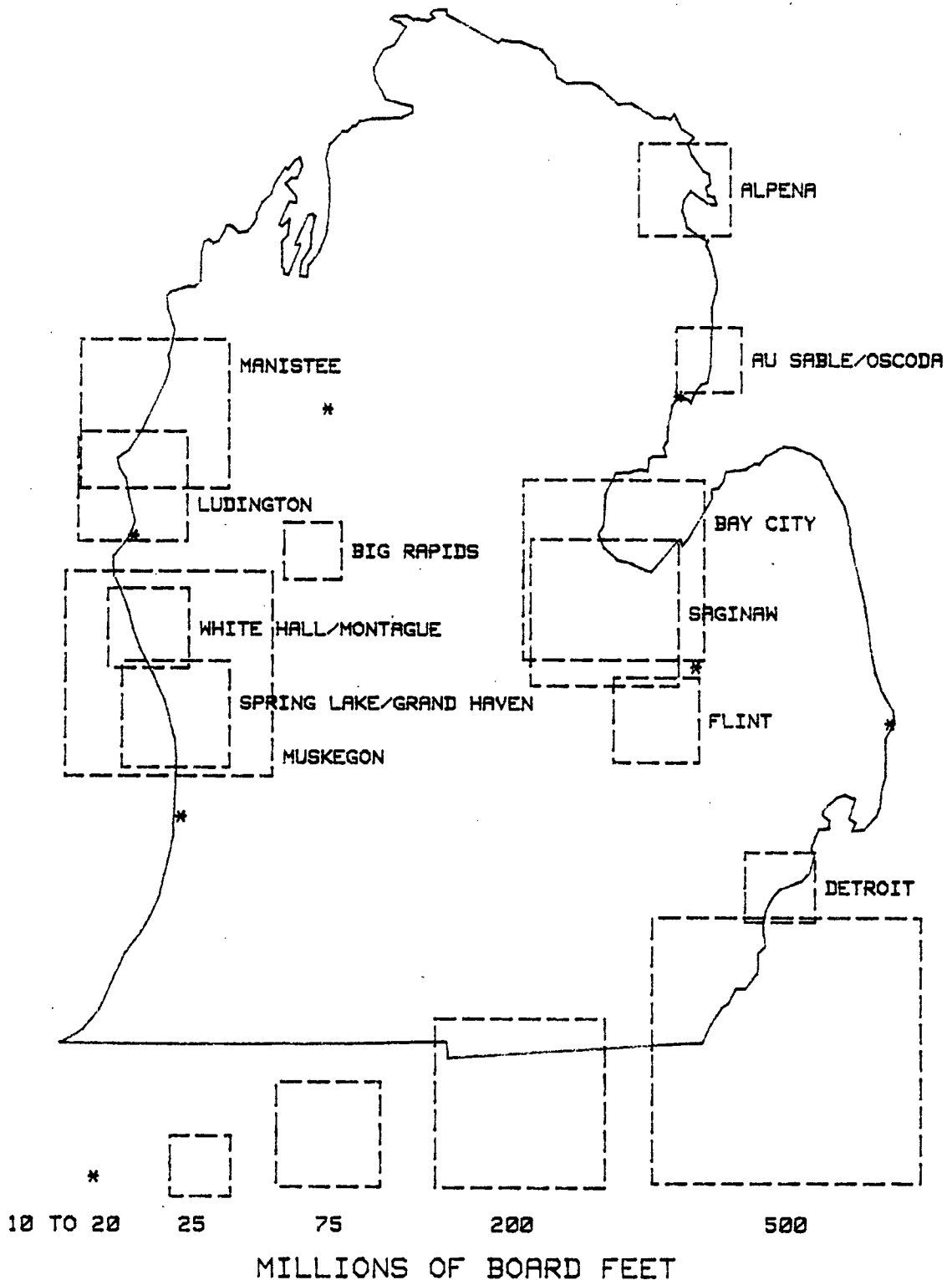


FIGURE 14

# LUMBER PRODUCTION -- 1874 (BY MILL TOWN)



SOURCE: Smith, "Lumbertowns in the Cutover," pp. 43-67.

transport. Saw mills at upriver points had to send their finished product down river by raft to be restacked and loaded onto lake vessels. In general, manufacturing plants are often located at a point of transshipment to minimize handling costs. Because rafting was more expensive than driving and transshipment at the river mouth was unavoidable, mill owners were inclined to locate their mills along the lower reaches of Michigan's logging rivers.<sup>10</sup> Here the logs were fished out of the river, cut into lumber, and loaded onto a Great Lakes schooner or barge.<sup>11</sup> The cost of transporting saw logs from rollway to mill pond was small. In 1870 driving charges in the Saginaw Valley averaged \$.75 per M; booming and delivery costs were \$.70 to \$.80 per M. Overall, they amounted to roughly 20 percent to 30 percent of the cost of logs at the mill.<sup>12</sup> Rail transport was much more expensive than water transportation at this time and did not, in general, offer a viable alternative to waterways for log or lumber transportation.<sup>13</sup>

#### THE RIVER DRIVE

As the capacity of coastal mill towns soared and logging operations expanded, annual river drives grew in length and volume. Pressing back to the upper reaches of the state's rivers the drive companies found many of them full of boulders, sand bars, and fallen trees. Moreover, on some rivers dozens of drive operations competed for finite water. When Michigan mill owners were investing large amounts of money in new milling equipment and when many of them had capital tied up in large amounts of

pine land (which had been purchased to ensure a continuous supply of logs for their mills), they sought to reorganize the drive system into a more dependable, more efficient, less costly operation. Centralized drive and boom operations had proven successful in Maine, Pennsylvania, Wisconsin, and Minnesota, and Michigan mill men lobbied the state legislature for the necessary legal provisions.

Earlier enactments, introduced in the mid-1850's to allow centralized drive and boom operations, had been severely limited in effectiveness by court challenges. In 1864, after much lobbying by sawmill owners, the legislature granted drive and boom companies greater power. Chartered boom companies were empowered to charge fees for all logs in their care, whether they were under contract or included by accident. This law ended previous abuses and made centralized drive and boom operations viable. By 1870 chartered drive and boom associations existed on all of Michigan's important logging rivers. Sanctioned by the state legislature, these companies supervised the driving, booming, and delivery of logs for most, if not all, of the logging operations on a river.<sup>14</sup>

Saw mill owners acted quickly to exploit the expanded powers granted boom companies in 1864. Within a few months the Muskegon Lumbermen's Association was reconstituted as the Muskegon Booming Company, with capital of \$40,000. The investors and directors were all mill men and pine land owners from Chicago and Muskegon.<sup>15</sup> The Tittabawassee Boom Company (\$50,000 capital) and the Huron Boom Company (on the Cass River) were also formed

in 1864, replacing earlier concerns. By 1870 drive and boom associations had been formed on the Cheboygan, Au Gres, Thunder Bay, Manistee, Grand, White, and Rifle Rivers. These companies ran integrated operations from rollway to mill pond.<sup>16</sup>

Despite capital improvements to rivers and booming grounds, and large annual dividends to stockholders, these companies frequently paid re-bates to their members.<sup>17</sup> By the early 1870's both the Tittabawassee and the Muskegon Boom Companies were handling over 300 million feet of logs a year. The boom companies on the smaller rivers handled 60 to 150 million feet annually.<sup>18</sup>

River driving began with the "breaking" of rollways in the spring. Logging formally ended once the logs were "in the stream," thus a few loggers often stayed on in the forest to break the rollways or river drivers might break them for an additional charge. Logs left on the river bank were piled such that the removal of a few key logs set them tumbling into the river. Rollway breaking was often difficult and always dangerous; injuries and deaths were common. Joseph Proctor described a close call of his own in the spring of 1872:

In breaking the rollway I met an adventure that might have cost me my life; but I was not hurt. James Peasley and my brother Frank were helping me. We commenced early in the season, and the logs were frozen in; it took some hardwork to get them loose with our peavies; finally we concluded to give it up, till they thawed out a little more. As we started for the bank, we saw a log on top that was loose, and Peasley says "lets roll this in and not a loos one", we rolled it off, it struck a log about four feet down and that started the logs; they broke about five feet back of us. The boys had got a little the start of me and crossed the break, but I

got to the solid logs, but they broke again and I went down with the logs. I dropped down into the water and a few logs formed a bridge over me and the logs rolled over me. After they had settled down, I came out at the end of the rollway without a scratch but very wet. Peasley says "my God! Are you alive", I asked him if I looked like a dead man? the boys looked more like dead men than I, for they were very pale.

Breaking the rollways typically occurred in early April, but the activity varied from year to year depending upon the size and timing of the spring freshets.<sup>20</sup>

Drive crews were organized into two groups: those men that were "bringing down the drive," and those that were "bringing up the rear."<sup>21</sup> The best river men joined the former group (also known as the jam crew) which worked at the head of the drive to keep the logs moving and prevent log jams. Jams were common and the crew had to work quickly to free trapped logs. Should they fail the drive might back up, just as it did on the Muskegon River in April 1872, when Joseph Proctor described a jam "3 or four logs deep for more than a mile."<sup>22</sup> The jam crew was followed by the sacking crew which brought up the rear of the drive. The sacking crew spent much of the summer retrieving stranded logs from flats and sandbars. They were accompanied by a raft or two on which supplies were kept and meals cooked. Michigan drive companies divided up their rivers into sections to organize the work and to determine driving charges. In addition to the drive crew, local men were assigned to each stretch of river and were responsible for getting all the logs through their section. They were stationed on the river bank at trouble spots where they used pike poles to keep the logs

moving.<sup>23</sup>

The "river hogs" worked dawn to dusk--at times 24 hours a day--and slept out in the open, or in tents. They were paid better than the shanty boys (about \$3.00 per day), for this was dangerous work under wet, freezing conditions. The river men ate as many as 5 meals a day. Many drivers were French Canadians, who often wore a red sash and toque. Common dress included "corked" boots that had dozens of long (up to 2 inch) rivets or screws protruding from the sole, and trousers that were "stagged" or cut off above the boots. In all, roughly 200 men worked on a large river drive.<sup>24</sup>

The breaking of rollways began with the first thaws in early April, but the date of the drive's conclusion was far more variable. In 1869 the Muskegon main drive passed Big Rapids, roughly midpoint on the river, on August fourth, and was expected to reach Muskegon within 2 or 3 weeks. The next year it was roughly 5 weeks ahead of this schedule, passing Big Rapids about June 28, and being expected in Muskegon about July 15; this was more likely the average schedule.<sup>25</sup> While the first logs might reach the large mill towns by late May, the rear of the drive did not arrive until much later. The driving season could span 4 or 5 months from the breaking of the first rollway until the last log was boomed in late summer. Something of the difficulty of this stage of operations is reflected by the fact that "shrinkage"--the loss of logs from sinking, becoming stranded, or theft--accounted for roughly 10 percent of the logs put into the river.<sup>26</sup>



As the drives grew longer and larger, lumbermen built dams and drained lakes to make maximum use of spring flood water and to provide an adequate water supply. Yet river levels varied widely and driving was unpredictable. Low river levels often prolonged or terminated log driving and greatly affected the price of lumber. Driving was disrupted by low water in 1872 and the Lumberman's Gazette reported that 64 million feet were hung up on the Cass River system and 150 million feet on the Muskegon. Many rollways on the Muskegon were never broken that year.<sup>27</sup> Although centralized river drives provided a more dependable supply of logs, the drive continued to be seasonal and unpredictable.

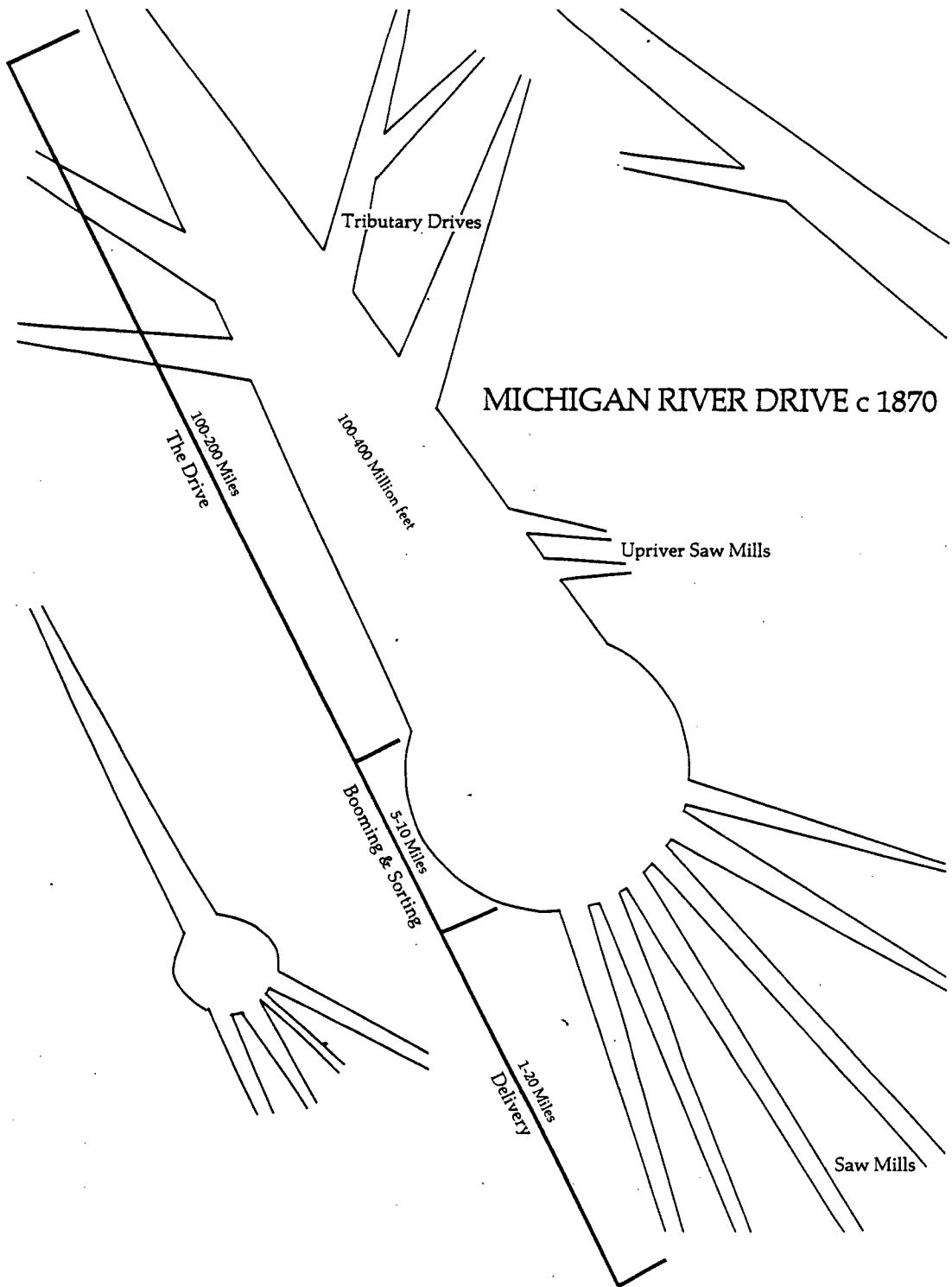
Booming grounds were the central clearing areas for nearly all the saw logs on a river, and most boom companies handled millions of feet of logs each year. Downstream progress of the annual cut was arrested by a boom--a barrier of logs chained together across the river--and then the logs were directed towards sorting pens. Here they were sorted according to their log marks. Each log had been marked in the woods on both ends with symbols that were registered with the county. From the pens, logs were moved to holding booms and eventually delivered to the owner's mill. Generally the booming grounds and holding areas were large; ten miles of the Tittabawasee River was said to be full of logs in the fall of 1868.<sup>28</sup> Boom companies often owned large amounts of land along the lower reaches of the rivers, where they were free to build elaborate booming grounds. Local land ownership also simplified legal

problems when the river overflowed due to the many logs. The Muskegon Boom Company owned 5000 acres along 8 miles of the Muskegon River where it empties into Lake Muskegon.<sup>29</sup>

Saw logs were delivered to mills in a number of ways. On the Tittabawassee the booming grounds were over 25 river miles above the Saginaw and Bay City mills, and logs were rafted downriver. Rafts were built from logs using rope and small hardwood pins, like clothes pins, that were driven into holes made with an auger.<sup>30</sup> Six steam tugs delivered the cut to mills along Lake Muskegon; they pulled rafts constructed of logs and chain and could deliver up to 64,000 logs a week (Figure 15).<sup>31</sup>

Michigan boom and drive companies were large, integrated, efficient operations that handled many millions of feet of logs from dozens of logging operations. In an industry marked by fierce competition and highly individualistic businessmen, boom companies were an important step towards industry-wide cooperation.<sup>32</sup> The drive was thus rationalized, and sawmills were assured of a more dependable supply of logs. Thomas Cox, a prominent historian of American lumbering, has argued that centralized booms were, at least on the Susquehanna River, a crucial step towards large scale, commercial lumbering: ". . . the Susquehanna Boom ushered the industrial order into Penn's woods."<sup>33</sup> In Michigan these booms were certainly a prerequisite to the emergence of the lakeshore mill towns as centers of enormous production.

Figure 15



## LUMBER MANUFACTURING AND MARKETING

During the 1860's northern Michigan mills were built with faster, more powerful saws as well as a variety of supporting machines that hurried the product through the mill. Nearly all the mills were steam-powered; large engines were needed to power the additional machines and the two or three saws per mill. Improved versions of the circular, gang, and mulay saws were adopted and assigned specialized tasks. With new machines and a rationalized production line, the capacity of the average mill more than tripled between 1860 and 1873. No single technological innovation revolutionized sawmilling. Rather, lumber production was re-organized by mill owners who sought larger profits through increased production and more efficient operation. They achieved this through increased mechanization, specialization of function, and increased capital investment. Moreover, many mills showed certain characteristics of modern business enterprise, particularly the expansion of the mill concern into new commercial spheres. Many Saginaw Valley mills engaged in salt production--brine was pumped from subterranean pools and evaporated using mill waste as fuel--and many large mill concerns operated lumber yards in local and regional urban markets. In sum, the early 1870's marked the emergence of Michigan's larger sawmills as industrial manufactories.<sup>34</sup>

Sawing machines were greatly improved during the 1860's, particularly the circular saw, whose speed had grown manyfold.

In 1870 the average Michigan sawmill had two main saws, a mulay and a circular. The latter had become widely established during the 1860's and had displaced the mulay as the mill's primary saw. In the Saginaw Valley the mulay and the circular were equally common in 1868, and the gang saw had been widely adopted as well.<sup>35</sup> By 1872 nearly half of the saws in the Saginaw River region were circulars, while gangs were as common as mulays.<sup>36</sup> One saw, often a mulay, was used to slab the logs as they first entered the mill. With one, or perhaps two sides squared ("slabbed"), the log was then transferred to a gang or a circular saw to be cut into lumber. Circular saws were popular because their speed increased production. Driven at a maximum of 500 to 700 revolutions per minute, they were run with a feed of up to 6 inches per revolution.<sup>37</sup> Yet circular saws cut an enormous kerf; the blades were large in order to cut the large white pine logs, and a typical 60" diameter saw blade might be 1/2" wide near its center. Thus, much of the log ended up as sawdust, twenty-five percent when cutting inch boards. Wavering blades and overheating were also disadvantages of the large circular saw. Double circular saws, with a smaller blade suspended over (and just in front of) a large one, were designed to avoid some of these problems.<sup>38</sup>

Mulay saws had a single, vertical blade that cut on the downstroke. A single mulay blade might be 7 or 8 feet long, and thus mulays were preferred when large logs were slabbed. Gang saws were similar, but had many parallel blades in a reciprocating gate. These saws cut smaller kerfs than the

circular saw and were prized for their resource economy. A gang saw might be five feet wide with as many as 50 saw blades, each 4 to 6 feet long. With a stroke of a few feet, gangs were slower than the other saws, and they required more power to operate. Gang saws were run at roughly 180 to 225 RPM, with a feed of 5/8ths of an inch.<sup>39</sup> Although a modal mill had one circular and one mulay, many mills had a gang as well. Lumber mills with the largest annual production averaged four saws per mill and were more likely to have a gang saw, or even two.<sup>40</sup>

After the lumber was cut, it was edged and trimmed. By the early 1870's a whole range of finishing machines were available to perform these tasks. They were all of the same form--small circular saws were mounted in a table or bench. Newly milled lumber was moved forward, end-first onto a table; one edge was cut clean and straight as the other was moved along a guide wall or rollers. After edging, the board's direction was changed 90 degrees as it was transferred, edge-first, to a trimming table where a number of saws were set at standard lengths. Large mills often had a number of other saws, including gang edgers that had 3 or 4 saws at variable widths and that cut both edges at once. Butt saws were used to square the end of the logs. Steam-powered lath and shingle machines utilized offcuts and greatly increased production. A \$200 shingle machine could turn out as many as 6000 shingles an hour.<sup>41</sup>

Lumber manufacturing had been refined and now included many specialized stages. Edgers and trimmers freed the mill saws for cutting lumber, and increased the variety of lumber sizes.

The production process was rationalized, and the product flowed uninterrupted through the mill. In the larger mills, gang edgers greatly increased production, relieving a bottleneck between the faster main saws and the single-saw edger. In sum, by the mid-1870's Michigan mills had adopted multiple saws and finishing machines for tasks that had previously been done by a single saw.

Though a few steam-driven mechanisms for the movement of logs and lumber were available at this time, much mill work was done by human labor.<sup>42</sup> Between every work station the product was hand carried. Cant hook men rolled each log onto the mill carriage; others carried the resulting cant to the next saw. Lumber was carried from saw to edger to trimmer and then hand sorted and stacked. Sawdust and other mill waste were usually carted away by hand. Though industrial technology had greatly changed the character of milling, in 1870 human labor was still an important element of production. The new machines increased the number of skilled and semi-skilled positions, but the proportion of unskilled laborers grew with increased production levels.

Sawmills were generally large two-story structures. Manufacturing occurred on the second floor; the first was used for the belt and drive links to the steam engine. Sawdust and other waste fell through to the first floor, where it was collected and carted away. Average mill buildings were roughly 100 by 40 feet; the engine and boilers were usually housed in a separate building of 30 by 50 feet. Mills were invariably constructed of wood, though the foundations for the building and

the saws were built of stone. Because of the fire hazard the engine building was occasionally brick. Few water-powered mills remained. Saw mill engines were 50 to 150 horse power, with 3 to 5 boilers of 40 inches by 20 feet. Waste disposal was often a serious problem at this time and could affect the location of a mill. Though much of a mill's waste was burned as fuel, there was often an enormous amount left over. Riverside mills often used the river current to remove mill waste, though this was not always successful. Many mills were on lakes, especially along the western coast of Michigan, and were often built on stone pilings a short distance from shore. These mills simply filled in the area around their pilings with waste.<sup>43</sup>

The cost of producing lumber in the early 1870's was roughly \$10.25 per M, 65 percent of which was the cost of sawlogs. Total lumbering costs ranged widely, from perhaps \$6.00 to \$12.00 per M, depending on a number of factors including stumpage costs and mill productivity.<sup>44</sup> Mills with three or four saws, as well as gang trimmers and edgers, were able to increase production significantly and thus reduce costs per M. Lumber was typically sold to wholesale yards in large lake ports, with the yard operators paying the freight of roughly \$3 to \$5 per M.<sup>45</sup> Of course, freight charges varied with distance; in the summer of 1872, freight to Chicago from Muskegon was \$3.50 per M for all lumber, and from Saginaw to Buffalo it was \$4.50 to \$5.00 per M. That same year, lumber was sold by Michigan mills for \$7.00 per for culls, \$14.00 per M for common, and \$35.00 per M for uppers, for an average price of \$14 to \$15 per M.<sup>46</sup>



The capital requirements of sawmilling grew with increased mechanization. A typical mill represented an investment of \$45,000 to \$50,000 in 1870, a four-fold increase over 1860. By the early 1870's a dozen or more of Michigan mills were valued at \$300,000 to \$400,000.<sup>47</sup> The Saginaw mill of Henry Sage, for example, was offered for sale in 1874 at \$400,000.<sup>48</sup> Yet there were many mills capitalized for less than \$5,000, a sign, according to Barbara Benson, that sawmilling continued to be an easy-entry field.<sup>49</sup> Yet \$5000 was a large amount of money for most people, and expenses were high. Access to credit was crucial, but it was no guarantee of success. Untoward weather often hindered logging and driving, leaving a mill without sawlogs. Moreover, mill fires were common.<sup>50</sup> The large number of mills with low capitalization may well be evidence of the rapid expansion of the industry. That is, there was room, for a while, for the smaller, less efficient mills. Typically, the larger mills were owned by eastern capitalists; the smaller concerns served local needs, perhaps by contract, and were largely operated by local, bootstrap entrepreneurs. Capital requirements of the industry had grown with the expansion of the industry; in addition to the sawmills, large amounts of capital were invested in pine land, boom companies, and river improvements. Capital sources were varied; lakeport lumber wholesalers extended credit, as did the land grant companies (on pine land sales) and the mill equipment manufacturers. Increased capitalization tended to concentrate production in large mills and large mill towns.<sup>51</sup>

Lumbering was an extremely profitable enterprise during the late 1860's and early 1870's. Lumber companies were able to exploit the rising demand for lumber and the rising value of stumpage. Profit margins varied widely and are difficult to document--they may have been \$1.00 or \$2.00 per M. Henry Sage, a New York businessman with a large mill in West Bay City, earned an annual profit of more than \$150,000 between 1870 and 1873, which was more than a 35 percent annual return on his investment. In 1874, a depression year, he earned 7 percent. These figures do not include the \$25,000 to \$30,000 annual profit his mill earned from salt sales.<sup>52</sup> Barbara Benson estimated that Awri Wright, another prominent Saginaw River mill owner, netted a minimum of \$27,000 or a 17 percent return at this time.<sup>53</sup> Of course not all mills were this successful, yet if \$1.00 per M was a poor profit margin--as Henry Sage stated in 1876<sup>54</sup>--a typical mill with an annual output of 7 million feet might have earned \$14,000, perhaps a 30 percent return. The large profits of this period were due in large part to the rising value of lumber associated with the rising cost of stumpage, which was roughly \$.75 to \$1.50 per M in 1870. Of course many lumber concerns had acquired stumpage for as little as \$.10/M.<sup>55</sup>

Profits were greatly influenced by log quality and sawyer skill. "Clear" or "upper" lumber grades brought prices up to three times as much as culls and common grades. A skilled sawyer could get the extra few percentage points of "uppers" out of saw logs, especially using the faster (though wasteful) circular saw which allowed the log to be re-positioned as it was cut. The

proportion of "uppers" varied from roughly 5 percent to 30 percent in Michigan mills, according to contemporary accounts.<sup>56</sup> Profits were also enhanced by salt, lath, picket, and shingle production which used offcuts to produce valuable secondary products. In 1869 roughly 14 percent of the value of Muskegon's annual product was from shingles, lath, and pickets.<sup>57</sup>

At a time of rapid national growth and expansion, the largest sources of demand for forest products were the Prairies and the eastern seaboard. The continued growth of eastern cities and the spread of western agriculture during the 1860's resulted in soaring demand for forest products, particularly lumber and shingles. This demand was supplied in part by the two largest lumber wholesale centers: Chicago, which handled 1123 million feet in 1873, and Albany, New York, which handled 448 million.<sup>58</sup> Lumber was shipped to Chicago from the hundreds of sawmills along the shores of Lake Michigan, and from there it was shipped south and west by rail. The market for Michigan lumber had been extended during the 1860's as railroads spread west from Chicago into the plains. Chicago lumber yards were able to capture much of this market from upper Mississippi lumber concerns due to cheap railroad rates and direct shipping.<sup>59</sup> These western markets were very important, yet demand fluctuated with the viability of the agricultural economy.<sup>60</sup>

Albany stood at the head of navigation on the Hudson river and supplied Michigan and Canadian lumber to the East Coast. Albany received lumber from the west, via the Erie Canal,

and from the north via the Erie Canal's Oswego feeder and the Champlain/Richelieu Canals. The majority of Albany lumber came from Canada, perhaps 60 percent, with the balance from Michigan.<sup>61</sup> Wholesale concerns shipped to yards in New York City, New Jersey, and other seaboard states.<sup>62</sup>

Most Michigan white pine lumber was exported, and nearly all of these exports were carried by Great Lakes vessels.<sup>63</sup> The mills of Michigan's western shore shipped their product to Chicago and Milwaukee. Those on the east coast to eastern lake points, especially Buffalo, Tonawanda, and Cleveland. By the mid-1870's Tonawanda had displaced Buffalo as the largest Eastern lumber port; twenty-five per cent of the lumber shipped from Saginaw went to Tonawanda, comprising 65 percent to 75 percent of the latter's receipts.<sup>64</sup> Though Cleveland received the largest amount of Saginaw lumber in 1873, the combined total of Buffalo and Tonawanda, both at the west end of the Erie Canal, far exceeded that of Cleveland and accounted for roughly 45 percent of the lumber shipped from Saginaw River mills (Table VII).<sup>65</sup> Michigan lumber also dominated the Chicago market. In 1875 Lower Michigan mill towns supplied 74 percent of Chicago's annual receipts of lumber; Muskegon and Manistee--the largest suppliers--accounted for 34 percent.<sup>66</sup>

Michigan sawmill concerns sold the larger part of their product to specialized lumber wholesalers in lakeport towns. During the 1860's commission agents, who arranged sales between mill and wholesaler, became an important part of the marketing mechanism. These lumber agents were increasingly inclined to

Table VII

## DESTINATION OF SAGINAW RIVER LUMBER

(Million Feet)

	1873 (RANK)		1875 (RANK)	
	-----		-----	
CHICAGO	4.1	#10	32.8	#5
CLEVELAND	103.7	#1	87.4	#2
BUFFALO	86.4	#2	75.4	#3
TONAWANDA	83.7	#3	112.3	#1
TOLEDO	56.2	#4	74.5	#4

Source: Saginaw River Improvement, p. 6; Hough, Report on Forestry, 1878, p. 517.

open offices in Michigan mill towns to facilitate these transactions. Moreover, Michigan mill owners were evidently more inclined to deal with agents who had local offices.<sup>67</sup> Yet many sawmill concerns operated their own lumber yards in Chicago and New York State, as well as in southern Michigan, northern Ohio and Indiana. Henry Sage, for example, operated yards in New York City, Albany, Buffalo, and Toledo.<sup>68</sup> Not all Michigan lumber left the state; perhaps 20 percent of Michigan's lumber was sold in local Michigan markets,<sup>69</sup> and a small percent was shipped via rail to northern Indiana and Ohio. The integration of regional railroad networks and the adoption of a standard gauge opened new opportunities for marketing. Yet during the early 1870's Michigan sawmill concerns were just beginning to experiment with new products and new marketing systems to take advantage of these new opportunities.<sup>70</sup>

A variety of Great Lakes vessels delivered Michigan lumber to regional markets. During the 1860's old passenger steamers, made obsolete by the spread of railroads, were stripped of machinery and cabins and turned into large lumber "barges". Such barges, towed by tugs, became a common method of lumber shipment. Most held roughly 300 MBF, but there were a few that held 600 or 1000 MBF. A tug or propeller-driven steam ship often pulled a number of lumber barges--up to 7 or 8--at a time. By 1870, "propellers" often carried a large load of lumber themselves (perhaps 650 M), and they were slowly replacing tugs in the barge-pulling trade.<sup>71</sup>

Great Lakes schooners were still common, and they were

used over short distances to carry cargoes of about 100 MBF. The Muskegon mill firms of C.H. Hackley & Co. and Hackley & Sons shipped all their lumber to Chicago by schooner. Two or three, occasionally four, such vessels left C.H. Hackley & Co's docks each day.<sup>72</sup> In 1868 as many as 420 vessels cleared Muskegon Harbor in a single month.<sup>73</sup> It was a quick trip to Chicago. In August 1870 the schooner "7th Ohio" left for Chicago with cargoes of lumber on August 22, 25, and 27.<sup>74</sup> In 1870 the Lake Michigan lumber fleet that served western Michigan mills comprised 81 "vessels" and some 30 tugs that were independently owned, and 20 "vessels" and 4 tugs that were owned by the mills.<sup>75</sup>

By 1870 most Michigan sawmills had access to the growing regional railroad network. Yet little of Michigan's lumber left the state by rail because rail rates were prohibitive.<sup>76</sup> Michigan's interior mills, which did not have direct access to Great Lakes shipping, availed themselves of rail transport, and more expensive mill products, such as planed and custom-cut lumber, were more likely to be shipped by rail.<sup>77</sup> Yet the railroad system simply was not able to handle a significant part of the lumber trade.<sup>78</sup> Rail shipments drew comment in the local press.<sup>79</sup> In 1878 C.H. Hackley & Co. wrote to a customer explaining that "on this lake the custom is to put lumber on the dock, not on the rail."<sup>80</sup>

In the early 1870's the milling season was roughly 160 work-days, or just over six months. The first sawmills opened with the spring thaw and ice breakup in early April, and the last

mills closed with the onset of early winter storms in late October. In 1869 the first Muskegon mill opened March 25, the second April 12; in 1870 all mills were closed by October 29.<sup>81</sup> C.H. Hackley and Co., one of Muskegon's largest mill firms, operated 166 workdays in 1873, and 160 workdays in 1874; this was a 27 or 28 week season.<sup>82</sup> Winter weather hindered sawmilling, and it also stopped shipping. Millponds froze over, and frozen, icy logs were difficult to cut. Though the mills often held a supply of logs through the winter to tide them over until the arrival of the spring drive, poor logging and driving conditions could close the milling season early. The shipping season was similar to the milling season; it ran from mid-April to late November. During 1870 C.H. Hackley & Co. sent their first lumber shipment on April 18th; their last shipment, the 93rd of the season, was on November 26.<sup>83</sup> A summer milling and shipping season was the culmination of lumbering's seasonal rhythm, which began with winter logging and spring driving.

Increased mechanization, higher capital investment, and a longer season led inexorably to a rapid growth in productive capacity. In 1870 a modal sawmill produced 6 or 7 million feet annually. Michigan's largest sawmills cut as much as 25 or 35 million feet per season. C. H. Hackley & Co., for example, milled 20.9 million feet in 1873, and Henry Sage's mill cut 34.5 million feet in 1870.<sup>84</sup> Production had increased enormously during the 1860's: in 1855 the average Saginaw Valley sawmill cut 1.8 million feet, by 1867 the average was 5.2 million, and the 83 sawmills along the Saginaw River in 1870 averaged 6.9 million



feet per season. In addition to lumber a typical mill produced 2 million lath and 5 million shingles per year.<sup>85</sup> While production per mill had nearly quadrupled since the mid-1850's, total production grew at an even faster rate as new mills were built. Between 1855 and 1870 actual production along the Saginaw River increased nearly 600 percent.<sup>86</sup> Moreover, production lagged behind the growing capacity of Michigan's sawmills; capacity of an average mill in 1870 was 9 or 10 million feet per season. Although the 78 or so Saginaw Valley mills produced 429 million feet of lumber in 1867, their capacity was closer to 800 million feet, according to T.B. Fox, author of History of the Saginaw Valley, published in 1868.<sup>87</sup>

Daily output ranged from 30 to 150 M per day. C.H. Hackley & Co. averaged 126 M per day in 1873, while the average daily output of Henry Sage's mill was in the 150 to 170 M range.<sup>88</sup> Daily production for an average mill was roughly 50 M per day, compared to 12 M in 1860. A modal mill employed 45 men in 1870, while the largest mills, such as S.A. Brown & Co.'s and John McGraw's, employed as many as 150 men.<sup>89</sup> Mill productivity had increased as well, production per man/day was roughly 1 M; annual production per man was perhaps 185 M; and 150 M were cut for every \$1000 of mill capital.<sup>90</sup>

Industrial technology had transformed the productive potential of Michigan's sawmills. The availability of eastern capital, credit from wholesalers, and the mill owner's interest in rationalizing production provided a fertile context for the use of new machines in lumber manufacturing. Mill capacity

soared, and the ramifications extended hundreds of miles beyond the lakeside mill towns. The lumber economy spread into the northern interior to supply the growing demand for logs. More of the forest was cut each year, and the scale of forest production grew as mill owners urged higher levels of production onto logging operators.

### MILL TOWN LIFE AND WORK

The towns and villages of northern Michigan were lumber towns first and foremost. Their emergence and growth during the 1860's were due to the soaring demand for lumber in eastern cities and on the western Prairie; these mill towns were the far-flung expression of a growing national economy. Here, as in older eastern communities, large, mechanized, manufacturing plants dominated boarding house communities where there was increasing division between owner and worker. Yet there was a distinctive pattern of life in these isolated mill towns due largely to the seasonality of the industry. Life and work changed with the seasons, and a large part of the labor force was transient; thousands of men arrived each spring and departed the following autumn. Saw mills varied greatly in size from the new villages, located along the northern rail routes with a few dozen people, to Muskegon and East Saginaw with 6,000 and 11,000 people respectively in 1870.<sup>91</sup> These towns were the extensions of an industrializing economy into the bush. As such, they showed a

unique blend of industrial technology and frontier life.

Lumber manufacturing dominated the local economy. Two-thirds or more of the people employed in manufacturing in Michigan's foremost lumber counties worked in sawmills (Table VIII).<sup>92</sup> Capital investment in manufacturing shows a similar pattern. A Boston Globe correspondent gave this account of Muskegon in 1872:

Muskegon is literally a city of sawmills. Its capitalists are almost wholly interested in lumber, and the great body of the inhabitants with few exceptions, are engaged in its manufacture.

. . .  
Whatever other manufacturing establishments there are in Muskegon, they are tributaries to the mills.<sup>93</sup>

Michigan mill towns grew up around river front or lake shore saw mills (Figure 16). Secondary manufacturing was a small sector of the local mill town economy, and in general these activities were associated with sawmilling. Indeed, in many sawmill towns more than 90 percent of the manufacturing labor force was employed in mills or other wood processing plants. A boastful account of manufacturing in Muskegon in 1869 explained:

In addition to the capital invested in lumbering there is a large amount devoted to other industries. We have several very large sash, blind and door factories, foundries and machine shops, saw factory, boiler and engine shops, carriage shops, furniture establishments, &c., There is scarcely any sort of wooden manufacture<sup>94</sup> known that is not carried on here, and with profit. . .

Table VIII  
 MANUFACTURING IN SELECTED COUNTIES c. 1873  
 (PERCENT OF TOTAL MANUFACTURING)

	SAWMILL EMPLOYEES	ALL WOOD MFG EMPLOYEES	SAWMILL CAPITAL
ALPENA	69.5%	91.4%	85.6%
BAY	73.2	80.0	74.9
GENESEE	50.5	62.9	43.4
KENT	25.2	55.1	19.9
MANISTEE	94.1	95.9	97.2
MASON	96.0	97.6	92.5
MUSKEGON	80.8	89.0	88.4
SAGINAW	60.5	70.9	57.1
STATE	39.6	52.1	38.5

Source: Statistics of Michigan, 1870, pp. 416-421, 571-575; Census of Michigan, 1874, pp. 270-271, 281-282, 299-302, 319-321, 367-368.

Figure 16



East Saginaw, Michigan, 1867.

Source: Clarke Historical Library, Central Michigan University.

Whatever its merits as a characterization of Muskegon, this is clearly misleading if regarded as a general picture. As a rule, lumber refinishing and re-manufacture occurred in the wholesale centers such as Chicago and Albany, or at retail yards.

Moreover, few Michigan foundries, machine shops, and saw makers served the local mills. In general, mill equipment was purchased from eastern manufacturers.<sup>95</sup> The older mill towns in the settled region of the Peninsula, such as Grand Rapids, Saginaw, and Flint, had a larger secondary manufacturing sector than the northern coastal towns such as Manistee and Alpena. The older mill towns had a more diversified economy and had better (and earlier) rail links.

Most of the men who worked in Michigan's sawmills were young Americans from the Northeast or they were recent immigrants from Canada or Germany. In the 1850's nearly all mill hands had been born in the Northeastern states, but after the Civil War the number of immigrants began to rise as the forest industry declined in Ontario and New Brunswick, as European immigration increased, and as wages in the industry rose. In 1870 only half of the mill workers were native born, many the sons of Michigan farmers. Due to the proximity of Southern Ontario, Canadians were found in large numbers in the Michigan lumber industry, where they were more than twice as common as in the Wisconsin industry. Most Canadians were of Scots or Scots-Irish background, but there were also many French Canadians. Germans, Irish, Scandinavians, and Poles were also common.<sup>96</sup> The labor force expanded with the productive capacity of Michigan

sawmills, and men--especially immigrants--were attracted to the cash wages and certain employment. One of several Icelandic immigrants to Muskegon, A. Gudmundsen wrote to his parents in July 1872 concerning his new job:

We got work here immediately and the wages are 2 dollars a day or almost 22 marks. We have now been here six days. I have worked at night, for these mills run day and night and produce a lot. There are 28 mills in this town, and many shiploads are sent to Chicago every day. The work comes rather hard for us, which is to be expected at first. Some, including myself, stack boards, and everything here goes full blast. The working hours are ten hours at night and eleven during the day, and it is more pleasant to work at night because it is very hot here--but not so much that we can't stand it. I have now been working six nights, and the others have only worked four or five days, for they have all been feeling sick now and then. Not I, except that I have a lot of stiffnees; but this will pass. . . .

I do not know how long we will be here, but certainly for the greatest part of the summer. We are all in the same house and we pay 4 1/2 dollars a week for room and board. If we do not miss any days we will thus have 30 dollars at the end of the month, which is quite good. This is an excellent place for good workers, for there are plenty of jobs.<sup>97</sup>

In some mill towns there was a concentration of a specific immigrant group or groups. In Manistee, for example, the proportion of Germans and Norwegians ran far ahead of the national and state rates.<sup>98</sup>

Mill operatives lived close to their place of employment, often in tenements or boarding houses owned by the mill. An 11 hour workday did not leave much time for long walks to work. Furthermore, high wages and the seasonal rhythms of the industry contributed to a highly transient labor force. Tenements and boarding houses suited the housing demands of the highly mobile population. The Lumberman's Gazette described the site of

E.B. Ward's sawmill near Ludington:

Around it is a cluster of first-class tenement houses with convenient shops, barns, and other buildings, creating quite a pleasant suburban village, on the banks over looking the beautiful lake.

Most mill workers had a less sanguine view. "Let the rents . . . come down. . ." argued one Muskegon worker in 1870.<sup>100</sup> The boarding house for Ward's "north" mill had three stories, was 60 by 110 feet, and it was built and furnished at a cost of \$7000.<sup>101</sup> Henry Sage's "Barracks" was two stories, 24 x 400 feet and housed 25 families, as well as rats, lice, and roaches. The "Barracks" resembled the slums of Chicago or Boston more than the idyllic scene painted by the Lumberman's Gazette.<sup>102</sup> Workers' neighborhoods also grew up around the mills. These were often platted by the mill owners, who sold lots to their workers.<sup>103</sup> For Henry Sage the supervised construction of a mill town community--in his case Wenona (later West Bay City)--was both his right and duty as businessman and property owner. Moreover, it was also a way for him to gain more control over another factor of production. For example, eviction was often used by Sage to control labor unrest.<sup>104</sup>

Wages in the sawmills of the early 1870's were high. In Saginaw, sawmill wages averaged \$55.00 per month in 1870, twice the level of 1860.<sup>105</sup> In the spring of 1872 Delos A. Blodgett hired Joseph Proctor as head sawyer at \$4.00 per day; in the autumn of 1869 Joseph's brother Frank earned \$3.00 a day in the mills of Muskegon.<sup>106</sup> In general terms, sawmill wages in



1870 ranged between \$2.00 per day for common labor (such as stacking lumber), and \$4.00 per day for the skilled jobs (such as sawyer and filer). Over a six-month season an average worker might earn \$330.<sup>107</sup> Roughly 50 percent of the mill hands went into the forest each winter to work in the camps.

Despite (or perhaps because of) rising wages and full employment, there were brief skirmishes between labor and capital in the early 1870's. The major issue in the mill towns, as it was throughout the country was the 10 hour day. Eleven hours was standard in Michigan mills, with 12 hour days common along the Saginaw River. In 1869 employees of the Muskegon Boom Company's booming and sorting works went on strike when the company attempted to increase the workday by one hour. In reference to the mill owners, a boom hand wrote to the Muskegon Chronicle:

They seem bent on taking what little day light is left the laboring portion of mankind to cut his wood or make his garden and have it bestowed upon the rich and wealthy, in the hours of hard labor that rightfully, morally and legally belong to the honest laborer. They seem to think that because they are not tired and weary that no one else would be -- How little do they know what it is to earn their bread by the sweat of their brow. If they ever did they seem to have entirely forgotten it, and do not know that laboring men require rest and recreation.<sup>108</sup>

The owners' position on the length of the workday had a similar moral tone. In Saginaw a 10-hour strike occurred in 1872 and shut the mills for two weeks. The Lumberman's Gazette, representing the owners' point of view, waved the banner of honest toil:

What is wanted in this county is not combinations, nor social war, but industry, temperance, economy, education, skill and enterprise. Young men who practice and aim at these will not fail of a competence if they do of wealth.<sup>109</sup>

Both of these strikes, like most early labor actions, failed; the 10-hour day was yet a decade away for Michigan mill workers. Seasonality and the nature of the work place hindered the full development of a factory system in the lumber industry, but there was a strong sense of class, master, and worker in the burgeoning coastal mill towns. Here the scale of production had grown such that the owner was removed from the shop floor and his rapidly growing crew.<sup>110</sup>

The mill town populace comprised two classes, mill workers and a growing middle class of merchants, professionals, and mill managers. A large portion of the mill employees were transient workers who moved seasonally between the mills, logging camps, Lake Superior mines, railroad construction crews, and the harvest (particularly wheat) frontier. The saloons and brothels of Michigan mill centers catered to these young men with cash in their pockets. In general the saloons were limited to the outskirts of town, and they have been the source of many embellished accounts.<sup>111</sup> On the other side of town the merchants and mill owners endeavored to build a community of order and respectability. The churches, reading rooms, and hospitals they built were the source of great community pride.<sup>112</sup> Dozens of mill towns and local service centers emerged along the northern railroads between 1868 and 1873. Here

the bourgeois respectability and drunken revelry of the coastal mill towns were transplanted almost overnight. In 1871, for example, Clam Lake was barely a clearing in the woods along the projected route of the Grand Rapids and Indiana Railroad. A single log cabin, the Clam Lake House, acted as hotel, tavern, and supply store.<sup>113</sup> By 1874 Clam Lake was a booming industrial outpost with 10 mills. One mill owner, George A. Mitchell, had recently completed construction of a new home; this large, ornate, wood frame, Second Empire structure was fit for a true baron of industry.<sup>114</sup>

By 1874 the white pine industry of Michigan had become a crucial sector of the state and national economy. Agriculture was the dominant industry in Michigan, but the sawmill industry ranked first among manufactures in the number of firms (37 percent of the total), value of products (32 percent of total), capital invested (38 percent), and number of workers (40 percent) in 1874.<sup>115</sup> By 1870 Michigan had displaced New York and Pennsylvania as the leading lumber manufacturer in the nation. Production in the latter states doubled in the 1860's, but output, value of product, number of employees, and capital invested had roughly tripled in Michigan during the same period (Table IX).<sup>116</sup> Yet Michigan had relatively few mills by comparison with these older lumbering states, a reflection of their large capacity, advanced technology, and increased capitalization. These mills experienced tremendous growth in output and number of employees. The large, industrial processing centers of Michigan stood in strong contrast to the small, local,

Table IX

## THE MICHIGAN LUMBER INDUSTRY 1860 - 1870

	1860	1870	INCREASE
PRODUCTION (Millions of feet)	796	2121	267%
VALUE OF PRODUCT (Thousands of \$)	\$9,303	\$31,946	343%
CAPITAL IN SAWMILLS (Thousands of \$)	\$7,736	\$26,990	351%
# OF SAWMILLS	986	1,571	159%
# OF EMPLOYEES	7,491	21,881	292%

Source: Benson, "Logs and Lumber," p. 215.

one-saw mills of the East.<sup>117</sup>

The rapid growth in production and the expansion of the industry into the northern interior was largely due to entrepreneurs' eager attempts to exploit the growing national demand for lumber through the use of faster, more powerful machines and by bringing order and efficiency to the various stages of production. Thus, the white pine industry of northern Michigan showed many of the classic signs of 19th century industrialism. Michigan sawmills had adopted more saws, each now given a specialized job, and a range of secondary machinery speeded the product through the mill. Mill capacity soared, the work force grew, and there were clear signs of a growing distance between owner and worker. The emergence of centralized boom associations had been an important step in stabilizing an important and costly stage of production. Boom companies and railroad construction aided the expansion of the industry into the northern interior. The overwhelming dominance of the wage labor economy in the interior circumscribed the unfolding of the agrarian frontier. Yet the lumber industry remained fundamentally dependent upon water transportation and the seasons. Because of the continued, indeed increasing, importance of the movement of timber over slick winter roads, down rivers with spring freshets, and to market during the summer shipping season, the lumber industry remained only a refined, improved version of the Maine scheme of lumbering. Over the next decade lumbermen would struggle to free their industry from the stranglehold of the seasons. Any success they would have in this

endeavor would be due to the large, concentrated land holdings they acquired during the 1860's and the spread of railroads, which brought industrial technology one step closer to the stump.

## Chapter 4

### INDUSTRIALISM IN THE FOREST:

#### LOGGING IN THE 1880'S

The Michigan lumber industry employed roughly 45,000 men in 1879, and the value of its annual product was more than \$52 million. One-third of all manufacturing workers in the state worked in the industry, and Michigan led all other states in lumber production.<sup>1</sup> There was a growing demand for Michigan lumber in the West, where a spreading railroad network distributed Michigan's forest products across the treeless plains. Lumber was also in demand to build homes for the native and immigrant factory workers of the burgeoning urban-industrial centers of the East. The capacity of Michigan's mills increased greatly with the introduction of live rollers and other devices that hurried the product through the mill. Output soared as steam power replaced human labor in all aspects of lumber manufacturing. Also, new secondary manufacturing industries created demands for lumber and other mill products. Michigan's mill towns were crowded with wood product manufactories that made doors, furniture, carriages, and buckets. In short, the demand for sawlogs continued to grow, and logging expanded--due largely to the use of railroads to haul logs--into new areas. Innovative business methods and new logging techniques facilitated the emergence of a more dependable, and more "industrial", logging industry. Lumber production peaked in Michigan in 1888, with a

total output of 4.3 billion feet.<sup>2</sup> Yet in 1889 Michigan produced over \$68 million worth of lumber and the state still led the nation in value of lumber production.<sup>3</sup> Though the state would continue to be an important lumber producer for a decade or more, lumber production had peaked, and by the early 1890's white pine had become scarce in the Lower Peninsula.

Late nineteenth century land ownership patterns were largely determined by the land market of the 1850's and 1860's. Then, lumbermen and speculators had purchased forested land, especially pine land, in large, contiguous tracts from the federal government and from the land grant companies. By 1870 nearly all of the pine land in northern Michigan was in private hands. The names of lumber concerns stretched across thousands of acres on land ownership maps; between them, the barrens, marshes, and scrub forests remained in the hands of the federal government. In 1885 the pattern of land ownership was much the same. To be sure, individuals had purchased small parcels of land left behind by lumbermen; larger tracts of pine land had changed hands as lumbermen attempted to consolidate their holdings; and some speculators had sold off their holdings as pine land prices reached as high as \$125 an acre by the late 1880's. For the most part, however, pine land owners tended to hold on to their land, even after it was logged. Taxes on stumpland were negligible, and it was not uncommon for land to be logged a second or third time as the market evolved. Thus persistence marked patterns of land ownership in the last third



of the century.

Logging railroads and public carriers delivered sawlogs dozens of miles to rollways or millponds, and consequently pine land that had previously been considered inaccessible was in demand in the 1880's. Above the headwaters of the Manistee River, David Ward--perhaps the largest owner of Michigan pine land--owned thousands of acres far from drivable streams. Some of Ward's tracts encompassed entire congressional survey townships.<sup>4</sup> More typical, however, was the pattern of land ownership in Haring Township, Wexford County (Figure 17). The township was not directly tributary to a major river; all of its pine logs were hauled out of the woods by rail. Yet a few lumber interests owned almost 2/3rds of the township. As Delos A. Blodgett's holdings reveal, the essence of this pattern was laid down in the 1860's (Compare Figures 17 and 7). Haring Township land ownership patterns showed a distinctive consolidation, or the "filling-in," of individual holdings. The influence of the lumber industry upon the value and availability of land extended to all corners of the region. During the 1870's Lower Peninsula mill owners had begun to purchase pine land in Michigan's Upper Peninsula and along Ontario's Lake Huron shore.<sup>5</sup> Concentration of land ownership facilitated the steady increase in the scale of production in the woods. It inhibited the settlement of large areas and, after a region was logged, it allowed summer forest fires to run unchecked through large tracts of slash.

# FIGURE 17

## LAND OWNERSHIP PATTERNS IN A LUMBER TOWNSHIP - 1889 (HARING TOWNSHIP)

C I C I			\$ \$ \$ \$	\$ \$ \$ \$	\$ \$ \$ C J
C I C I C I			\$	\$ \$ \$ \$	\$ \$ C J C J
C I C I C I	C J C J		\$ \$ \$ \$	\$ \$ \$ \$	C J C J C J C J
C I C I C I			\$ \$ \$	\$ \$	C J C J C J C J
C J C J C J	C I C I C s C s		\$ \$ \$ \$	\$ \$ \$ \$	C J C J C J C J
C J C J C J	C I C I C s C s		\$ \$ \$ \$	\$ \$ \$ \$	C J C J
	C J C I C I C s C s		\$ \$ \$ \$	\$ \$ \$ \$	C J C J C J
C J C J	C I C I C s C s			\$ \$	C J C J
C w				Ch Ch / /	* * * *
C w C w				Ch Ch / / / /	* * * *
C w C w				Ch Ch / / / /	* * * *
C w				Ch Ch Ch / / / /	* * * *
	C I C I C I C I		/ / / /	/ / / /	/ / / /
	C I C I C I C I		/ / / /	/ / / /	/ / / /
	C I C I C I		/ / / /	/ / / /	/ / / /
	C I C I		/ / / /	/ / / /	/ / / /
		/ /	/ / / /	/ / / /	C w C w C w C w
		/ /	/ / / /	/ / / /	C w C w C w C w
		/ /	/ / / /	/ / / /	C w C w C w C w
		/ /	*	/ / / /	C w C w C w C w
*	C w C w		C w	C w	/ / / /
	C w C w C w C w		C w C w C w		/ / / /
	C w C w C w C w		C w C w C w C w		/ / / /
	C w C w C w		C w C w		/ /

ONE MILE

J. CUMMER & SON	C J		/	DELOS A. BLODGETT
JACOB & W. CUMMER	C w		*	COBBS & MITCHELL
CUMMER & HOLISTER	C h		\$	PUTNAM & BARNHART
W. CUMMER & SONS	C s		C I	CUMMER LUMBER CO.

OWNERSHIP SHOWN BY 40 ACRE PARCEL

## TOOLS AND TECHNIQUES

Industrial technology transformed sawmilling during the 1860's; by 1880 it was recasting work in the forest. The widespread adoption of "logging railroads"--that is, short, privately owned routes of light rails and small locomotives--marked the penetration of the "steam and steel" complex as far as the skidway. Important innovations also occurred in traditional techniques and tools, such as advanced saw filing methods, block and tackle loading, and big wheel skidding. The scale of production continued to grow as these improved logging techniques emerged. New tools and equipment made each step of the logging production line more specialized. The mill owners and logging companies sought to remove logging's overwhelming dependence upon weather and seasons. The development of railroad logging was an important step towards this goal. The use of railroads in the bush brought a new work discipline to the forest. Logging operations could be planned with greater confidence, and forest production proceeded with greater regularity, despite fluctuations of weather or seasons.

## CUTTING

In the 1880's pine trees were felled and bucked (that is, cut into logs) in much the same manner as they had been a decade earlier. Although each tree was notched with an ax, two sawyers felled and then bucked it with a cross-cut saw. The saws of the

1880's were far better than those of the late 1860's, however. A variety of new teeth patterns allowed loggers to adapt to different conditions (e.g., pitchy trees or frozen trees), and there were new methods of sharpening and gumming saws. Metallurgical innovations greatly improved the cutting ability of crosscut saws, but these improved saws required frequent maintenance by a skilled filer to keep them at peak performance. Filing had previously been done during off hours by the blacksmith or foreman, by the 1880's a saw filer had become an essential member of every logging camp.<sup>6</sup>

Changes in the market for forest products affected the size and type of trees that were logged. The grading of lumber had become more precise and included dozens of categories, and new secondary manufacturing industries in the major mill towns utilized a greater variety of lumber. Smaller pieces, flawed lumber that could be hidden, and small strips of pine all had their uses in the furniture, door, and woodenware industries. This increasingly complex market with an elaborate price structure had a profound impact upon logging operations at this time. Logs too were finely graded and cut to precise standards. A batch of sawlogs of varying quality brought an average price or a price commensurate with its lowest quality logs. Log grading brought high prices for the high quality classes and average prices for the average logs.<sup>7</sup>

Efficient log sorting and careful cutting--as epitomized in the operations of Delos A. Blodgett--were essential to success. In 1883 Blodgett wrote to the manager of his logging

operations:

We must be careful about shake. Butts that have seams, and bad shake, must be long-butted. Also look very carefully to the lengths, see that the timber is cut according to directions, and also very particularly to the stub-shot. Cut logs exactly 2 in over the number of feet wanted. These matters must be watched closely, and log-cutters made to come back & cut again if necessary.

Log marks were first used to indicate ownership, but as logs were sorted into more specialized classes to maximize profits by sales in an increasingly differentiated sawlog market, log marks proliferated. In November 1871, Blodgett registered his log mark "DAB" in Chicago, Illinois, and later that year in Muskegon and Osceola Counties. By 1873 Blodgett was using at least three log marks: "Best -- DAB, 2nd -- DA, Shingle logs -- ZZZ." Two years later there were four (DAB, O, ICU, and DA); in 1876/77 there were seven.<sup>9</sup>

The fine sorting involved is clear from Blodgett's instructions to his camps on cutting different types of logs, represented by different log marks:

Cut DAB all 16 ft except when you find a 12 or 14 which is good enough to go in.

Cut DA logs all 16 feet that are 14 in and under at the small end.

Cut DA logs over 14 in into 12 ft, 14 ft, 18 ft, & 20 ft Running 18 ft & 20 ft largely.

Cut O// surface clear Norway all 16 ft

" DB or pc stuff logs 12 ft & 14 ft where an 18 or 20 can not be made but make all 18 & 20 possible and a few 16 ft & 22 ft.<sup>10</sup>

Each mark represented a different class of logs, such as first class white pine or common Norway pine, and single operations were likely to produce a range of classes. In one 1876/77 camp, for example, the cut was divided between four log marks; log size varied greatly between them (Table X). At times logging concerns also used log marks to differentiate between the logs of different camps, and of different years.

#### SKIDDING

In the 1880's logs were still moved from stump to skidway along rough roadways with a chain and a small sled, but horses had largely replaced oxen as draft animals. Some jobbers and independents continued to work oxen, but small operators were being forced out of the forest by the soaring price of stumpage and the growing scale of production, and thus the presence of oxen in a logging camp was something of an oddity. Horses were adopted for their speed and ease of handling. As stronger, heavier work horses became widely available, their adaptability made the extra cost worthwhile.<sup>11</sup>

Skidding techniques also improved. Skidding tongs replaced the simple swamp hook for attaching a chain to the end of the log. Similar in design to ice tongs, they made it easier to secure the log at the stump and unfetter it a few moments later. Improved versions of the log dray accommodated up to ten small logs.<sup>12</sup> And large-wheeled carts were used to move logs when there was no snow. These innovations speeded operations and

Table X

## LOG MARKS IN A 1876/1877 LOGGING CAMP

MARK	CLASS	LOGS/M
MAXIM	Surface Clear	2.22
UTK	First Class	4.96
DV8	Smooth Norway Pine	6.63
8T6	Common	9.11

Source: Proctor Diaries, Proctor Collection.

aided the move to horses.

Log carts also freed skidding from complete dependence upon frozen ground and snow cover, but they remained supplementary to more traditional skidding practices through the 1880's. Intended to overcome the difficulties of bad weather and limited seasons, log carts were first used in the mid 1870's; Syllas Overpack of Manistee, Michigan, experimented with several wheeled carts before marketing the so-called "big wheels": a pair of nine-foot wooden wheels connected by an axle on top of which was mounted a long tongue. Once the cart was positioned astride the log, the longer end of the tongue was raised to a vertical position, thus lowering the shorter end (Figure 18). The log was then chained to this lowered end of the tongue. When the long end of the tongue was pulled down to horizontal the log was raised as the axle acted as a fulcrum. An average big wheel load was 1 to 5 logs, or about 500 to 1000 feet.<sup>13</sup> These wheels were used to move logs from stump to skidway for a maximum distance of one mile when there was no snow. They were relatively inexpensive, at \$160, and needed little maintenance. They did require flat, cleared roads "almost like a city street."<sup>14</sup> They were more difficult to load and maneuver, and required far more expensive roads than snow skidding. Moreover, they proved unwieldy in snow because the narrow wheels cut through the snow pack. Thus poor skidding conditions were a frequent tribulation during the 1870's and 1880's. In November 1883, a lumberman wrote one of his foremen with these instructions:



Figure 18



Loading the "Big Wheels".

Source: Michigan Historical Collections, Bentley Historical Library, University of Michigan.

Dont think you had better try & drag out any logs on bare ground the teames will not earn their board unless there comes a little snow do not cut your crew down to small. Sooner you get thru cutting and skidding the better but do not drag any unless you get snow or frozen ground. It does not pay to work in the mud I judge.<sup>15</sup>

Although they increased the flexibility of logging operations and allowed a lengthened, expanded season, log carts did not initiate a wave of summer logging because the industry continued to depend upon the river drive to transport logs to the sawmills.<sup>16</sup>

The loading of logs onto sleighs and railroad cars had become easier and faster with the adoption of block and tackle loading devices in place of the "cross-haul" method. The block and chain, or "jammer" system, was simple. A single chain ran from the horse team through a block that was suspended from a tree or a large tripod of poles above the sleigh or car. Attached to the end of this chain were two other chains. These were either attached to the side of the sleigh, so that when a log was placed in their slack it might be rolled up an incline, or there were hooks on the ends that allowed the logs to be hoisted onto the sleigh. Once loaded, the logs were chained down to the bunks. An array of newly available chain fasteners and binders were easier and safer to use, though the binding pole was still common, and the peavey was used interchangeably with the cant dog to handle logs in loading and unloading drays, sleighs, and railroad cars. The block and tackle appealed to loggers because it allowed the horse teams to work in the logging road and because it was much faster. The loading crew no longer had

to cut the cross-haul, and the horse teams did not have to be moved over to this runway each time a sleigh was loaded.<sup>17</sup>

#### SLEIGH HAULING

The hauling of logs by sleigh had greatly improved by the 1880's. Larger, more powerful horses hauled bigger loads on larger sleighs. Sleigh bunks were as large as 12 or 14 feet in width, compared to the typical 6- or 8-foot wide sleigh of the early 1870's. The average load size was about 3,000 feet in the 1880's, a substantial increase from the 1,000-foot loads of the post-war years. Loads of 5000 to 6000 feet were common under favorable conditions. Record loads were much larger and were frequently the subject of photographs and newspaper notes. Like most lumbering records, these were extraordinary events contrived to generate publicity.<sup>18</sup>

As sleighs and sleigh loads grew, there was a concomitant improvement in the construction and maintenance of logging roads. In the fall, logging roads were built with great care and cost. Stumps were pulled and the roadways were graded. Fitzmaurice described the logging road of the 1880's:

The log road is a wonderful piece of civil engineering. It goes round hills, over swamps, down and up ravines, a solid mass of snow and ice, which frequently remains solidified when all about it is free from the grasp of winter.<sup>19</sup>

In the larger camps, logging roads were made of ice, rather than packed snow. Special "sprinkler" sleighs that covered the road

with a thin layer of water were common by this time. Sprinklers held up to 100 barrels of water and had a small fire box to keep the water from freezing. Moldboard plows had replaced the old V-shaped models and were used to keep unwanted snow off the ice roads. As the ice logging road improved, gutters were cut into the roadway to keep the sleighs on track. An ice road with a gentle downhill slope facilitated the drawing of enormous loads greater distances to the river.<sup>20</sup>

The longer hauls, the larger scale of production, and the increased emphasis upon ice and snow roads made sleigh hauling a crucial part of the forest production line. Yet it was a vulnerable link, and its unreliability was emphasized by the frequent thaws and lack of snow that plagued sleighing during the 1870's. Joseph Proctor's diary describes the difficulties that prompted a wave of experiments in log transport in these years:

- 13 January      Snow is falling every day we have not had a thaw since it came & it is very light & mealy does not make a good road cant draw large loads.
- . . . .
- 3 February      Rec d a card from Quillin, he says their roads are about done for
- . . . .
- 12 February     Arrived at camp about sun down found the snow about all gone off but they were drawing light loads of logs
- . . . .
- 22 February     They commenced drawing logs nights again last night thawing very fast

23 February It has been cloudy to day but thawd some  
They are handling logs from mid night till  
noon yet.<sup>21</sup>

When there was snow available it was too light, and then an early thaw forced nighttime hauling, a desperate attempt to move logs without destroying the roads.

The next season was worse. There was little snow, and temperatures were relatively warm through most of the winter. By late January the situation was critical. Snow had to be drawn from the woods and shoveled onto the roads.

18 December It rained part of the day & is raining  
hard this evening poor prospects of  
sleighbefore Christmas.

. . .

3 February Warm spring weather.

. . .

6 February Thawing fast snow has to be drawn quite  
a distance to keep the road up

7 February The water ran in torrents in the logging  
road to<sup>22</sup> day. they cant draw much  
longer.

By February 20, three teams and twelve men were drawing snow  
"nerly all the time."<sup>23</sup> On February 21 the camp was closed,  
and the men given their time.

Logging conditions were particularly unfavorable at a time  
when the lumber industry was expanding rapidly. Logging  
companies sought to transform logging into a more dependable  
enterprise, and many concerns experimented with new methods of

log transportation. Yet bad weather simply focused attention upon transportation; long-term developments provided more compelling reasons for transport innovations and provided a fertile context for experimentation. Most of the pine within four miles of a river had been cut by the late 1870's, and the capacity of Michigan's sawmills continued to grow. Moreover, many lumber concerns had begun to accumulate large amounts of capital, having reduced their liabilities after a decade or so of profitable operations. Finally, important technological advances had been made in metallurgy and in the design of steam engines. In particular, small, powerful locomotives had been developed for use in eastern mines. Thus inaccessible stumpage, a growing accumulation of capital, and improved technology--as well as a succession of poor winters--encouraged the development of new modes of transport.

#### RAILROAD LOGGING

The logging railroad was perhaps the single most important innovation of nineteenth century logging. The use of temporary, often narrow gauge, rail lines and light geared locomotives ("logging railroads") as well as public carriers reduced logging's dependence upon winter weather and brought industrial technology deep into the bush.<sup>24</sup> For the most part, private roads and public carriers were used to transport logs from skidway to riverside banking grounds. Thus railroads replaced sleighs in log handling. They did not fundamentally

alter the spatial organization of logging. Yet the logging railroad did have profound long-term consequences for the northern Michigan forest. As a dependable means of transporting logs, it facilitated longer logging seasons and greater production. Moreover, logging railroads ranged far from river courses, giving access to the most isolated pine stands.

Early experiments in moving logs by rail included horse- or ox-drawn trams that were pulled over pole roads. Public carriers had been used to haul logs during droughts in both Maine and Michigan, and locomotives had been used to haul logs over wooden rails in New York and Georgia. During the mild winters of the mid-1870's, many Michigan lumbermen experimented with carts, rails, and locomotives in an attempt to get logs out of the woods.<sup>25</sup> Hackley and McGordon explained the situation to a Quebec customer in 1878:

. . . There is not over 40% of the usual stock of Logs in the Muskegon River and its tributaries, Some of the lumbermen are putting in railroads, others drawing on trucks &c, and we expect that before the Main drive is completed there will be 2/3rds of the usual stock put in. but it will be late in the season before the logs reach Muskegon.<sup>26</sup>

At this time Winfield Scott Gerrish, who had experienced difficulty driving logs down a tributary of the Muskegon River during a season of low water, built the first successful logging railroad in North America, a 7 1/2 mile, standard gauge line of light rails known as the Lake George and Muskegon River Railroad (LG&MRR). The railroad linked Gerrish's camp to the Muskegon; there were no links with other railroads. Its 8 1/4 ton Porter,

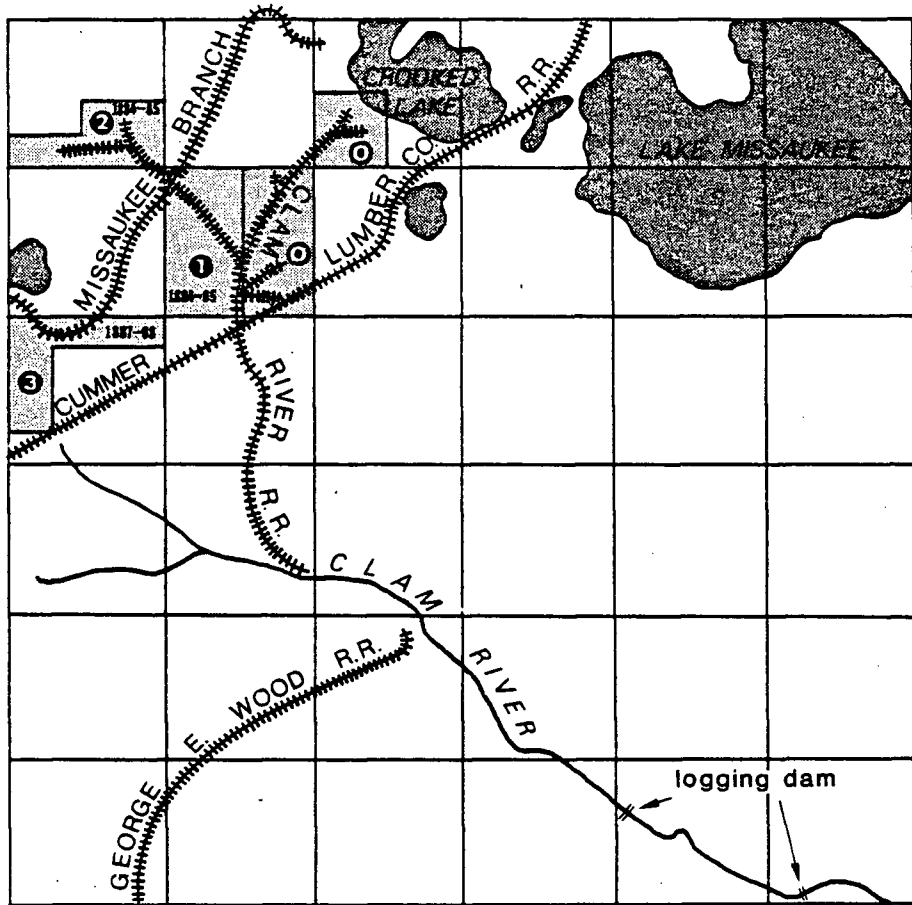
Bell locomotive pulled 30 cars and worked 24 hours a day. In its first season the LG&MRRR hauled 29 million feet of logs, earned \$15,600, and returned 28 percent on paid-in stock. The next year the road acquired a second locomotive and 30 additional logging cars; it had an even more successful season.<sup>27</sup> Many lumbermen were skeptical, but Gerrish's logging operation flourished while the rest of the industry suffered continued bad weather. In 1878 four logging railroads were built in northern Michigan.<sup>28</sup> One of these was built by Ephraim Shay, who, during the next few years, invented the geared locomotive, which was able to pull larger loads and negotiate sharper turns.<sup>29</sup> BY 1885 Michigan had 71 logging railroads with 574 miles of track.<sup>30</sup>

Logging railroads were light, temporary roads that hauled logs 3 to 10 miles to a nearby river. They were rather large investments. A logging railroad cost roughly \$3,000 to \$8,000 per mile to build; locomotives were roughly \$4,000 to \$8,000 and cars \$150. A logging concern might invest between \$50,000 and \$100,000 for two locomotives, 60 cars and 8 miles of prepared bed and track. A modal logging railroad probably represented a \$25,000 investment.<sup>31</sup> Typical of smaller enterprises was the Clam River Railroad built by Delos A. Blodgett in southwest Missaukee County to haul pine logs 3 or 4 miles to the Clam River (Figure 19). Although it operated--as intended--for only a few years, perhaps 1882 to 1888, the Clam River Railroad's small roadbeds were well engineered and still exist today.<sup>32</sup> With its 7 miles of track, the railroad serviced one or two logging



Figure 19

# The Clam River Railroad c. 1888



Lake Township (T22N R8W)  
Missaukee County, Michigan

① logging camp number

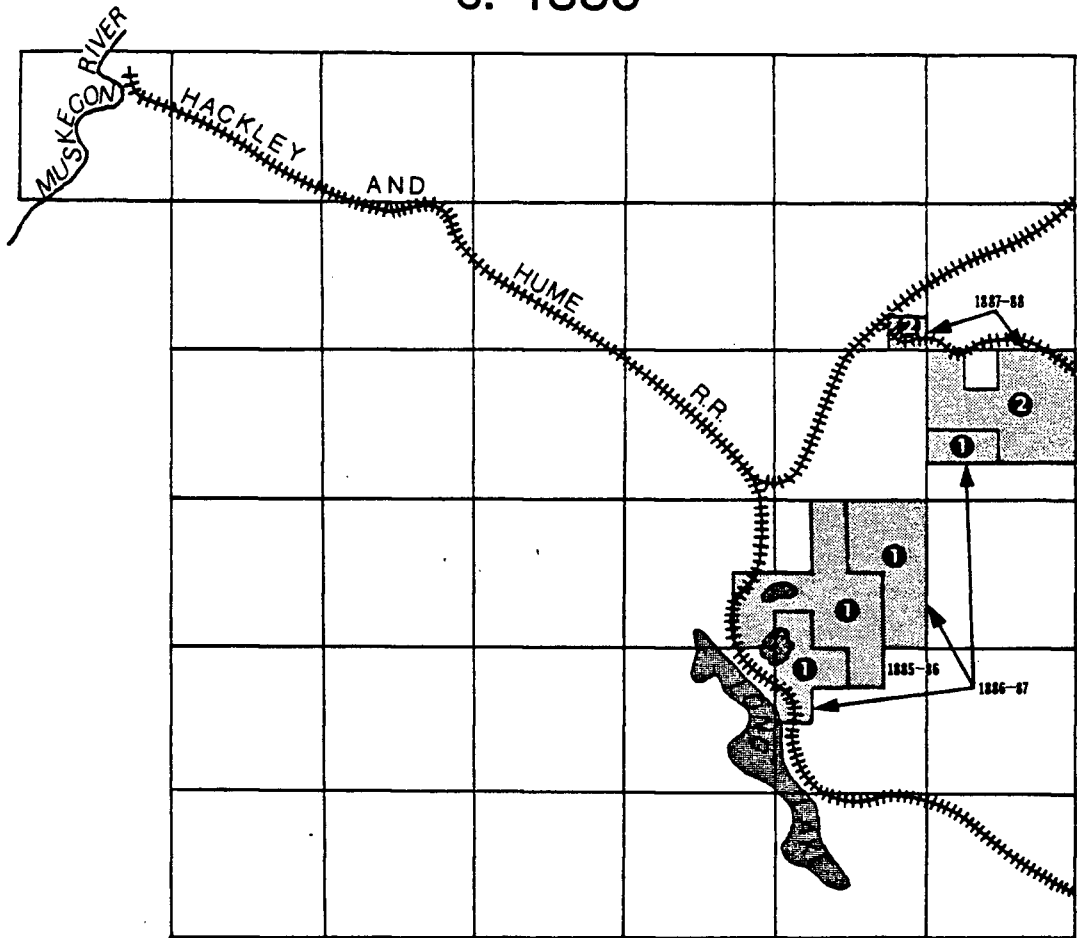
camps each year for an annual load of 5 to 10 million feet, until it was ripped up and sold in 1888. The rolling stock, rails and ties raised over \$8000.<sup>33</sup>

Hackley and Humes's logging railroad in northern Clare County was much larger than the Clam River Railroad. It was a standard gauge line of mostly 35 lb rails; it used two 22-ton Mogul Brooks locomotives to pull the logging trains, and two 9-ton Porter, Bell locomotives to switch its 46 cars as they were loaded. The Hackley and Hume road ran roughly 17 miles from the Muskegon River east through Frost and Franklin Townships. Both they and Blodgett owned a great deal of timberland in this area (Figure 20), and for at least seven seasons Blodgett relied upon the Hackley and Hume railroad (HHRR) to haul an annual average of 9.5 million feet of logs (at \$1.50 per M), between 6 and 10 miles to the Muskegon River. Concurrently, the road hauled more than 20 million feet a year of Hackley & Hume logs.<sup>34</sup>

With the success of the logging railroads, the public carriers began to tap the new log hauling market. Michigan railroad companies had carried logs before, but only on rare occasions during poor sleigh and drive conditions. By the late 1870's the hauling of logs by public carrier had become common; in 1880 the Flint and Pere Marquette Railroad (FPMRR) hauled 87 million feet of logs. By 1890 the Mackinaw Division of the Michigan Central Railroad hauled nearly 270 million feet of logs.<sup>35</sup> As pine became scarce in their tributary basins, Michigan's sawmill towns placed increasing reliance upon public carriers for logs.

Figure 20

# The Hackley and Hume Railroad c. 1885



Frost Township (T20N R4W)  
Clare County, Michigan

① logging camp number

Public railways were used to haul logs in much the same way as were logging railroads. The same types of cars were used, and loading and unloading procedures were identical. To encourage log hauling by rail, the railroads built branches and spurs into the pineries. Public carriers typically hauled sawlogs much farther than did logging railroads, roughly 25 to 75 miles, and delivered them to riverside rollways, although some public carriers did deliver logs directly to sawmills. On average, carloads hauled by the common carriers contained 3600 feet (about 16 to 25 logs), and rates were roughly \$2.00 per M.<sup>36</sup> Again Delos A. Blodgett's operations provide a useful example.

Delos A. Blodgett relied upon the Grand Rapids & Indiana Railroad (GRIRR) to deliver logs from a number of his camps to the Muskegon River. For three seasons at the end of the 1880's the logs from two camps near Deer Lake, on the Manistee Branch, and a third camp near the main line of the GRIRR were hauled south to the village of Paris in northern Mecosta County, where the railroad ran alongside the Muskegon River. Every workday from mid-December 1888 to early April 1889, thirty cars of Blodgett's Deer Lake logs were hauled 18 miles to Paris. The freight charge was \$2.00 per M. That season over 9 million feet of logs were hauled at a rate of 104 M per day, in carloads averaging 3467 feet. Two years later the GRIRR charged Blodgett \$2.50 per M for hauling logs some 35 miles.<sup>37</sup>

Railroad logging offered access to isolated stands and helped remove much of the uncertainty from the logging business.

Railroad hauling was neither hindered by lack of snow nor truncated by an early thaw. Though the average railroad carload was about the same as a sleigh load, the railroads ran every day, for months after the sleigh season closed. Logging railroads were large investments for lumbermen, and the rates charged by the public and private railroads were high. A short sleigh trip to a drivable stream was the cheapest and preferred method of log transport, but railroad logging allowed access to timber beyond the range of horse-drawn sleighs. Moreover, railroad logging reduced labor, food, and feed costs (as much as \$3500), and the required investment in horses (perhaps \$2500).<sup>38</sup>

Railroad logging had a widespread impact upon the landscape of northern Michigan. The railroads knew no seasons, and the scale of production grew with this dependable method of transport. More and more logs were cut each year and rails allowed logging to spread into the most inaccessible corners of the pinery. Railroad logging further contributed to the greater clearing of the forest by its enormous use of ties and cordwood. Though coal was also used, vast quantities of hardwood were cut to fuel the hundreds of locomotives. Railroad ties were usually cut from trees taken from the adjoining forest; immature pines, as well as unmerchantable species were used.<sup>39</sup> When the rails were taken up and laid elsewhere, new ties were often cut. Railroad logging also contributed to the continued dominance of sawmills at or near the mouths of Michigan's larger rivers. Railroads brought logs to riverbanks that were beyond the reach of sleighs, and when pine was gone in one river basin, they

brought logs from more distant points north. Although sawmills in the northern interior received logs and shipped lumber by rail, these mills were dwarfed by the continued high output of the large, downriver sawmill towns increasingly served, to some degree, by rail.

The average log size continued to decline during the 1880's. On average, the cut of the early 1870's ran 4 logs per M; that of the late 1880's ran roughly 8.5 logs per M. Logs of this scale averaged only 118 board feet.<sup>40</sup> Longer logging seasons and more dependable methods made it profitable to cut these smaller and poorer quality trees, especially as they were in demand for the furniture and woodenware industries. Though the total cost of railroad hauling was typically more expensive than the traditional sleigh, it was often much cheaper per mile. Moreover, after the initial investment, the marginal cost of hauling the smaller trees was minimal. With a greatly expanded hauling season railroad camps found it profitable to cut the smaller pines that would have been left behind by the sleigh hauling camps. And the average yield per acre, roughly 13 to 15 M per acre in 1870, jumped to 26 M in the 1880's when some yields were as high as 50 M feet per acre. Between 1884 and 1892, for example, Delos A. Blodgett's many camps cut 19 to 40 M per acre. In general, output per acre increased during this period in Blodgett's camps.<sup>41</sup> The steady fall in log size and rise in output per acre during the 1880's reveals the extent to which logging camps exploited the forest far more intensively, cutting lower quality and smaller trees than were taken in the 1870's.

As a result, the pine forest was decimated.

The environmental impact of less selective cutting was enormous. Loggers left behind saplings, unmerchantable species, and a tangle of tops and limbs. As W.J. Beal wrote in an 1888 report of the Michigan Forestry Commission,

. . . the forests [are] deprived of vast quantities of young trees, which ought to be left to produce more timber for the future. Desolation follows the track of the lumberman. All of the beauty and most of the value is removed from the land where the timber has been removed. Stumps, rubbish, the poor trees, the small young trees are burned or charred and the ground left to grow up to briars, pin-cherries, poplars, birches, willows, scrub oaks and other worthless trees and plants.

The lumberman cuts and removes the best, leaving the remainder in condition for the fire to certainly follow and destroy it, and moves on to treat <sup>42</sup> one section or township after another in a similar manner.

Although forest fires had become more common with logging and settlement since midcentury, new methods of logging greatly exacerbated the problem in the 1880's. Large tracts of dried slash were readily ignited by lightning, a locomotive spark, or fires set by farmers to clear their fields. In 1881 much of the "Thumb" area of Lower Michigan was burned in one of the worst forest fires in American history.<sup>43</sup> A few years later, John Fitzmaurice, a former Saginaw newspaper editor, gave free reign to gothic sentiment in describing the effects of another forest fire. Yet for all its maudlin tone, his characterization suggests something of the bleak aftermath of fire in the forest. "The sun," Fitzmaurice wrote,

was fast declining in the west, when we reached the last three miles separating us from our destined camp, with a cold November wind whistling through the interminable avenues of the Norway pines, as we came upon the Au Gres river, many miles from its outlet into Saginaw Bay. The steep banks were marked by the old "rollways," where the past season's logs had been precipitated into the waters of the snow fed river, now dwindled down to a modest stream. The prospect about us was not extremely inviting. The axe of the woodsman and the incendiary torch of the "fire fiend," had left on either side but little else than death and destruction, productive of the most sombre feelings, especially when contemplated upon an empty stomach. A snow storm--the first of the season--had covered the dreary landscape with a snowy shroud, through which the frost bitten ferns, dead brambles, and blackened stumps, pushed their shapeless forms, while a lowering, leaden sky added to the gloom. The fire scorched ruins of an old logging camp, stood near by, to, if possible, make the general desolation still more desolate. If a picture is ever wanted of perfect death and despair, in an earthly form, it can be found in all its ghastly perfection, in a Michigan pine woods where the fire has gone through, and if there be added, the charred and blackened remains of a lumber camp, partially hidden in snow, the scene will present an aspect, fully equal to any ever delineated by Dore, in his Dante.

#### THE SCALE AND ORGANIZATION OF FOREST PRODUCTION

The size and output of Michigan's largest logging camps increased greatly through the 1870's and early 1880's as the demand for sawlogs continued to rise and as the big lumber companies consolidated their dominant position in the Michigan industry. Camp production varied from a few thousand feet to as much as 12 or 15 million. Even in Delos A. Blodgett's operations production per camp ranged from 4 million to 13 million between 1884 to 1893. With such diversity, "average" figures can be misleading; yet, the growing scale of production is nonetheless demonstrated by a comparison of modal operations from the early



1870's and mid-1880's. Whereas the typical logging camp of 1870 produced 2 million feet with roughly 25 men, the average logging camp of 1885 produced roughly 8 million feet of logs with a crew of perhaps 65 men. During the 1860's the scale of forest production had been limited by inefficient tools, the difficulty in supplying remote camps with food and hay, and the potential for financial loss if bad weather occurred. The technological innovations, and the enormous profits, of the 1870's removed many of these limitations. Logging productivity had also grown with improved techniques, a longer season, and the increased scale of production. Seasonal output per man had jumped from roughly 90 M in 1870 to 130 M in 1883. The scarcity of stumpage and the increased cost of logging at greater distances from rivers had closed the industry off to most small- and many medium-size lumber companies. Most logging was done by large concerns that ran many logging camps and had annual production levels of 20 to 50 million feet or more.<sup>45</sup>

With more men, horses, and equipment at their disposal the large lumber concerns also had a greater capacity to adapt to troublesome weather fluctuations. Most of the larger lumber companies operated farms where food and feed were grown and where horses and equipment were kept until needed. They also operated larger camps in which men and teams could be reallocated to skidding, or hauling, or drawing snow for roads depending upon conditions. Typical of these operations was a G. Collins Lumber Company camp in northern Mecosta County where 12 crews, each with six men and one team, cut, bucked, swamped, and skidded

logs.<sup>46</sup> Teams were similarly appointed to skidding and hauling as required in Delos A. Blodgett's camps. In one camp, in the late 1870's, between 4 and 13 teams skidded at different times, and daily tallies of logs skidded ranged from 150 to 1200. In sleighing Blodgett sometimes had 25 teams at work, at others, only 1.<sup>47</sup>

The logging season expanded as new methods of log transport freed logging from much of its reliance upon winter conditions. In the early 1870's logging seasons lasted approximately 4 1/2 months, from late October to early March. By the 1880's the season was seven months (September 1 to April 1) due to big wheels, ice roads, and railroad hauling, as well as the continued demand for sawlogs by Michigan mills. Generally, men and teams spent the fall and early winter cutting and skidding and the late winter drawing logs to the river. In the railroad camps much of the fall and winter was used to stockpile logs at the skidways along the rail lines. The railroads then hauled logs from winter through spring and, at times, into early summer. The camps served by railroads might be closed in early April, but the log trains might run for months afterwards. Thus in 1879-80, Scott Gerrish could agree to supply C.H. Hackley & Co. with 10 million feet of logs half to be delivered to the Muskegon River by the Lake George and Muskegon River Railroad by April 1 and the remainder to be delivered similarly by July 1.<sup>48</sup>

Despite an expanded logging season, the lumber industry remained tied to the spring and summer river drive and the

summertime shipment of its product on the Great Lakes. Many of the constraints upon log transportation in the woods had been eliminated, but the industry was still heavily dependent upon cheap water transportation for the movement of logs to the sawmill and of lumber to market. Railroads allowed the direct delivery of logs to millponds and lumber to lumber yards, but in the 1880's most logs carried by private and public carriers were put into rivers, and most of Michigan's lumber reached external markets via the Great Lakes. Water continued to be the cheapest method of transportation despite the uncertainty of the drive and the winter hiatus in lake shipping. Though there were instances of year-round cutting, lumbering in Michigan continued to be a seasonal industry with distinct subseasons. Most cutting was confined to the traditional fall and winter season, and skidding occurred during the winter; it was easier to skid logs on frozen ground, and cold temperatures turned swamps, marshes, and lakes into hard, flat roadways, making many stands more accessible. Due to the continued importance of the drive, railroad hauling ended in many areas in May. Lumbermen were also hesitant to stockpile logs in the summer because of the danger posed by frequent forest fires.<sup>49</sup>

#### LOGGING COSTS

Despite larger, more mechanized logging camps, the costs of logging--comprising expenditures for stumpage, hauling, cutting, and skidding--remained relatively stable in the 1880's as economies in some facets were offset by cost increases in

other areas. The value of stumpage rose consistently through the 1870's and 1880's due to the growing scarcity of timber and the domination of the market by large companies and speculators. Some timberland purchased for as little as \$.55 an acre in the late 1860's was worth \$100 or more by the mid-1880's. Good pine land brought roughly \$13.00 an acre in 1870; in 1886 Cobb & Mitchell, a Cadillac lumber concern, purchased 800 acres from Delos A. Blodgett for \$125.00 per acre. The cost of stumpage per M increased less quickly than the cost per acre due to increased yields per acre.<sup>50</sup> At roughly \$4 to \$5 per M the value of stumpage during the mid-1880's was 4 or 5 times greater than it had been in 1870. In addition to stumpage, the main expenses of running a logging camp were food, feed, and wages. Wages, the largest of these, had fallen roughly 24 percent from pre-1873 levels. Larger camps and expensive stumpage pushed gross expenditures upwards, but total logging costs per M remained roughly \$8.00 due to the growing scale of production. That is, scale economies, increased yields, and declining wages offset the growing value of stumpage.

The investment required by logging soared in the 1870's and early 1880's; the capital outlays required to build ice roads and railroad grades and to purchase rolling stock and dozens of horses were enormous.<sup>51</sup> Despite the overwhelming increases in capital investment, the cost of cutting, skidding, and hauling (excluding stumpage) in 1885 was roughly the same as it was in 1870: \$4.00/M. Where railroads were used instead of sleighs, hauling costs might have represented half this figure.<sup>52</sup>

The ledgers and journals of Delos A. Blodgett provide a most detailed breakdown of logging costs at this time. Yet they reflect the presumed market value, not the actual cost, of Blodgett's timberland and of the services provided by one branch of his operations to another. Nonetheless, Blodgett's "costs" were generally lower than contemporary estimates of average industry costs. During the 1880's, when industry-wide costs were estimated at \$8.25 (1882), Blodgett's ranged from \$5.09 per M to \$7.92 per M. Much of this discrepancy is attributable to the fact that Blodgett's costs were reduced by his ability to provide food, feed, animals, and railroad hauling for his own camps, but in this he was not alone. Moreover, Blodgett may have carried his pine land below current market prices, at \$75 to \$80 an acre in the 1880's, and at \$100 an acre during the 1890's. At these values, the per M cost of Blodgett's stumpage ranged from \$2.15 to \$4.32,<sup>53</sup> with a definite downward trend associated with increasing output per acre from 1884/85 to 1891/92. The average costs for Blodgett's 23 camps were: stumpage \$3.18 per M, cutting and skidding \$1.74, and hauling \$1.63, for a total of \$6.55. Cutting and skidding costs varied from \$.95 to \$2.60 per M, largely according to the distance logs had to be skidded to the railroad. Thus, Blodgett's Camp number 3 (1887/88), almost 1 1/2 mile from the Clam River Railroad, had the highest cut and skid costs. Conversely, Camp number 2 (1884/85), which was directly served by this railroad had low logging costs per M (Figure 19). The cost of railroad hauling in Blodgett's operations included \$1.50 per M charged by Hackley & Hume and the Grand Rapids &

Indiana Railroad (GRIRR), for hauls of 6 to 15 miles; \$2.50 charged by the GRIRR for a 35 mile haul; and \$.80 to \$1.30 "charged" by the Blodgett-owned Clam River Railroad for hauls of a few miles. In sum, Blodgett's logging costs (excluding stumpage) were largely determined by the distance logs were skidded and hauled.

Few data are available concerning the profits of logging concerns, yet the information available makes clear that for those companies which purchased pine land in the 1870's, or before, the gain in stumpage was significant. Delos Blodgett's logging and milling operation earned an annual net profit of \$60,000 to \$135,000 during the 1880's, in addition to the profit earned on the soaring value of his stumpage.<sup>54</sup> Each year Blodgett rewrote the book value of his stumpage to represent his assessment of its market value. Thus, he often showed a "paper" profit on pineland that had been neither cut nor sold. When a parcel was cut and the resulting lumber sold, Blodgett earned a profit on his logging and milling operations, and he also realized the stumpage profit that he had taken on his books years before. Therefore, in addition to his large annual profit from logging and milling, Blodgett earned perhaps \$2 or \$3 million dollars between 1870 and 1893 from the rising value of his stumpage. For those operators who had acquired pine land during the 1850's and 1860's, the stumpage profits so overshadowed the profits from lumber production that some, like Henry Sage, considered quitting the lumber business to devote their full attention to pineland management.<sup>55</sup>

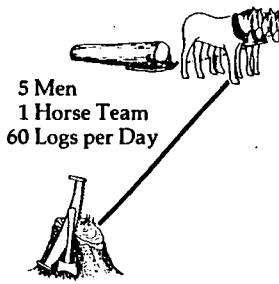
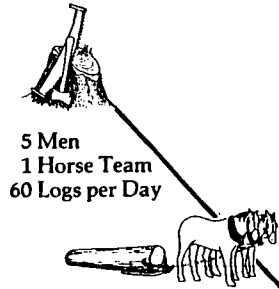
## A MODAL LOGGING OPERATION

The typical logging camp of 1885 cut roughly 8 million feet with 65 men over a seven month season. If a railroad were used to haul the logs, the season might be drawn out another month or two. A typical camp would cut about 320 acres (that is, two quarter sections) and produce roughly 8 million feet. The logs ran 8.5/M (the average log was 118 feet) and 26 M to the acre. After felling, logs were dragged a hundred feet or so to an open area to be chained to log drays or big wheels according to the season (Figure 21). Skidded (or wheeled) approximately half a mile to the skidway, they were stacked high. All of this cutting and skidding was done by crews of five men and one horse team, each of which produced about 60 logs per day. Six crews were at work on an average day.

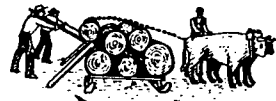
Sleighs, logging railroads, and public carriers were used to transport logs out of the woods. On an average day a horse team hauled three sleigh loads of 3000 feet, for a daily total of 9 M. In 1870 teams averaged 8 M per day, hauling their loads roughly 1 mile (8 "M/miles" per day); in 1885 the teams pulled roughly the same quantity of logs over twice the total (one-way) distance per day, for an average of 18 "M/miles". Sleighing did not begin until December, but then nine teamsters might be at work. At 78 M per day, these nine teams would take 100 days to move 8 million feet.<sup>56</sup>

Logging railroads were used instead of sleighs to transport logs from more distant points (typically 8 to 10 miles)

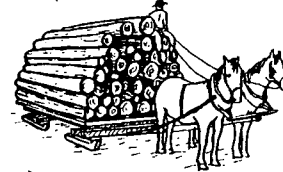
**CUTTING & SKIDDING**



**LOADING**



**HAULING**



—Sleighs on Ice Road  
3 Teamster &  
3 Horse Teams  
2 Road Monkeys  
Load Size: 3000 feet (25 logs)  
26 Mbf (225 Logs) per Day  
18 Mbf per Mile, per Team, per Day

**BANKING**

3 Men  
1 Horse Team

**TOTAL:** 63 Men  
15 Horse Teams  
78 Mbf per Day  
(+ 5 Men in Camp)

26 Mbf  
21 Men  
5 Horse Teams

26 Mbf  
21 Men  
5 Horse Teams

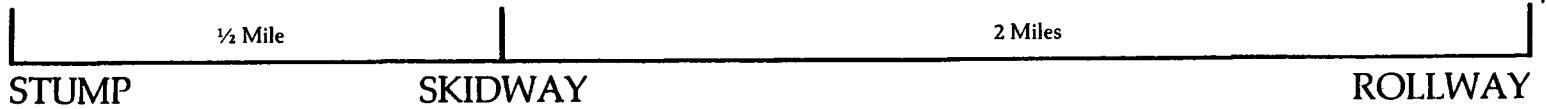


Figure 21. Organization of Logging production c.1883—Sleighs.

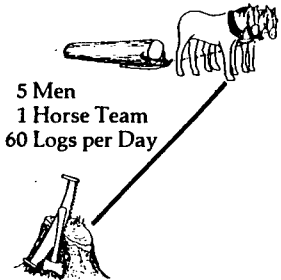
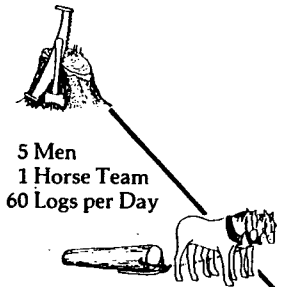


to the river (Figure 22). The roads hauled roughly the same number of logs per day as the horse-drawn sleighs, but were more dependable. Moreover, a logging railroad carried logs farther, averaging roughly 675 M/miles per day, compared to the 162 M/miles per day of a sleigh camp. Public carriers, too, were used to move logs. Typically these railroads hauled logs 15 to 75 miles to the riverbank (Figure 23). Railroad hauling reduced the number of men and horses required in an 8 million-foot camp. To sum up, logging during the early 1880's was characterized by an increased scale of production, less seasonality, and a capital intensive technology that kept costs per unit low.

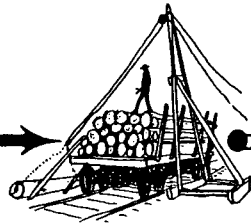
#### LOGGING CAMPS AND SHANTY BOYS

Railroads broke the locational association of camps and rivers in the 1880's. Camps that were served by a public railroad, or a private road with an outside link, were provisioned by rail. Camps that used small logging railroads or sleighs to haul logs were characteristically supplied by "tote teams" that made their way to and from a nearby village each day (Figure 24). As logging moved up the smaller tributaries and beyond the headwaters, tote roads were often 25 to 50 miles long. In a large logging camp three tote teams were sent each day for food and supplies. A small village in a logging area might be visited by more than a dozen tote teams daily.<sup>57</sup> With the adoption of railroad logging, individual camps ceased to be the isolated, self-contained productive units they once were.

CUTTING & SKIDDING



LOADING



HAULING

— Logging Railroad  
75 Mbf per Day  
2 Trains per Day  
Car load 3500 feet  
5 Men

BANKING

10 Men  
2 Horse Teams

**TOTAL:** 54 Men  
11 Horse Teams  
75 Mbf per Day  
(+5 Men in Camp)



Figure 22. Organization of Logging production c.1883--Logging Railroads.

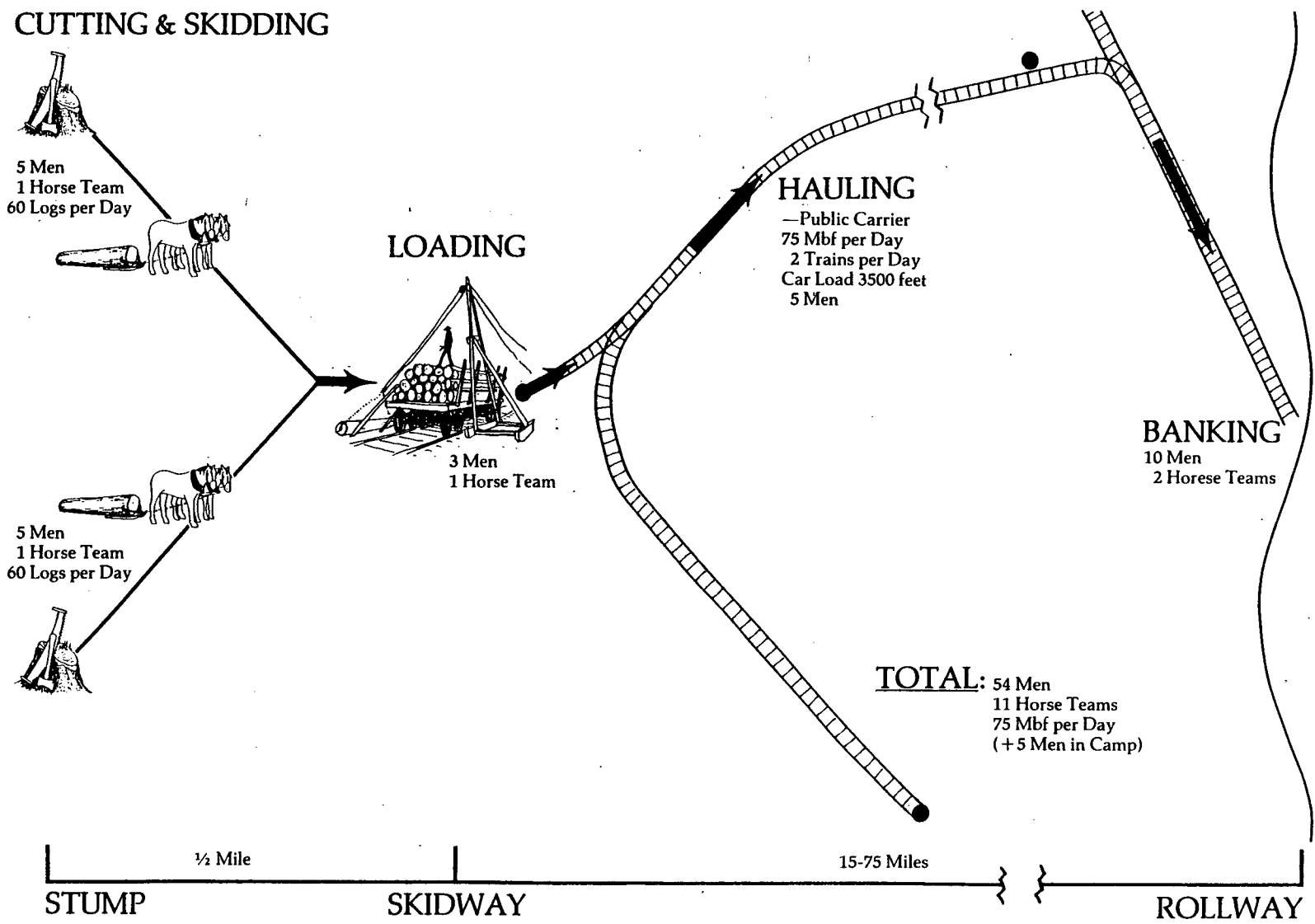
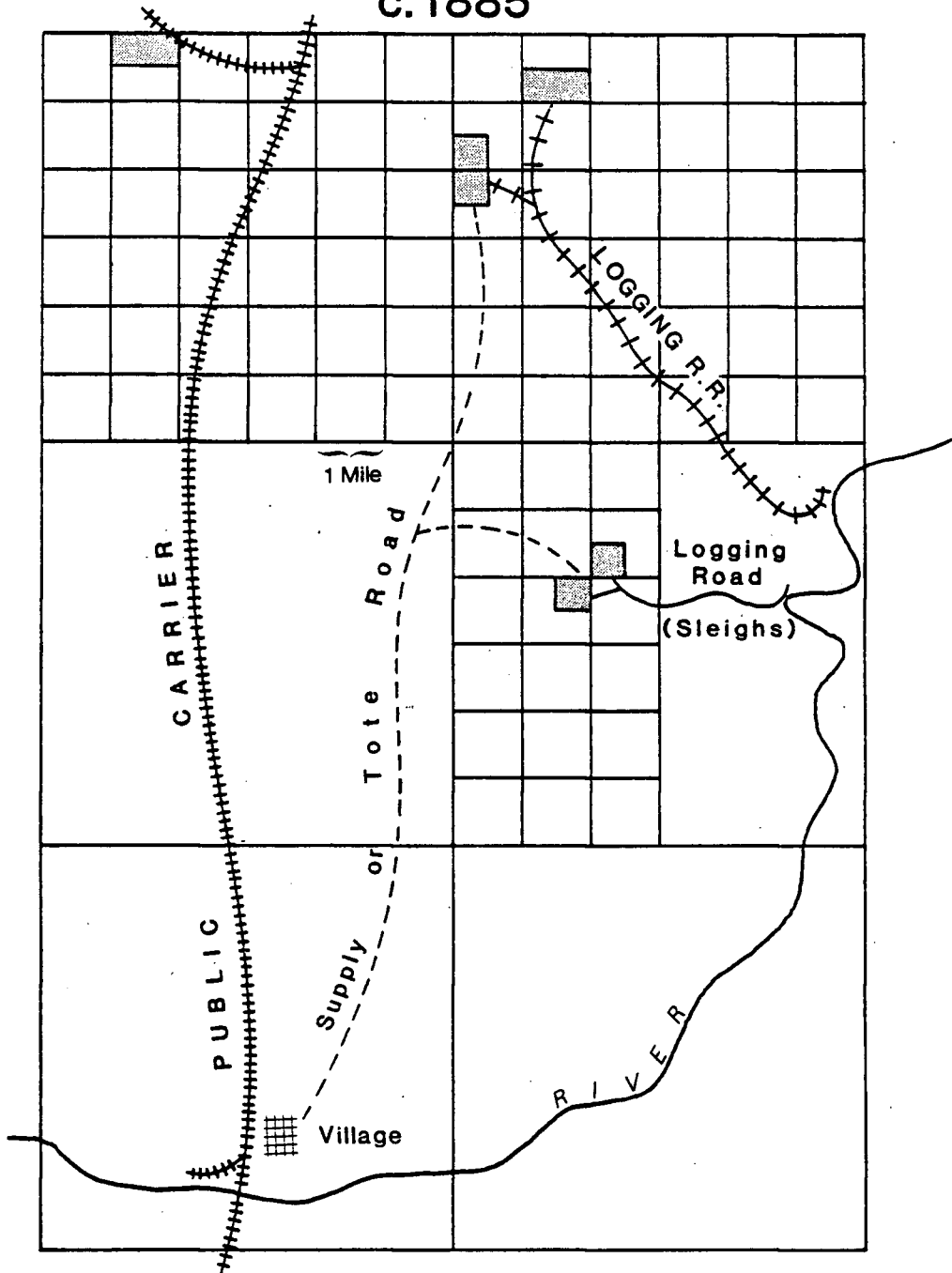


Figure 23. Organization of Logging production c.1883--Public Carrier.

Figure 24

### Logging Camp Location c.1885



Characteristically, several logging camps were integrated into a single large operation by a logging railroad that hauled their individual cuts.

The logging camps of the 1880's were larger and better furnished than those of a decade earlier. Five buildings remained the norm: men's shanty, cook shanty, office and van (store), stable and hay barn, and blacksmith and carpenter shop. The men's shanty was roughly 30 feet by 60 feet, and tar paper, held down by occasional boards, was the common roof covering.<sup>58</sup> The shanties were often comfortable and well furnished. Sheets, washed every few weeks by a camp washwoman, and straw mattresses were not uncommon. Shaded lamps, tables and chairs, mirrors, window curtains, and cuspidors were found in the better camps of this period.<sup>59</sup> The shanty boys were a transient bunch, and many lumbermen improved living conditions in an attempt to reduce labor turnover.

By the 1880's the logging camps were no longer isolated settlements in the wilderness. As railroad and telegraph systems expanded through northern Michigan and as the settlement and economic development of the region proceeded, the logging camps were increasingly integrated into the life and events outside the forest. Reading materials, especially newspapers, were in high demand and commonly available. Mail was delivered regularly, and peddlars, hospital agents, and preachers frequently visited the camps. The visits of the latter group were often encouraged by the lumbermen, who felt that lectures on temperance and clean living might reduce the turnover in the labor force. Although

liquor was generally not found in the logging camps, the shanty boys often left camp late Saturday or early Sunday in search of whiskey and women.<sup>60</sup>

#### THE SHANTY BOYS

Shanty boys of the 1880's were typically young, unmarried immigrants or sons of Michigan farmers. These men were attracted to the woods because there was nearly always work with cash wages. In 1890 roughly two-thirds of the Great Lakes's shanty boys were single. Most of David Ward's shanty boys were farmers' sons from Oakland County. The number of Michigan lumber workers nearly doubled between 1869 and 1879, and many of the new workers were recent immigrants. In 1879, when they accounted for 56 percent of the total labor force, foreign born lumber workers were twice as common as were foreign born in the state. Fully 30 percent of the Michigan lumber workers--half of the foreign born--in 1879 were Canadian. Ten years later the proportion was lower due to an influx of Scandinavians into the industry. Men from New York and Maine were also concentrated in larger numbers in the lumber industry than in the rest of the state. In certain northern Michigan lumber counties New Yorkers constituted 18 percent of the population.<sup>61</sup>

The large number of Canadian shanty boys was due, in part, to a large seasonal influx from Ontario, roughly 2/3 rds of whom were English-Canadian. In 1880 a net 7000 men entered Michigan at Port Huron/Sarnia. Roughly 75 percent of these migrants were lumber workers who came each fall to work in the

camps or in the spring to work the drives. The men of a few Michigan logging camps were entirely French-Canadian.<sup>62</sup>

As the lumber industry expanded and the scale of production in the forest grew, the social distance between the lumbermen and the shanty boys increased. The career of Delos A. Blodgett nicely illustrates the case. Once a shanty boy and camp foreman, Blodgett frequently visited his logging camps along the upper Muskegon during the 1870's. In 1881, however, he and his wife moved from Hersey to Grand Rapids, and Blodgett's lieutenants began to manage his logging operations for him. The removal of Blodgett from the direct management of his logging operation was due in part to his age; he was 56 in 1881. It also reflects the great prosperity of the industry and its changing scale. By this time Blodgett had an annual income of \$60,000 to \$80,000, and he commanded a logging operation that cut roughly 15 million feet each year. He owned two or three sawmills and was a senior partner of another large lumber company. The success of the industry brought great wealth to many entrepreneurs, and it tended to separate them from the day to day life of the camps and mills.<sup>63</sup>

The shanty boy reaction to the increased distance between owner and worker was varied. Many workers were happy to have a job, and, if they knew that their employer had once worked long hours in the woods, they were perhaps doubly appreciative of the improved living conditions in camp. According to one witness heard by the Michigan Bureau of Labor during an investigation of camp working conditions:

Thanks to the honor, manliness, humanity, and love of fair play which pervades the character of my employer, he does not avail himself to any extent of the advantages which his enormous capital would give him over his men, and we are to-day better paid, better fed and better cared for generally than the men of any similar establishment in the State.<sup>64</sup>

Other shanty boys saw no benevolence in their employers:

If there was more sympathy on the part of employers for their employees; less of a disposition to hold themselves aloof--to isolate himself from us--to regard us as in a manner created for no other purpose than his own aggrandizement, as machines to be speculated on and worked to our utmost capacity when in good condition, but to be cast aside as worthless when out of repair, just like any other piece of machinery; in short, if there was more of a disposition on the part of our masters to regard us as human beings, with the same feelings and instincts as they themselves have,<sup>65</sup> such disaffection as gives rise to strikes would be unknown.

In the 1880's the Knights of Labor had emerged as a strong force in most of Michigan's mill towns; strikes were common. Roughly half of the mill operatives worked during the winter in logging camps where there were occasional walkouts and slowdowns. The incipient class consciousness that had emerged in the mill towns by the early 1870's spread to the woods by the 1880's.

The longer logging season of the 1880's made it difficult for Michigan farmers to work in the winter camps and also participate in spring planting and the fall harvest. As the proportion of farmers and farmboys among loggers fell, a migrant working class emerged. Lake State shanty boys were likely to find summer work in the Lake Superior iron and copper mines, on



railroad construction crews, or on the grain harvest frontier. Lumbermen employed many of their shanty boys year-round, building railroad grades, fighting fires, and working on the company farms. The logging camps continued to employ large numbers of Midwest farm boys, but with the lengthened season recent immigrants flocked to the camps. Little land, other than cutover, was available in Michigan, and many immigrants worked as laborers in camps and mills before moving farther west in search of cheap land. Moreover, as the logging and milling seasons both expanded, there was less intraindustry job migration. The logger might be laid off from April to August, but a temporary job on the drive, on a farm, or on a railroad crew could tide a young man over until preparations for logging began again in late summer.<sup>66</sup>

#### WAGES

Shanty boy wages declined nearly 50 percent after the Panic of 1873 and increased slowly over the next decade. In 1883, \$26.00 per month (plus room and board) was the average wage for semiskilled labor, compared to \$35.00 per month in the early 1870's. This was a decline of 26 percent in actual wages. Average daily wages for common laborers in Michigan declined 13 percent from 1869 to 1880, while daily wages for laborers nationally dropped 20 percent.<sup>67</sup> The Michigan Board of Labor canvassed 31 logging concerns during the 1883/84 logging season--a time of mild economic depression--and found an average low monthly wage of \$16.44 and an average high wage of \$25.98,

which was paid in addition to room and board;<sup>68</sup> this represented the wage range for unskilled and semiskilled workers. The young boys of the camps, who worked as cook's helpers (cookees) or who kept the roads clean of debris (road monkeys), earned roughly \$16.00 per month; sawyers, choppers, and loaders received the average wage of \$26.00 per month. The more skilled members of the camp work force, such as the top loaders, the blacksmith, and the filer often received \$30 to \$40 per month. The camp cook, who worked a seven-day week and longer hours, and the scaler earned \$40 to \$70 per month. If Hackley and Hume's offer of a job as foreman to A. Rodgers of Manistee at \$75.00 per month in 1887 is any guide, camp foremen received \$70-\$80.<sup>69</sup>

Annual incomes of shanty boys are more difficult to determine due to the seasonal nature of the industry. In 1893 the Michigan Bureau of Labor estimated that a shanty boy earned \$185.00 during the logging season. This is what we would expect, given a seven-month season and the typical \$26.00 per month wage. In 1870 a shanty boy earned roughly \$175.00, but this was for a five-month season. A Michigan lumber worker during the 1880's earned about \$280 to \$300 for a year's work in camp and mill.<sup>70</sup> Though wages declined, annual income stayed relatively stable due to lengthened logging and mill seasons. Moreover, real earnings had advanced significantly. In constant dollars lumber workers earned roughly 30 percent more per year in 1880 than in 1870.<sup>71</sup>

As the Michigan lumber industry expanded in the 1870's

the scale of production increased enormously. By 1885 Michigan sawmills cut a total of 3,578 million feet of pine lumber, twice the output of 1869.<sup>72</sup> New tools, such as large-wheeled log carts and block & tackle loading devices, and new techniques, such as logging roads of solid ice and the use of railroads to haul logs, reduced the loggers' dependence upon weather and seasons. Greater capital investment and the soaring value of stumpage raised the threshold of access to the industry. Small lumber companies, unable to acquire new stumpage, faced a cost squeeze as efficient large operations set the price for saw logs. Equally profound changes affected life and landscape in northern Michigan. More efficient and reliable logging methods made it profitable to cut smaller, lower quality trees. Although average log size plummeted, yield per acre increased as the industry cut more and more of the forest. The enormous demand for labor created by the expansion of the industry and its longer season was met largely by recent immigrants and young men from midwestern farms. A large migrant labor force emerged in the upper Lake States to serve the needs of the lumber, and to a lesser extent, the mining and railroad construction industries.

In short, a more capital intensive, mechanically dependent industry was replacing the simple, small-scale, seasonal enterprise typical of the 1860's. Logging in the 1880's was characterized by a specialization of its various tasks, increased distance between stump and rollway, the emergence of a forest working class, a growing scale of production, and a wider array of products. Although the traditional methods of logging

were still being used in some of the logging camps,<sup>73</sup> the lumber economy had expanded greatly, and it affected the value and availability of land and labor throughout northern Michigan and the Upper Lakes region. A more dependable, less selective logging industry moved into hitherto inaccessible areas and in so doing hastened the decline of Michigan lumbering.

## Chapter 5

### MILLS AND MILL TOWNS IN AN INDUSTRIAL AGE

After decades of expansion, the Michigan lumber economy reached its zenith during the 1880's. Michigan led the nation in lumber production for most of the late 19th century, but its dominance was the greatest during this decade. In 1885, for example, Michigan produced more than half of the white pine output of the three Lake States, and 22% of the national output of all lumber.<sup>1</sup> During the 1870's and early 1880's the Michigan lumber economy grew and expanded into the northern interior. The population of northern Lower Michigan nearly tripled during the 1870's.<sup>2</sup> The distance between stump and mill increased, Michigan saw mills became fully-mechanized factories of enormous production, and secondary manufacturers of wood products grew up around these mills.

This expansion and growth took place within a rapidly evolving national context. The demand for Michigan lumber remained strong in eastern urban and western agricultural markets. The proportion of urban population in New England and Mid-Atlantic states grew 35% during the 1880's,<sup>3</sup> and population soared in the plains, where Nebraska's population had a net increase of 150% during the 1880's.<sup>4</sup> In the lower Midwest, agricultural clearing continued unabated and Indiana, Illinois, and Ohio became important markets for Michigan lumber.<sup>5</sup> A spreading railroad and telegraph system

increasingly linked Michigan mill towns with these national and regional markets. Michigan lumber manufacture showed the effects of its rapid integration into a national, modernizing economy. Industrial technology transformed the nature of sawmilling, as well as log transportation, while Michigan's saw mill towns began to produce an array of finished lumber and manufactured wood products for national markets.

Despite the general trend of expansion, the Michigan lumber economy was given to occasional cycles of growth followed by retrenchment. Following the Panic of 1873 a depression plagued the lumber industry for a number of years; wages and prices dropped drastically. Not until 1877 did annual production exceed pre-depression levels. After 1878 production grew by roughly 20% annually until 1883 when depression again gripped the industry.<sup>6</sup> Yet this decline was smaller than that of the previous decade. After a year or two of slow markets, recovery followed and there was strong demand for Michigan lumber until the Panic of 1893. During the 1880's the Michigan lumber industry found it difficult to control the fluctuating market for lumber. Of the roughly 1750 sawmills operating in Michigan, none produced more than a small fraction of the state's total output. Even in the main mill centers, the largest mills produced no more than 10% of local output. Furthermore, the industry lacked an effective manufacturer's association. A fluctuating market and occasional overproduction characterized the Michigan lumber industry during the 1880's.

## PATTERNS OF REGIONAL TRANSPORT AND MANUFACTURING

New patterns of forest production and lumber manufacturing had emerged by the early 1880's. The pine within a few miles of Lower Michigan's large rivers had been cut during the 1870's; in the next decade logging moved north and inland, up the tributaries and into the uplands between rivers. The distance between sawmills and their supply areas increased as lumber manufacturing remained concentrated in the river mouth mill towns. Log transportation grew in cost and importance as a result. Within the major river basins logs were driven longer distances out of small streams that required extensive improvements. Logging railroads carried logs from more inaccessible points to riverside rollways. Furthermore, logs were being cut outside these traditional logging areas and transported by public carriers and Great Lake rafts. For example, of the sawlogs received by Saginaw Valley sawmills in 1887, 28.5 percent were delivered by rail (compared to 2.5 percent in 1879) and 5 percent were rafted from outside Saginaw Bay; river drives supplied the balance. Other large sawmill towns, such as Manistee, Muskegon, and Alpena, received nearly all of their logs via the drive, due in part to their limited rail connections.<sup>7</sup> In sum, the Michigan lumber economy expanded into the isolated reaches of the traditional river basins, and extended its influence through most of the Lower Peninsula and beyond. As timber grew scarce in the Saginaw and

Muskegon River basins, these areas began to lose their prominent position in the industry. Northern mill towns, such as Alpena and Cheboygan, were still secondary production centers but they had increased production in both absolute and relative terms.

As logging moved into the northern interior smaller streams and creeks were used to drive logs. Many logging concerns went bankrupt trying to drive ten thousand logs or more out of a small, shallow river. Consequently small rivers were dredged and straightened, trees and boulders were removed, bridges were rebuilt to allow the passage of logs, and dams were constructed to conserve precious water. This was expensive difficult work, generally conducted in the summer during low water, but it was essential if timber were to be brought out from remote areas.<sup>8</sup>

Logging dams played a crucial role in river driving during the 1880's. Used occasionally in earlier years, they were widely adopted as the volume of the drive grew and the size of the streams to be driven diminished. Logging dams were semi-permanent structures constructed of timber and earth with a sluice gate; a small dam at the head of a stream might cost \$500 (larger more substantial structures ran to \$5000), and raised 6 to 8 feet of head. These dams were used primarily to accumulate a reservoir of water and also acted as storage ponds for logs. At times conflicts arose over use of a dam and its water, though the largest operator along a stream often supervised a central drive.<sup>9</sup> A small dam might provide water for a few days of driving. The wave of water released from the dam would fill the



nearly-dry streambed and carry the season's cut down river. Another dam or two might be used along the stream until the logs reached the main river. Dozens, perhaps hundreds, of these dams were scattered through the upper reaches of single river basins.<sup>10</sup>

Logging dams extended the drive season and ordered its helter-skelter, success-or-failure character by giving river men greater control over the drive's operation. John Fitzmaurice, author of "The Shanty Boy", explained in 1888 that it was "not so long ago" that the river drives had relied entirely upon spring freshets. Yet, with the widespread use of dams and other river improvements, . . .

Now the whole summer can be passed in "washing out" timber by the medium of these methods, which--however costly in construction--have served their purpose fully, and it is only in comparatively small creeks and streams that the logs are now "hung up."<sup>11</sup>

Though dams greatly aided the drive, many logs were stranded on the smaller tributaries due to the wide fluctuation of water levels and the smaller average log size. Logging dams and river improvements were, however, only short-term solutions. The water let loose from logging dams flushed streams of silt and sand, and widened and deepened their beds. Consequently more water was required to drive logs in the enlarged streams.<sup>12</sup>

The river drives of the 1880's were conducted in much the same manner as they had been a decade earlier. The jam crew worked at the head of the drive to keep the logs moving and to

prevent log jams. The sacking crews brought up the rear of the drive; they spent two or three months recovering stranded logs. Yet the drives of the 1880's contained many more logs, covered longer distances, and lasted many more weeks than those of the late 1860's. In the mid-1880's the largest river drives, such as the Muskegon and Tittabawassee, handled over 400 million feet of logs annually; the drives on the Au Sable, Manistee, and Thunder Bay were approximately half this size.<sup>13</sup> Feeder drives, which were usually organized independently, fed into the main drives. The larger volume of logs often led to larger log jams, at times 30 to 40 feet high; many men, oxen, and peavies, as well as an occasional stick of dynamite were required to get the logs free and flowing.<sup>14</sup> The sacking crews began at the head waters in late May or early June and reached the booming grounds by late July or early August.<sup>15</sup> The increased volume of logs led to larger boom works and widespread flooding; conflicts between boom companies and riparian land owners increased as a result.<sup>16</sup>

River drives were consistently the cheapest, if not the most dependable, method of transporting logs from the forest to sawmill. Driving charges were determined by the the distance logs were driven, and driving on small streams was typically more expensive (per mile) than on the main river. While costs on the large drives were as low as .5 cents per M/mile, per mile costs on small tributaries might be as much as 5 cents. In the early 1880's the cost of transporting logs from rollway to mill pond varied widely, from \$.06 to \$2.00 per M for driving and from \$.18

to \$1.00 per M for booming, sorting, and delivery. On average, driving and booming charges were roughly \$1.75 per M. This was about 10% of the total cost of lumbering.<sup>17</sup>

"Shrinkage," or the loss of logs on a river drive, was an important, albeit hidden, cost of river driving. During a river drive many logs were stolen, stranded or sunk. Good quality white pine floated extremely well, but Norway pine and the smaller and poor quality white pine logs floated less well. Moreover, the problems of sunken and stranded logs increased as the average log size diminished. Theft was a common problem. Logs had their ends sawn off and were re-marked, or were said to have "strayed" into the booms of upriver mills. "Shrinkage" claimed roughly 10% of a drive, and another 10% or 20% of each year's cut did not arrive until the following year.<sup>18</sup>

The pattern of river driving during the 1880's is well revealed by the Clam River drive operated by Delos A. Blodgett, a prominent lumberman of the Muskegon River area. Two logging dams were constructed along the Clam River to aid the drive. The 10 or 12 logging concerns along the Clam River paid driving charges of \$.23 to \$1.00 per M depending upon the distance their logs were driven. Blodgett divided the 35-mile river up into seven "divisions", and drive charges (per M) were determined by the location of each company's rollway. Logs that were put into the river at "Division I" incurred charges of \$1.00 per M, or roughly \$.03 per M/mile. Those reaching the River in Division 4 paid \$.45/M. The Clam River Drive also charged the lumber concerns for driving the tributaries of the Clam River, and for breaking

rollways. In 1886 more than 64 million feet of logs were driven out of this tributary to meet the main Muskegon drive. This was roughly 25% of the Muskegon River cut.<sup>19</sup>

Conflicts between the lumber industry and riparian land owners multiplied as the flow of Michigan's rivers was disrupted by stream improvements and logging dams. Farmers complained that their fields were flooded by the opening of the dam flood gates. Spring flooding along Michigan rivers is common, yet riparian land owners alleged that it was "caused" or enhanced by drive and boom operations and sought damages. Michigan boom companies fought these cases, but the courts typically sustained the farmers' complaints to some degree, and the boom companies grudgingly accepted their responsibility. Reasonably typical was the case involving one farmer who brought suit against the Muskegon Boom Company charging that log jams had frequently flooded his land between 1881 and 1886. He claimed \$15,000 in damages, but received only \$500 after a long trial.<sup>20</sup> In consequence of such actions, Michigan boom companies bought dozens of frequently-flooded farms along the lower reaches of the major rivers, and paid tens of thousands of dollars in damages.

Similar conflicts arose over access to the river course and the use of its water. John Koopman, who owned a sawmill, grist mill, shingle mill, and creamery--all water-powered--at Falmouth, fought many legal battles to stop the use of logging dams on the Clam River. He complained in court that Delos A. Blodgett's logging dams and river drive had disrupted his milling business and that he suffered financially as a result.<sup>21</sup>

According to Koopman:

. . . at certain periods . . . there . . . was very little water running in said river at plaintiff's said premises, and at other periods . . . said waters would and did run past said premises in great floods and torrents and much higher than said waters would naturally run.<sup>22</sup>

In retaliation Koopman denied drive crews access to his dam and its sluice gate at the height of the driving season. In 1886 Blodgett was compelled to post a \$10,000 bond to ensure that the Clam River drive and its use of dams did not cause Koopman any "loss or damage."<sup>23</sup> Blodgett and Koopman spent the next couple of years in court. When, a few years later, Koopman obtained an injunction against "driving logs on the Clam River by flooding" he effectively stopped logging on the upper Clam River for a season or two.<sup>24</sup>

Blodgett and other lumbermen claimed a traditional right to drive logs on Michigan rivers. For them this was the crucial issue, far more important than their responsibility for flooding damages. From the industry's point of view, Koopman wanted to deny the drive access to the river, and Blodgett went to great lengths to establish his position in court. By interviewing old river drivers he attempted to show that river drives had occurred on the Clam before Koopman built his mills. Local farmers were interviewed to determine whether they had been turned away from the mills by Koopman due to disruptions caused by the drive. Blodgett wrote letters to the owners of water-powered mills all over the state asking for the dimensions of their dams and

flumes, and whether it was possible to conduct business during a river drive.<sup>25</sup> This was a classic conflict over access to a river and the use of its water. In the end the Supreme Court of Michigan held in Koopman's favor and Blodgett paid damages of \$2000. Most of the remaining logs of the Clam River area were removed by rail, circumventing the Clam River.<sup>26</sup>

#### LOG DELIVERY BY RAIL AND RAFT

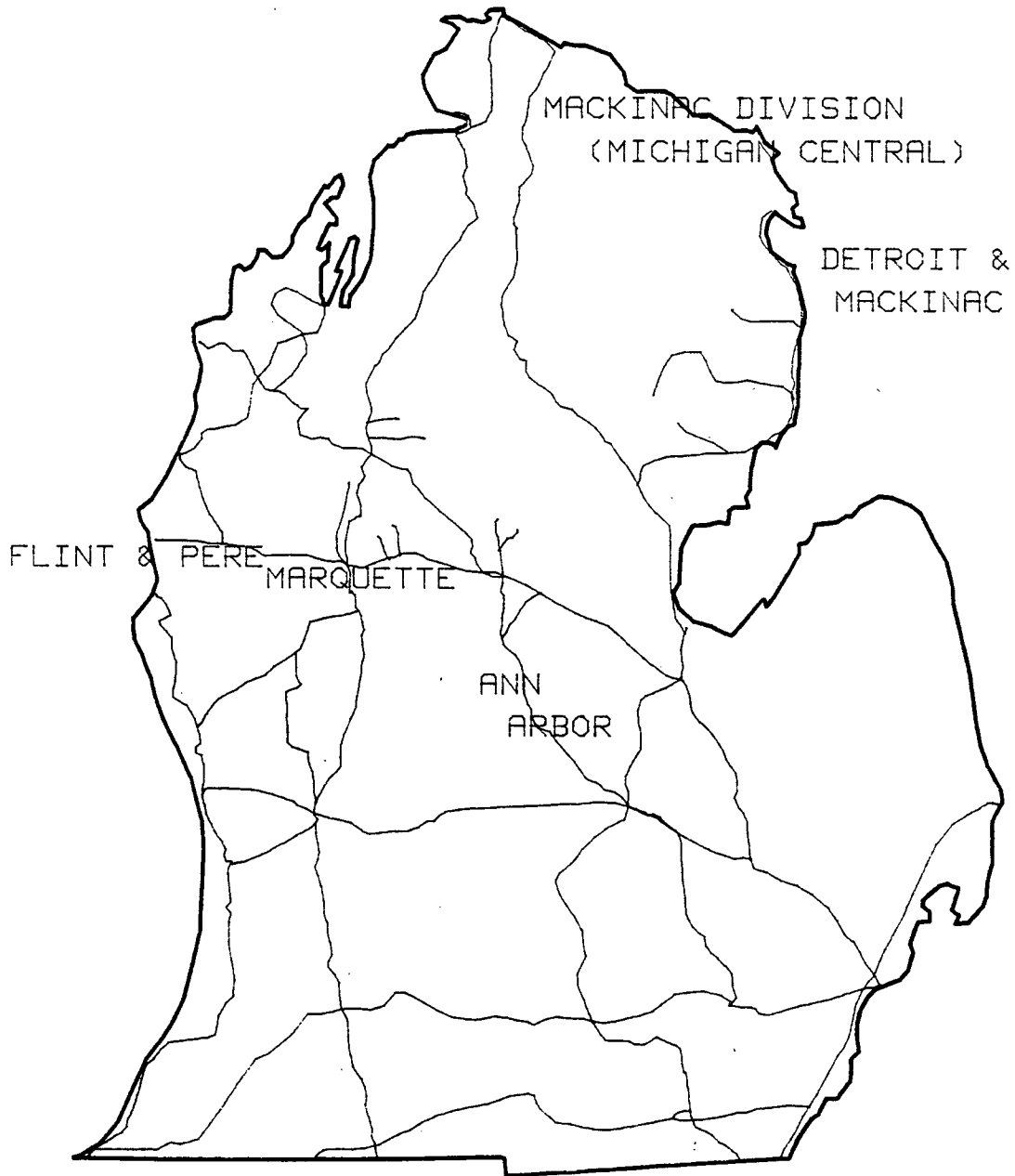
As pine became scarce along the banks of Michigan's rivers, mill owners and logging companies turned to new methods of transportation. Railroads emerged as an important method of log transportation during the late 1870's, and by the end of the 1880's Lake Huron mills began to receive logs by Great Lake rafts. Both of these methods extended the Michigan lumber economy into new areas. Railroads extended a mill's supply region to include the isolated stands in its own tributary basin, as well as the entire Lower Peninsula. Great lake rafts extended the supply line into Ontario and the Upper Peninsula.<sup>27</sup>

Although rails had been used to supply logs to Michigan sawmills in the early 1870's, the practice was uncommon, and it was not until 1880 that it became widespread. Public carriers hauled logs directly to a mill pond, or to a major river to be included in the annual drive. As a rule, log hauling by rail was expensive and it was not economical to use public carriers for more than fifty miles, though at times logs were marketed by rail up to 75 miles. Logging companies paid \$1.50 to \$3.50 (or more) per M for railroad hauls, that is roughly 4 cents per M/mile or 2

to 6 cents per ton/mile.<sup>28</sup> This was two or three times the cost of river driving. The northern Michigan railnet had grown in the 1870's and railroad companies built hundreds of spurs and branches into the pineries to attract log hauling business (Figure 25).<sup>29</sup> The Flint and Pere Marquette Railroad Company (FPMRR), for example, hauled 105 million feet in 1881, compared with 14 million just two years earlier. In 1883 the FPMRR hauled 60% of its 153.5 million feet of log freight to Saginaw mills; 19% went to the Tittabawassee River. The Mackinaw Division of the Michigan Central Railroad (MCRR-MD) with its access to the pine forests of the far north, hauled up to 250 million feet of logs a year--roughly the quantity of the Manistee or Thunderbay river drive--in the late 1880's.<sup>30</sup>

Logs were rafted short distances along the Lake Huron and Lake Michigan shores as early as 1855, but long distance lake transportation began in 1885 with the rafting of logs from the Michigan shore of Lake Superior to Saginaw River Mills. By the late 1880's, 30 or 40 million feet were rafted to Saginaw mills from "Upper Michigan points" annually.<sup>31</sup> In 1887 the Saginaw Board of Trade estimated that 5% of the logs milled in the Saginaw region were rafted. Few rafts and barges of logs crossed Lake Huron from Georgian Bay because of the difficulty of open water rafting and the \$2.00 per M export duty on Ontario logs. The invention of the "bag boom"--a large circle of short, thick logs chained end to end which enclosed free-floating logs--in 1885 and its subsequent refinement provided a reliable and economical method of lake rafting. Rafting was cheap, \$.70 to

Figure 25  
NORTHERN MICHIGAN RAILROADS  
1885



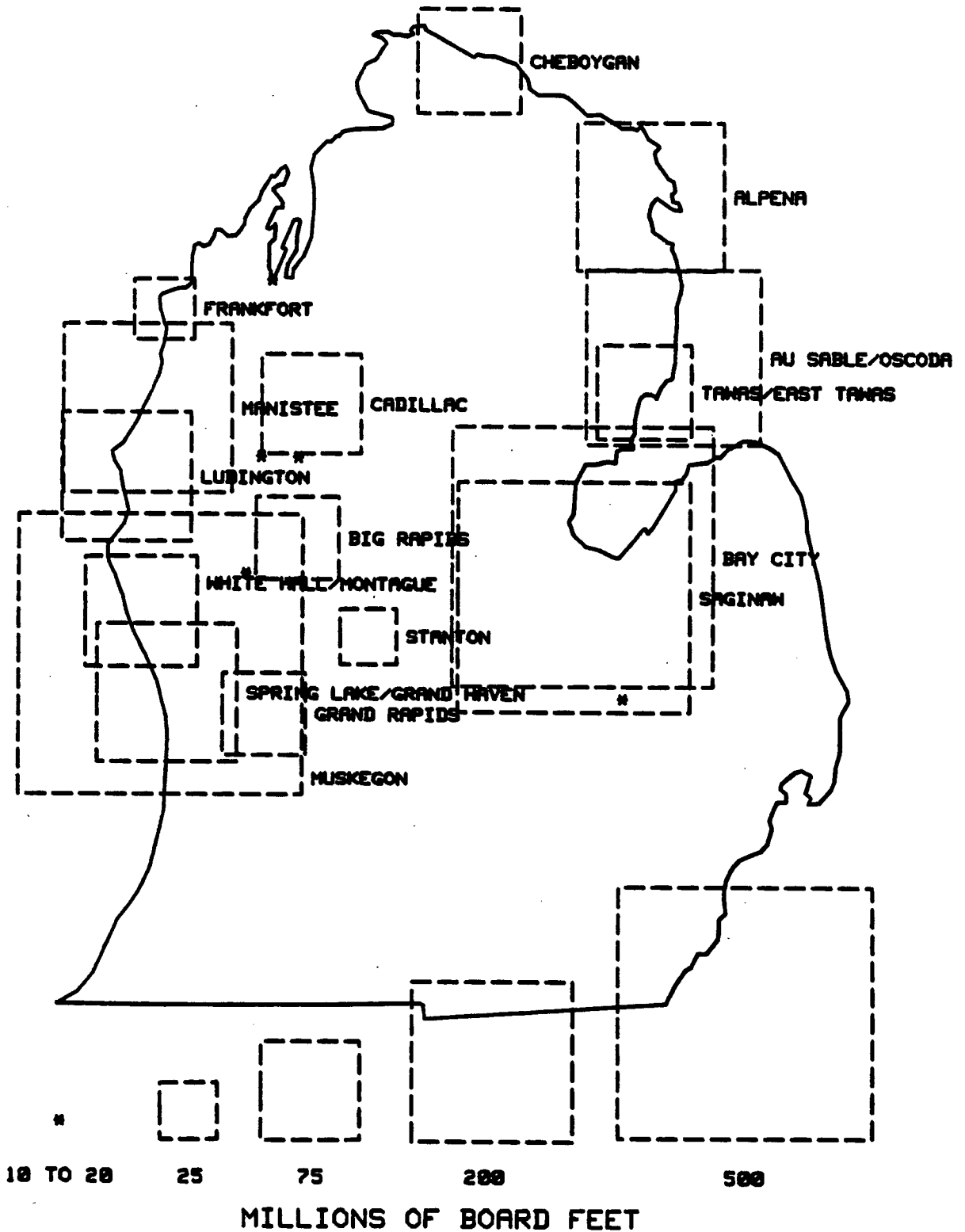
Source: [G.F. Cram], Michigan, Woods' Official Railway Guide, [1885]; Rand McNally, Michigan, 1883.



\$1.00 per M for even the longest distances.<sup>32</sup> Bag booms rode the waves well and rarely allowed logs to escape.<sup>33</sup> Generally they contained one million feet, but rafts of 3 to 5 million were not uncommon. With the removal of the Canadian impost in 1890 Ontario became an important source of logs for Michigan mills. Eighty million feet entered from Georgian Bay in 1891, and this rose to 184 million in 1892.<sup>34</sup>

A lengthening supply line facilitated the continued concentration of lumber manufacturing in Michigan's lakeshore sawmill towns (Figure 26). As a general rule, sawmill owners were not inclined to reduce the distance between stump and mill by locating in the northern interior along the spreading railroad network. Whereas mills were concentrated at "break in bulk" points in the 1870's, three additional factors affected industrial location in the lumber industry of the 1880's: the scale of production, the benefits of a large mill town location, and Michigan's unique position amidst the Great Lakes. As profit margins fell during the 1870's, mill companies had adopted larger, faster, and more powerful milling machinery to speed production, increase output, and lower per unit costs. These mills were not portable, and several years of operation were required to recoup the larger capital investment in such structures. Second, mill owners chose to locate in large mill towns because of agglomeration economies, that is the benefits of concentrating economic activity at a single place. Secondary manufacturing of wood products had become an important element of Michigan mill town economies in the 1870's and offered an

FIGURE 26  
 LUMBER PRODUCTION -- 1883  
 (BY MILLTOWN)



SOURCE: Smith, "Lumbertowns in the Cutover," pp. 43-67.

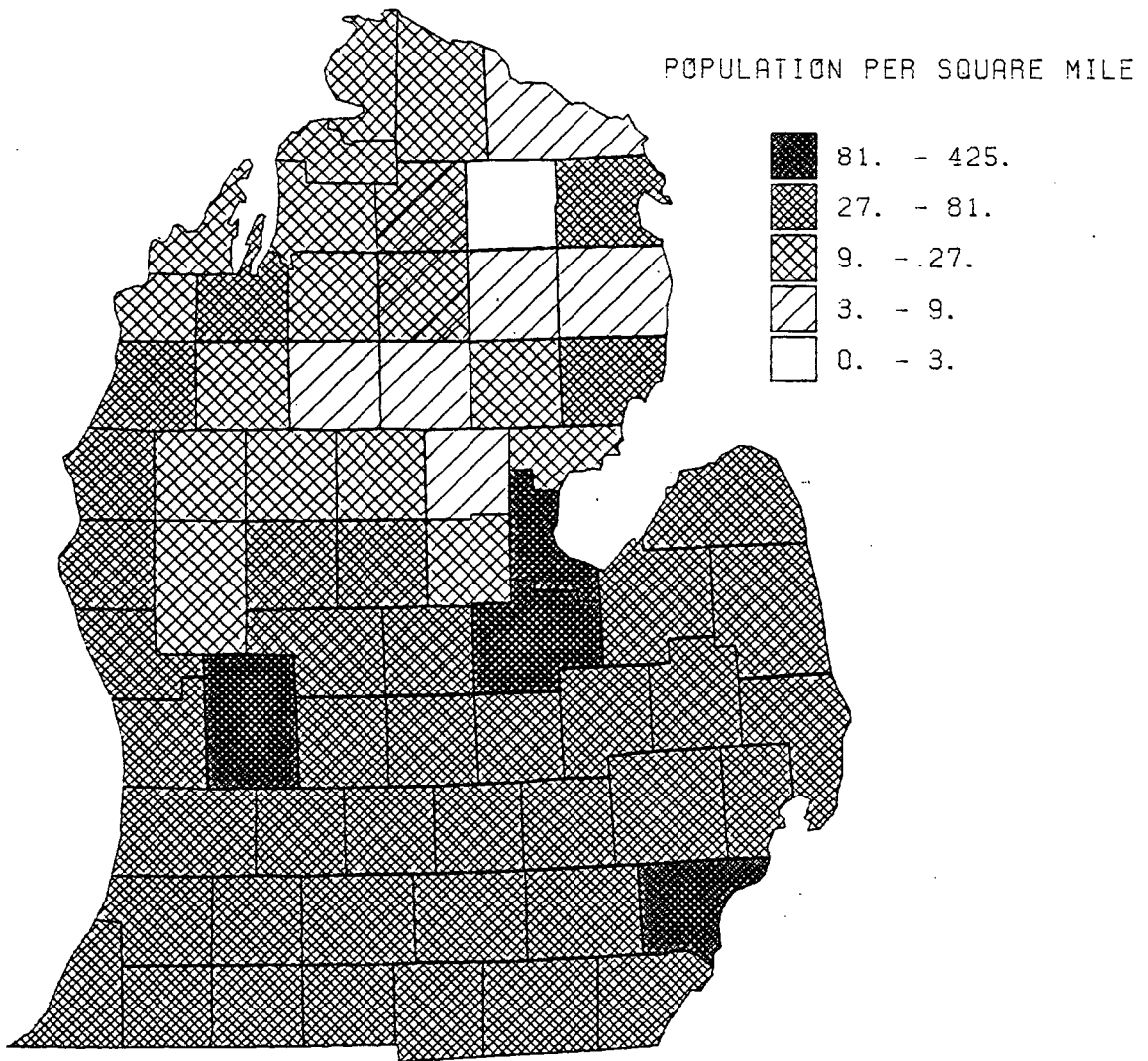
attractive market for sawmill products. In these centers foundries and saw blade manufactures were at hand to supply sawmill needs, and competing railroad connections kept down transportation rates to the larger lumber markets. Furthermore, labor was cheaper, and skilled labor was more readily available, in these lakeshore mill towns.<sup>35</sup> Thirdly, Lower Michigan, unlike any other state, had direct access to the major wholesale markets in both the east and west via the Great Lakes. In Wisconsin, for example, both the Mississippi Valley and the Lake Michigan mills shipped by rail to a much greater extent than did Michigan mills.<sup>36</sup> Access to lake shipping served further to reduce rail rates.<sup>37</sup> The spread of railroads and a lengthened drive facilitated the continued dominance of lakeshore mills.

Although a few settlers and logging camps preceded the advance of railroads into remote northern Michigan, in general the rails opened up new areas for settlement and logging. After 1873 this was particularly true in the northeast corner of the Lower Peninsula and in the area bounded by Manistee, Traverse City, and Cadillac where population density increased greatly (Compare Figures 27 and 13). As logging spread north and inland so too did agricultural settlement, and local service centers appeared along the major railroads. Logging, railroads, and local agriculture were mutually dependent enterprises. The camps offered winter work to local farmers and markets for their goods. Forest and agricultural products were the railroads' primary source of income, and the corollary--that camps, mills, and farms depended upon the rails to receive supplies and to ship their

Figure 27

POPULATION DENSITY --- 1890

(LOWER MICHIGAN)



product--was true as well. The number of farms in Cheboygan County, for example, grew from 31 in 1870, to 343 in 1880; total acreage in farms grew at a similar rate.<sup>38</sup>

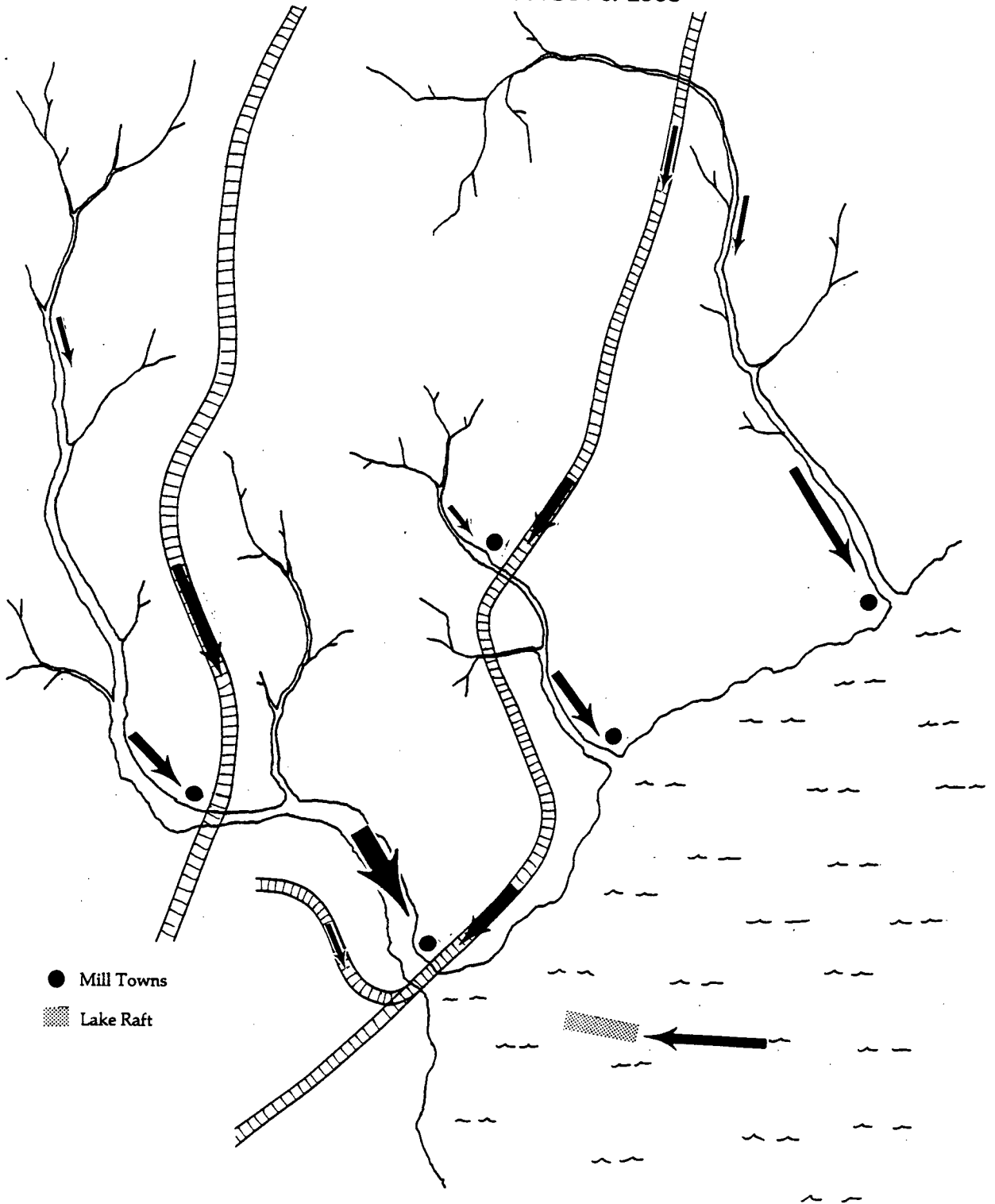
The Michigan lumber economy continued to expand during the 1870's, a result of the growing demand for lumber, the concentration of manufacturing in lakeshore mill towns, and the availability of improved and new methods of transport. The river drive adapted to changes in lumbering in the 1870's, and expanded up tributaries and into headwaters. The widespread use of short, light-weight railroads to haul logs to rollways acted as an extension of the drive into more inaccessible areas. Public carriers brought logs from outside the traditional supply areas, but this was not economical for long distances. Figure 28 illustrates the relative importance of these methods of transport c. 1887. An improved, expanded drive and the expansion of the railroad network facilitated the growing distance between stump and mill.

#### LUMBER MANUFACTURING AND MARKETING

Though still a seasonal industry of partnerships and proprietors, Michigan saw milling showed many signs of modern industrial manufacturing in the 1880's. The entire production process was mechanized; capital requirements were up; manufacturing and shipping seasons were extended; mills produced a larger and more-finished array of products; and the scale of production had grown significantly. Capacity in Michigan's

Figure 28

LOG TRANSPORTATION c. 1883



mill towns soared (partly as a result of demand from new secondary wood manufacturing concerns) and so too did the demand for saw logs.

By all accounts profit margins in the milling industry narrowed during the late 1870's. Pine stumpage increased some 60 percent and although labor costs fell 25 percent, mill owners sought to improve their profitability by reducing waste and increasing output.<sup>39</sup> The Lumberman's Gazette of February 2, 1878 succinctly revealed the changing context within which mills operated:

. . . During the late Civil War, and for a time thereafter, labor bore such relations to the price of lumber that the attention of manufacturers was chiefly directed to the economy of labor, but at the present time, when lumber is already double the former value and steadily increasing in price, the saving of raw material becomes more and more the great object, . . . .<sup>40</sup>

New machinery offered the most direct means to this end. Mill men turned to saws that produced lumber of higher quality and that cut a smaller kerf (that is, the cut made by the saw was narrower). Again the Lumberman's Gazette articulated sentiments that were finding common expression.

. . . when timber becomes scarcer and advances in price correspondingly, it will not do to waste one-fourth of the wood in cutting it into inch boards. Thinner saws will be required; saws cutting with greater regularity as to thickness and securing a surface that will not have to be cut away so much in planing. The circular saw, with its quarter inch set, its wasteful kerf and production of rough and furrowed surfaces, will be laid aside except for slabbing . . .

The circular saw had emerged as the standard head rig during the 1870's because of its high speed and the simplicity of its design. It was used in association with a mulay or two, or perhaps a gang saw. But the circular cut a wide, 1/4 inch kerf, and it had a tendency to heat and to waver at high speeds. Thus circular saws turned 20 percent of a cant into sawdust (when sawing inch boards), and produced scored lumber and an inconsistent product that meant more waste when the lumber was planed. During the 1870's the very large mills typically used gangs of 30 or 40 saws to cut lumber and circular saws only to slab or square the saw logs. Such a circular-gang arrangement was efficient; the gang saw had a smaller kerf than the circular and the lumber was of higher quality.<sup>42</sup> Yet the circular held sway because it allowed the cant to be repositioned after every cut--producing a higher percent of "uppers"--and it required less power than the gang. Although gangs were often used to reduce waste, the band saw emerged during the mid-1880's as the most efficient and least wasteful sawing machine.

Band saws were used in woodworking shops and hardwood mills before they were adapted to the milling of white pine lumber. Invented in Britian early in the 19th century,<sup>43</sup> band saws were widely used in woodworking shops for pattern work by mid-century. These saws had wheels of 2 to 3 feet in diameter and saw blades 1/2 inch wide.<sup>44</sup> The blades were long ribbons of steel, the ends of which were welded together to form a loop or continuous band. To be used in sawmills, band saw blades had



to be strong enough to withstand the stress and strain produced by a moving saw log, and flexible enough to bend over the saw machine's wheels. Because of these demands band saw machines were not easily adapted to the milling of lumber. In the late 1870's greatly improved blades imported from France overcame some of the problems of milling lumber with the band saw.<sup>45</sup> But until 1885 band saws were used in only a few mills in the northern United States, and then almost exclusively for hardwood manufacture, where reduction of waste and a high quality product were of greater importance than speed.<sup>46</sup>

During the winter of 1884-5 band saws were installed in a few Michigan saw mills.<sup>47</sup> For some this was ". . .the commencement of what is likely to effect a considerable revolution in white pine sawing".<sup>48</sup> Others were unconvinced. In the view of the Lumberman's Gazette the band mill had yet to prove its practicality and reliability, and it lacked "sufficient productive capacity" to compete with the circular or the gang.<sup>49</sup> Yet Michigan mill men were attracted to the band saw because of its economy and quality. In the summer of 1886 the Timberman reported:

When a man sees a band saw cutting inch lumber, and turning out twenty per cent. more from the same quantity of logs than the circular on the other side of the mill, he cannot over look the difference. A saving of one-fifth of the lumber in a lot of choice logs would not at that rate take long to pay all the cost of the new machinery. And when there is added the fact that the lumber is better and smoother, and can be dressed<sup>50</sup> with less waste, the doubter's position becomes untenable.

By 1886, band saw machines were available from a dozen manufacturers and the trade journals were full of band advertisements. In June of 1886 the Northwestern Lumberman reported that there were "scores" of band saw mills in the white pine country, and a survey of Michigan saw mills that year revealed that there were nearly 50 band saws in the state.<sup>51</sup> The band saw machines adopted in Michigan mills had wheels that were 6 to 9 feet in diameter, and they had blades that were 45 to 55 feet long and 7 to 10 inches wide.<sup>52</sup> Band mills were expensive and they were not adopted (or accepted) overnight. However Michigan, with its dwindling pine resources, appears to have taken to the band mill faster than other regions.<sup>53</sup>

During the 1880's band saws cut a 1/12 inch kerf, compared to the typical 1/4 inch kerf of the circular. According to contemporary estimates band saws produced 15% to 20% more lumber per log than did circular saws but production was slower.<sup>54</sup> Early estimates of band saw output were 25 to 40 M per day. The saw blades simply could not stand the speeds necessary to turn out the 50 M or 60 M per day that was typical of a circular saw. At maximum speeds, the latter saw cut roughly 500 feet per minute, while a band sawed less than 300 feet.<sup>55</sup>

Although some Michigan mills were quick to adopt the band saw, it never replaced the circular saw there. Indeed, in Michigan the band saw emerged as a practical, reliable milling machine just as the industry began to decline. Furthermore, the band saw continued to have problems as it was refined and improved. Manufacturers of band saws and blades, and saw mill

workers needed experience before its full potential would be realized.<sup>56</sup> Thinner saws and insertable teeth also increased efficiency of circular saws.<sup>57</sup> Yet most of the very large, highly-mechanized saw mills adopted the band saw as they moved towards a more efficient use of the timber resource and the manufacture of higher quality products.

New equipment installed along the production line was designed to increase production by speeding the product through the mill. "Bull chains" were used to haul logs into the saw mill where they were held aside until a steam-powered log turner or flipper rolled them onto the carriage and a steam-powered "nigger" rotated them as required.<sup>58</sup> Carriages were often powered by direct steam (a "steam feed") during the 1880's which was extremely fast.<sup>59</sup> The carriage set works, that pushed the log out from the carriage and determined the thickness of each board, was also steam-powered by this time. Lumber, slabs, sawdust and waste were moved through the mill automatically by "live" rollers, transfers, and conveyors. Boards were carried automatically to the edger, the trimmer, and the sorting table; the slabs to the slab saw and lath mill; and the waste to the refuse burner or to the mill "hogs" where it was ground up into fuel for the boilers.<sup>60</sup> Thus the widespread use of steam power profoundly altered the character of saw milling.

Michigan saw mills had also added more finishing machines by the 1880's. The trend towards a more finished product (and away from selling green, rough-sawn lumber), was due to a number of factors. Widespread adoption of gang edgers and trimming

machines helped increase mill production,<sup>61</sup> and an expanding railroad network meant that mills could ship finished products directly to retail lumber yards, bypassing the wholesale centers of Chicago and Tonawanda. Many mills added planing machines to produce dressed lumber, and kilns to dry their product quickly, thus further integrating their operations by taking over tasks formerly performed by regional or local wholesalers.<sup>62</sup>

Mechanization contributed to the changing nature of the workforce. Mill employment increased, but only at the unskilled levels. Dozens more men were needed to pile and stack lumber, to sweep and shovel saw dust, and to keep watch over the machines. In the Saginaw Valley, for example, 7 percent of the mill employees in 1885 were skilled workers (e.g. filers, circular sawyers, & foremen), and 8 percent worked in semi-skilled positions (e.g. edgers and setters). The remaining 4005 employees, including 470 boys under 16, worked in such jobs as lumber pilers, laborers, and lumber shovers.<sup>63</sup> In the large mills of the 1880's human hands rarely touched the product except to stack it on the docks. The nature of work and the volume of production had changed greatly since 1870 when logs and lumber moved through a sawmill primarily by human labor.

Water continued to be a crucial factor in the choice of sawmill sites during the 1880's. Most mills received logs by river and shipped lumber by lake steamer or schooner. Nearly all sawmills used a millpond to sort and store saw logs. When logs arrived by rail they were often rolled directly into the millpond. Thus the mill owners of Cadillac used Clam Lake as a

millpond, and built docks out into the lake so that logging trains could pull up and dump their logs into the water.<sup>64</sup>

Frozen millponds and ice-encrusted saw logs made milling in the winter difficult, but by the 1880's steam or hot water was often vented into a section of the millpond.<sup>65</sup> These "hot ponds" facilitated an extended milling season.

The characteristic sawmill site of the 1880's comprised a variety of buildings, sheds, piers, and railroad tracks all dominated by the large wooden mill building, perhaps 100 feet by 200 feet in dimension. As production increased the piling and drying docks grew, and there were often separate buildings for a planing mill, kilns, and the power plant. The number and size of boilers had grown due to the sharp increase in the power needs of the mill. New boiler grates facilitated the use of saw dust as fuel, and mill "hogs" were used to grind up slabs and other waste for fuel. Despite the large fuel needs of the mill, there was an excess of waste and large refuse burners were built to dispose of it.

With milling costs roughly \$2.50 per M in the 1880's, the total cost of lumber manufacture, from stump to finished product, was about \$13.50. This was some 30 percent greater than the cost of lumbering in the early 1870's, and the increase was due largely to the growing cost of stumpage. Indeed, the cost of milling had actually declined (from \$3.50/M in 1870), but the cost of saw logs was roughly \$10 to \$12 per M, up from \$6.75 in 1870.<sup>66</sup> The cost of raw materials represented better than 61

percent of the market value of an average mill's output in 1880, up from 45 percent in 1870.<sup>67</sup> Earlier, profit margins had been high; in the 1880's mill concerns could still survive when costs increased but prices did not. Lumber prices were given to constant fluctuation depending upon, among other things, the time of year, the success of logging and driving, construction trends in eastern urban centers, and the viability of the plains agricultural economy. Lumber prices dipped, for example, following the depression years of 1873 and 1883. However these fluctuations occurred around a stable mean; in general lumber prices were roughly \$7.50 per M for culls, \$15 per M for common, and \$36 per M for uppers during much of the 1870's and 1880's.<sup>68</sup>

Mill capitalization also increased at this time as mill men attempted to increase production, reduce waste, and produce a higher quality product. The largest sawmills were worth over \$300,000; average value was about \$75,000, a 80 percent increase over 1870. The ratio between capital investment and total annual wages also rose significantly. In the four major mill counties the capital/labor ratio was between \$3 and \$5 in 1870 and rose to between \$5 and \$7 by 1880. Muskegon County sawmills, for example, had an average capital/labor ratio of \$3.10 in 1870, and \$6.40 in 1880. The industry increasingly relied upon mechanized production and unskilled labor.<sup>69</sup>

Profit margins for many mills were much smaller during the 1880's. The cost of saw logs had increased, lumber prices were low, and many lumber concerns were cutting their last, and

poorest quality timber stands. Profit margins in the Lake States were estimated to be 7 percent in 1890. Yet many mill owners, such as Delos A. Blodgett, were still cutting logs from land purchased during the 1860's and they earned larger profits than the other mills, though lower than 1870's levels. In a highly competitive market, where overproduction was a common problem, these firms tended to keep lumber prices low. Henry Sage, owner of one of Michigan's largest sawmills, showed an annual profit of \$138,000 in 1883 and \$36,000 in 1885 (a depression year), down from the minimum of \$150,000 he received 8 of the 10 years following 1870. Blodgett earned sawmill profits of \$42,000 in 1885/6 and \$135,000 in 1887/8. A few mills closed during the depression following 1883, when they were forced to sell their lumber at a loss to pay their debts. Mill companies that were large enough (or wealthy enough) to hold their product during the market's downturns were more successful. With a small profit margin and high levels of capitalization Michigan mill men sought increased production, but they also needed the ability to wait out price fluctuations.<sup>70</sup>

Michigan lumber was delivered to regional and national markets primarily by Great Lakes vessels during the 1880's. From the eastern shore of the state, lumber was shipped primarily to lakeports in New York and Ohio. Western Michigan lumber was shipped largely to Chicago, as had been the case for decades. Yet railway shipments increased in importance in the late 1880's. In 1885 less than 10 percent of Saginaw Valley lumber was shipped by rail, but the proportion increased each year. In 1890 roughly

50 percent of the region's product went to market by rail, by 1892 507 million feet were shipped by rail compared to 348 million by boat.<sup>71</sup> In general, dressed lumber and other wooden products were shipped by rail; rough lumber was shipped via the Great Lakes.

Tonawanda, Buffalo, and Cleveland were the primary focus of Saginaw lake trade during the 1880's (Table XI).<sup>72</sup> Seventy-five percent of the lumber shipped by Saginaw River mills in 1884 went to these ports. That year 534 steamers and 1486 schooners and barges (totaling almost 630,000 tons) carried 735 million feet from the Saginaw River. By 1890, however, Saginaw's lake shipments were down to 409 million feet, largely due to the growing use of railroads. This shift was due to a drop in rail rates as well as to important changes in milling and manufacturing in the main sawmill centers. Railroad freight rates for Michigan lumber shipments dropped consistently during the late 19th century. In 1870 the freight on a carload (14 - 15 M) of lumber, shipped from Saginaw to New York, was \$120; in 1880 it was \$63; and by 1892 it was only \$46 (just over \$3.00 per M), or roughly the cost of shipping by water to Tonawanda, and then by rail to New York.<sup>73</sup> In comparison, Great Lakes shipping rates from Saginaw in 1884 were \$1.50 to \$2.00 per M to Buffalo, and \$1.25 to \$1.75 per M to Ohio ports.<sup>74</sup>

Interior mill towns, such as Cadillac and Flint, had always shipped by rail, while western and northern Michigan mill towns (e.g. Manistee, Muskegon, and Alpena) had traditionally relied upon Great Lakes shipping. The Saginaw Valley had better



Table XI

DESTINATION OF SAGINAW LUMBER SHIPPED VIA THE GREAT LAKES<sup>a</sup>  
 (Millions of Feet)

TO	1877		1884		1892	
	#	%	#	%	#	%
TONAWANDA	156	29	309	42	130	37
BUFFALO	96	18	133	18	54	16
CLEVELAND	96	18	120	16	97	28
TOLEDO	103	19	84	12	26	7
TOTAL SHIPPED	540		735		348	

Source: Saginaw Board of Trade, Annual Review, 4 (1884), p. 16; 12 (1892), p. 27; Franklin B. Hough, Report on Forestry, 1878, p. 517.

<sup>a</sup>Only those ports that received 10% or more of the annual total shipped are shown here.

rail connections south, and east (through Port Huron/Sarnia), than the other lakeshore mill towns and thus rail shipping was adopted more quickly There. By 1892 roughly half the lumber from Saginaw Valley mills went to local planing mills and factories that manufactured finished lumber, doors, and packing boxes. The Saginaw Board of Trade commented in its 1892 Annual

Review:

. . . Formerly all the lumber was shipped rough, and by water, but by manufacturing it into articles ready for use, a large amount of additional labor is employed in the city, and the product is shipped in cars direct to the consumer.<sup>75</sup>

As the nature of the product and shipping changed so too did the location of markets. Increasingly, these railroad shipments went to Michigan and Ohio lumber yards; by 1892 only 20 percent went east.<sup>76</sup>

Chicago remained the largest market for forest products from western Michigan during the 1880's; Milwaukee and Racine were of secondary importance. Muskegon and Manistee had a short, direct route to Chicago via Lake Michigan, and consequently lake shipping remained the principal method of lumber shipment for western Michigan mills. As late as 1892 Hackley and Hume, a Muskegon Mill concern, shipped 97 percent of its sales by water, at a rate of 3 or 4 million feet a month between April and October; the small number of rail shipments occurred largely during the winter.<sup>77</sup>

The marketing of Saginaw Valley lumber mirrored

developments in the national economy. Nineteenth century manufacturers bypassed middlemen when one of two conditions arose: 1) their product was too specialized or technically complex for a wholesaler to handle, or 2) it was cheaper to sell directly to a retailer. As early as 1872 Saginaw mills sent salesmen south into Indiana and Ohio to contact the many retail yards who were then receiving their lumber by rail from wholesale yards in Toledo, Cleveland, or Chicago. The wholesaler had played an important role in the early years of the industry but by the late 1870's competition had increased and Michigan mill owners were less dependent upon the wholesalers' credit. Though transport cost might be a little higher, Saginaw mill owners were able to get better prices from retail lumber yards.<sup>78</sup> David Ward, a principal figure in the Michigan lumber industry, explained that "inspection stealing", that is the inspection fee levied by the lake port Boards of Trade, was enough of an inducement to turn to direct railroad shipping.<sup>79</sup> Direct marketing was a sign of modernizing industry, and was facilitated by the concentration of production and markets, and the spread of transport and communications systems.

Saw milling remained a seasonal enterprise during the 1880's due to the continued importance of the river drive and Great Lakes shipping. The use of railroads to transport logs and to ship lumber, and the emergence of "hot ponds" facilitated a longer season. Yet year-round saw milling was rare at this time. A poll of 62 Michigan sawmills in 1883 revealed that 7 months was the average milling season.<sup>80</sup> The average season of 185 days

was one month longer than that of 1870. C. H. Hackley & Co. increased its operating season from 166 workdays in 1873 to 192 workdays (or 7.4 months) in 1878. In the late 1880's the Hackley and Hume Company apparently operated from mid or late April to late November.<sup>81</sup>

Output increased dramatically as a result of mechanization and a longer milling season. Modal output per mill had more than doubled to 16 million feet per year since 1870. The larger mills cut between 25 and 55 million feet of lumber annually. Daily production ranged from 30 to 200 M during the 1880's. The larger, highly-mechanized mills sawed in the neighborhood of 125 to 200 M per day, while the average daily output was roughly 86 M, up from 50 M in 1870. The many hundreds of Michigan mills added new equipment and expanded production at different rates. During the 1870's C.H. Hackley & Co. consistently increased its average daily production (based on total seasonal output) from 126 M in 1873 to 168 M in 1878. Hackley and Hume, the successor to C.H. Hackley & Co., reported a daily average of 127 M in 1887, but production had at times risen above 200 M per day, and the firm consistently cut between 26,000 and 32,000 M annually between 1885 and 1892. The average mill employed 70 men, while the larger sawmills employed as many as 260.<sup>82</sup>

Of more importance, mill owners had increased productivity significantly (about 25 percent) since 1870. Production per man/day rose to roughly 1.25 M from 1 M per man/day in 1870.<sup>83</sup> Production per man/year was up at the

same rate, from 185 M per man/year in 1870 to 229 M in 1883. And the ratio of output per dollar of capital had increased at an even greater rate, due to the increased reliance on mechanized production, from 150 M per \$1000 of capital in 1870 to 213 M in 1883.<sup>84</sup> Faster, more efficient machinery, economies of scale, and increased mechanization pushed production and productivity to new levels during the 1880's.

#### MILL TOWN LIFE AND WORK

In the changing environment of lumber manufacture, life and work in sawmill towns were also transformed. As lumber production increased, the economic base of Michigan's mill towns was expanded by new, secondary manufacturers of wood products. Furniture, doors, and sashes went to meet the rising demand of an expanding, increasingly integrated national economy. Saw, file and other machine tool factories were another new component of mill town economies diversified by lumber-associated manufacturing. By 1890 each of Michigan's three major mill towns--Muskegon, Saginaw, and Bay City--had 25 to 30 saw mills producing in excess of 350 million feet of lumber and employing about 1800 men.<sup>85</sup> The northern lakeshore mill towns had grown significantly during the 1870's and 1880's. Figure 29 shows the booming villages of Au Sable and Oscoda in 1880. Manistee, Alpena, and Au Sable/Oscoda each produced roughly 200 million feet per annum and had approximately 1000 mill workers in 1890. Yet saw mills accounted for only about 43 percent of the



men who worked in "manufacturing" in Bay City and Muskegon; in Saginaw the proportion was 28 percent. Planing mills and furniture factories were also substantial employers (Table XII). In Saginaw they employed 12 percent and 5 percent respectively; over 8 percent of workers there were concentrated in saw, file, and sawing machine manufactories. The production of salt, by burning sawmill waste to evaporate salt brine pumped from below ground, was also an important industry in the Saginaw Valley. In all, the lumber industry and associated secondary manufacturing employed roughly 60 percent of the manufacturing work force in Michigan's three major mill towns.<sup>86</sup> Because the mills employed primarily unskilled labor for little more than half the year they contributed even smaller proportions to urban manufacturing wage bills. Bay City saw mills paid 34.7 percent of total manufacturing wages there; in Saginaw the proportion was 21 percent.<sup>87</sup> By 1890 Michigan's larger sawmill towns had grown less dependent upon saw mills for employment; this was due in part to the decline of lumber production there.<sup>88</sup>

#### SAW MILL WORKERS

In the 1880's mill workers were typically young, immigrant males. Half of the mill workers were single; the 70 percent who were under 35 included a large number of young boys.<sup>89</sup> Great Lakes' sawmill and mining towns attracted many European immigrants during the 1880's. Indeed, immigrants were more heavily concentrated in the northern lumbering and mining counties of Michigan, Wisconsin, and Minnesota than almost

Table XII

## EMPLOYMENT IN MANUFACTURING -- 1889

(Percent of Total Employment in Manufacturing)

	SAGINAW	BAY CITY	MUSKEGON
LUMBER MILLS	27.8%	42.3%	43.0%
(SALT BLOCKS)	5.8	5.0	
SECONDARY MFGING OF WOOD	18.2	8.5	16.8
MFGERS OF MILL SUPPLIES	8.1	7.4	2.3
	.....	.....	.....
	59.9%	63.2%	62.1%
NEXT LARGEST INDUSTRY:			
NEWSPAPER PUB & PRINT	3.1%		
MASONRY		4.1%	
CARPENTERY			5.4%

Source: U.S., Eleventh Census, 1890, Vol. 6,  
Manufactures, Part II, pp. 54-61, 354-357, 502-505.



than almost anywhere else in the northern United States.<sup>90</sup> Although the proportion of immigrants in the state was 23 percent in 1870 and 26 percent in 1890, the foreign-born population exceeded 40 or 50 per cent of the total population in many of Michigan's sawmill counties, such as Oscoda and Manistee. This concentration was greater than that of eastern urban-industrial counties.<sup>91</sup>

Immigrants showed an even greater concentration in the lumber industry itself. Of those identifying themselves to federal census enumerators as lumber industry workers, the proportion of foreign-born grew from 55 percent in 1879 to 58 percent in 1889. In the twin sawmill villages of Oscoda and Au Sable, located at the mouth of the Au Sable River, roughly 79 percent of the lumber industry workers were foreign-born in 1884. In E. Saginaw this figure was smaller; roughly 63 percent of the lumber workers, and 56 percent of all the wage workers were immigrants. Within the sawmills immigrants were concentrated in the unskilled jobs; in many Michigan sawmill towns over 80 percent of the common laborers were immigrants.<sup>92</sup> In skilled positions the native/foreign proportions were roughly equal. Canada was the most common foreign birth-place, though its proportion declined from 30 percent of the self-identified lumber workers in 1879 to 24 percent in 1889. Due to the proximity of Ontario, Canadians were found in much greater proportions in Michigan mill towns than in Wisconsin or Minnesota. Nearly 50 percent of the lumber workers in Oscoda/AuSable in 1884 were Canadian, as were 25 percent of the workers in the Saginaw

Valley.<sup>93</sup> Although much of the late 19th century Scandinavian influx went to Minnesota and Wisconsin, the proportion of Scandinavians in the Michigan lumbering work force grew to 10.6 percent in 1889, replacing Germans as the second largest immigrant group.<sup>94</sup> Thirteen percent of the Oscoda/Ausable lumber workers in 1884 were Swedish, and 18 percent of workers in lumber-related occupations in E. Saginaw were from Germany or Prussia.<sup>95</sup>

In the 1880's sawmill wages were below their levels of the early 1870's. Semi-skilled and unskilled workers earned substantially less; skilled workers (who were in short supply) fared rather better but still faced a decline in wages. Supervisors and skilled workers, such as filers, head sawyers, and circular sawyers, generally earned \$3.00 to \$4.00 per day. Saw setters, edger table operators, tail sawyers, and other semi-skilled workers earned \$2.00 to \$3.00 per day. Unskilled workers, most of whom were common laborers, earned \$1.25 to \$1.75 per day with \$1.50 being most common. The high end of these wage ranges was typical while the industry was booming, the lower end was the common wage rate in the depressed years following 1883 and 1893.<sup>96</sup>

In 1883, 66 percent of a substantial sample of Michigan sawmill, shingle mill, and salt block employees made less than \$2.00 per day.<sup>97</sup> Thus the great majority of mill operatives earned less than \$300 per season; skilled workers accumulated perhaps \$700 during a seven month milling season. A laborer might increase his annual income to a little over \$400 by working

the remaining months of the year in logging camps at \$26 per month. A skilled worker could increase his annual income to almost \$1000 with work as a scaler or filer in a logging camp. Roughly 50 percent of the mill workers worked in logging camps in the off season during the 1880's. Perhaps the "average laborer" worked 6 months at \$1.50 per day in the mills, and 4 months in the camps at \$26.00 (per month), bringing his total annual income to \$338. This was a subsistence wage for a single man, and, as the mill workers frequently complained, it was nearly impossible to raise a family on such wages.

The high labor turnover characteristic of late 19th century American industry was exacerbated in Michigan by the seasonal nature of mill employment. Mill operatives typically lived in boarding houses although, in the larger mill towns especially, a sizeable number lived in rental units. In the smaller, northern mill towns, such as Oscoda and Au Sable, more than half of the work force lived in boarding houses, roughly 30 percent of the men lived in tenements, and the balance owned their own homes. In the large mill towns, such as East Saginaw, boarding predominated, but the number of men who owned homes nearly equalled the number renting. The proportion of wage earners living in boarding houses in the mill towns was 30 percent to 50 percent higher than in Michigan's other towns. Generally a mill owned, or contracted with, a nearby boarding house.<sup>98</sup> Boarding charges were roughly \$16 per month, while rents were typically \$5 or \$6 a month. Two thirds of the men and their families who rented lived in 5 rooms or fewer. Six dollars

per month was barely 15 percent of the monthly wage of a common laborer when he was working; many had to meet their year's rent from 6 or 7 months of wages.<sup>99</sup>

Though real wages rose during the 1880's, the average mill worker found it difficult to support his family. One native-born stationary engineer in Ludington earned the standard \$1.50 per day in 1892. The cost of supporting his family of four--which included expenditures of \$6.00 for rent, \$5.50 for furniture, \$4.63 for fuel, \$3.93 for bread, and \$3.90 for meat--exceeded his income by an average of \$2.50 per month.<sup>100</sup> Women and children in the homes of mill laborers often supplemented their father's wages.<sup>101</sup> The family of a Muskegon sawmill fireman benefitted from such supplemental income. The fireman earned \$1.25 per day and his wife worked occasionally for \$2.00 per week; annual income was \$383.75, total expenditures \$380.75. He paid \$3.00 per month for rent in 1891, which was 9 percent of his monthly wage. This fireman claimed \$72 worth of household affects. During March 1892, when the Michigan Bureau of Labor questioned this family as to their cost of living, earnings of \$30.00 fell short of their expenditures by 55 cents. Native born, of Scots-Irish ancestry, this man's largest outlays were for liquor (\$5.65), bread stuff (\$3.05), rent (\$3.00), and "Doctor & medicines" (\$3.00).<sup>102</sup>

In Michigan lumbering, as in other industries elsewhere, increases in the scale of production concentrated enormous wealth in the hands of a few dozen successful manufacturers in the late 19th century. These men had enormous local influence.

Generally, lumbermen assumed that what was good for their mill was good for the local community. Henry Sage stated on the occasion of his endowment of a library in West Bay City:

I have helped to build your churches, your schools, your railroads, and in all ways so far as in <sup>103</sup> me lay, to promote your interests, while promoting my own.

Merchants and other property owners joined the mill owners in efforts to make their towns better places to live and do business. The results were, to some eyes, a significant transformation. In 1879, the Muskegon Journal commented:

In its early days Muskegon was what is usually called a rough place. Pioneers are apt to be rough; a certain amount of roughness seems a necessary element in their make-up. People came here to stay awhile and make money, not to reside and make homes. That day has passed, and Muskegon is, now, not only a place to make money, but where men establish pleasant homes and enjoy life. At first it was hard work to establish and maintain churches; now there is ample and elegant church accomodations, presided over by able resident pastors. <sup>104</sup>

But if Michigan mill men were benevolent, charitable, local patriarchs at times, they were conscious, as business men, of their place in an industry and market that were national, and continental, in scale. By and large the profits of the Michigan lumber industry were invested outside the state, especially in the Southern and Pacific Coast lumber industries. In the view of successful mill owners such as Henry Sage and Delos A. Blodgett, the employment they provided for thousands of men for two decades

or more was the ultimate contribution to the communities in which they had made (or increased) their fortune.<sup>105</sup>

Antagonism between labor and capital increased as the distance between the owners and the mill floor grew. Most mill workers worked long hours, lived in spartan, if not wretched, quarters, and earned barely enough to live on. The Michigan Bureau of Labor and Industrial Statistics commented:

. . . An increased number [of businesses] are being managed by men selected with reference to their productive capacity; the sub-contractor in the lumber camp, at the mills and at the mines, often irresponsible, stands between the employer and the employed; middle-men have been introduced, and the employed are being farther removed from the employer. The middle-man is probably a convenience, but he must have a profit, and he often does that which the employer could not do if he would and would not if <sup>he</sup> could. The employed suffer by this widening breach.<sup>106</sup>

Despite the growing friction between the owners and the workers, these two groups were, in some ways, markedly similar. Men of both camps were fiercely individualistic and they shunned formal, binding associations. While mill owners formed temporary alliances (such as boom companies), long-term trade associations, or "pools" as they were called, were uniformly unsuccessful in the Lake State Lumber industry. Among the lumber workers, labor unions were equally unsuccessful. Although the Knights of Labor counted dozens of chapters and thousands of members in Michigan, the Knights rarely, if ever, initiated job actions.<sup>107</sup> Few indeed, were the strikes called by a union; most erupted spontaneously or were sparked by agitators when wages or hours

were changed without notice. These wildcat strikes were common in the woods and in the mill towns. They were typically non-violent and they were not unsuccessful.<sup>108</sup> That in Oscoda/Au Sable in June of 1884 was not atypical.

The 1884 strike in Oscoda and Au Sable was prompted by the sudden reduction of wages in all the saw mills in these two villages at the mouth of the Au Sable River.<sup>109</sup> The strike began on June 16th, the first pay day of the season for two of the local saw mills. These concerns had started work in late April and wages had not been announced or agreed upon. For roughly half of the employees this was the first pay day in 5 or 6 months. On 16 June the workers in these two saw mills learned that (1) wages had been reduced by 25 cents a day from the previous season's rates, (2) all charges such as rent, and credit at the company store up to 16 June, had been deducted, and (3) their wages for the first two weeks of June had been held back. Furthermore, one of the mills charged its tenants all of June's rent against May's pay, and many employees were charged for July and August rent as well. Out of 179 employees in this mill, 59 men drew no pay and 46 men ended up owing money to the mill company.

Wages were reduced in all of the Oscoda/Au Sable mills by agreement among the owners. A few mills informed their unskilled employees that they would receive 1/2 of the wage reduction (12 1/2 cents per day) if they stayed all season. The strike spread to the other mills within a few days. The strikers demanded no wage reductions, no wages held back, and a pay day every

Saturday. The workers spoke well of a few mill owners, but complained of high rents, low wages, and being paid by the month. If a worker needed money during the month he was often given a company store order which was discounted 8 percent to 15 percent for cash. There was no violence in this strike, but the mill owners sent for Pinkerton "detectives" and convinced the Governor to send in troops. A number of the mill owners admitted that the changes in the wage system were designed to reduce labor turnover by tying the workers more closely to the mills. Some of them agreed that the strike was not unjustified and they were willing to accept the strikers' demands. The strike ended within two weeks, when the mills agreed substantially to the strikers' terms.<sup>110</sup>

A large-scale, modernizing lumber economy dominated northern Lower Michigan during the 1880's. River improvements--such as logging dams--and logging railroads aided the expansion of forest production far from the traditional logging rivers. Furthermore, rail transport facilitated the delivery of equipment and supplies to remote northern camps. Settlement spread out along the rail lines, and lakeshore mills were able to expand their hinterlands far into the northern interior. By the mid-1880's the Michigan lumber economy encompassed all of the northern Lower Peninsula. In short, the white pine industry and an expanding rail system had fundamentally transformed the region and facilitated the concentration of manufacturing in lakeports.

Industrial technology had transformed transportation and



manufacturing in the industry, yet Michigan mill concerns also showed distinct signs of modern business enterprise during the 1880's. The larger lumber companies employed mill managers, foremen, and field lieutenants to manage their diverse operations. Logging, milling, planing, salt production, and farming were treated as distinct economic units, with separate account books.<sup>111</sup> Indeed, by the mid-1880's most of Michigan's larger companies, such as Louis Sands, Hannah, Lay & Co., and Delos Blodgett had adopted a complex system of modern bookkeeping.<sup>112</sup> And mill owners' reliance upon mechanization, capital investment, and unskilled labor, as well as the growing popularity of direct marketing, are all signs of a modernizing industry. Yet by 1893 the Michigan lumber industry was in decline. Saw mills had begun to close, boom associations disbanded, and lumber workers moved west to Minnesota or to the Pacific Coast. Little pine remained in the major river basins of the Lower Peninsula.

## Chapter 6

### LOGGING IN THE WANING YEARS OF THE INDUSTRY

By the early 1890's the Michigan lumber industry was in decline. White pine production had peaked in 1888, and though Michigan continued to produce at high levels for another decade or so, the downward trend was clear. Michigan was running out of pine.<sup>1</sup> The Panic of 1893, which swept the nation in the spring of that year, was a crushing blow to a waning industry. Years of depression followed and many mills stood idle.<sup>2</sup> By the 1899/1900 season there was increased demand for lumber, but with little pine remaining, Michigan could not fully exploit the upturn in the market.<sup>3</sup> The shortage of saw logs was felt first and hardest in the old sawmill cities of Muskegon, Saginaw, and Bay City. These towns commanded the great river basins where logging had peaked in the 1880's. They had grown into important centers of industrial manufacturing but now, as fewer logs were cut, operations wound down. In 1898 the Timberman reported that only a few Muskegon and Manistee mills were cutting pine; the remaining mills were sawing hemlock. Alpena, in the northeast corner of the state, still had pine enough for a few years more of milling, and the few remaining mills in Saginaw and Bay City had a stockpile of pine logs from Ontario.<sup>4</sup> Yet the importation of Canadian logs ceased in 1898 due to a conflict over tariffs, and, overall, the prospects of the Michigan lumber industry were bleak.

Lumbering adjusted in the years after 1893. Although many firms closed and moved west or south, others responded to the scarcity of pine stumpage in two ways. First, Michigan lumber companies established logging camps at greater and greater distances from their mills; logs were transported hundreds of miles from the Upper Peninsula, the Georgian Bay region of Ontario, and the far north of the Lower Peninsula. Secondly, Michigan lumber companies began to cut species other than pine, such as hemlock and maple, whose value had increased with the scarcity of pine. By 1905 Michigan produced only 13 percent of the pine cut in 1889 (Table XIII). At the turn of the century pine output was equalled by hemlock, which was up 40 percent (to 842 million feet) in the decade after 1889, and maple, which was unchanged at 400 million feet; in 1905 the combined hemlock and maple output was roughly double that of pine.

Overall, output was down, some 45 percent in the decade after 1889, and 68 percent in the sixteen years to 1905 (Table XIII). The American Lumberman commented in 1906:

. . .it is recognized that within six years the white pine timber of the state will be practically exhausted, while the output from this date will be comparatively limited. Hemlock and the hardwoods have supplanted pine in production and are being depleted rapidly.

The largest lumber producer in the nation from 1869 to 1889, Michigan slipped to second by 1899; by 1909 the Pacific Northwest and the South had unseated the Lake States from their half century of dominance in the American lumber industry.<sup>6</sup> Yet lumbering continued as Michigan's largest industry. In 1904 it

Table XIII

MICHIGAN LUMBER PRODUCTION  
(BY SPECIES -- MILLIONS OF BOARD FEET)

	1889	1899	1905	1910	1915
	*****				
WHITE PINE	3489	1285	463	128	64
HEMLOCK	600	842	570	637	373
MAPLE	400	400	358	508	340
TOTAL (All Species)	5478	3018	1720	1681	1032

Source: Reynolds and Pierson, Forest Products Statistics of the Lake States, pp. 5-6.

led all other manufacturing groups in value of production, number of workers, wages paid, capital invested, and number of establishments. Associated "Foundry and Machine Shops" formed the second largest industry in the state. Still, the average number of workers, value of products, and wages paid in the lumber industry declined by 24 percent, 24 percent, and 13 percent respectively between 1899 and 1904.<sup>7</sup>

Declining production, the cutting of hemlock and hardwood, and the growing distance between camp and mill greatly affected the geography of the industry and of Michigan. Landscapes were transformed; patterns of settlement and land ownership changed drastically; new use was made of the region's timber resources; and the scale and spatial organization of forest production was recast. As the price of all types of stumpage soared, Michigan lumber concerns held onto their large concentrated timber tracts, because the remaining timber, indeed the remaining stumps, could quickly become valuable. Large tracts--entire townships at times--of former timberland were held unavailable for settlement. After 1910, when decline turned to dissolution, these lands were abandoned, having been swept repeatedly by summer forest fires.

Innovations in manufacturing, such as veneer cutters and flooring machines, created a market for a variety of new forest products. Resource substitution and transportation innovations allowed the lumber industry to supply this diversified market. New species, such as hemlock and maple, new products, such as hemlock bark and cedar posts, and small trees were cut. Many of

Michigan's small and lower quality trees were being cut for pulpwood. By 1909 Michigan forests yielded up 64,000 tons of pulpwood, and 33 million feet of hardwood logs were cut for veneer. "Paper and Wood Pulp" had grown into the tenth largest industry in the state, as measured by cost of principal materials.<sup>8</sup> The lumber industry found value in nearly every tree of the forest. Heavy cutting left enormous areas of slash and cutover. Summer forest fires, a serious problem throughout the lumber era, increased as did erosion, fundamentally altering the region's ecology.

The unique conditions of the decline period also affected the spatial organization of the industry. White pine logging was limited to the distant corners of the state and region. Yet a secondary logging frontier swept much of the state as the industry turned to hemlock and hardwood. Railroads assumed a primary role in log transportation because of the isolation of the pine camps and because hardwood and hemlock, which floated poorly, could not be included in river drives. The distance between camp and mill had grown dramatically; camps were often one hundred miles or more from the mills they served. Distance and dependence on rail transport often required large capital investments in railroad grades and rolling stock. Faced with increased capital expenditures in both the forest and mill, lumber companies were forced to increase output to keep costs per unit of production down. While hundreds of smaller lumber companies cut posts or peeled bark, the industry was dominated by a few large, well-capitalized firms that cut pine and hardwood

saw logs.

This chapter examines patterns of land use and land ownership, the technology of forest exploitation, and the scale and organization of forest production in northern Michigan during the declining years of the industry, roughly 1893 to 1910. Two lumber concerns serve to illustrate the general discussion. The Ward Estate operations of Antrim, and other nearby counties, exemplify many facets of lumbering in this period. Although the size of this operation was extraordinary, the location of Ward Estate logging camps in an isolated corner of northern Michigan and the Estate's dependence upon rail transport make it representative of those ventures operating in the final years of white pine lumbering in Michigan. The medium-sized hardwood and hemlock operation of H.M. Loud & Sons Lumber Company in Oscoda County (where the pine had been cut many years earlier) provides an excellent example of operations on the second logging frontier that moved through the state at the turn of the century.<sup>9</sup>

#### PATTERNS OF LAND USE AND LAND OWNERSHIP

Before 1890 Michigan's lumbermen cut predominantly white and Norway pine; in the ensuing decades dozens of additional species were logged. Generally, trees cut at the turn of the century were far smaller than those taken earlier. More and more hemlock, maple, basswood, and cedar was cut, and after 1900 Michigan's forests were so depleted that spruce, tamarack, and jack pine were cut for lumber, as well as fence posts, pulpwood,

and cordwood. In earlier decades when the cutting of pine had been fast and furious, exploitation had remained selective. Now with the popularity of new products, such as maple flooring, giving new value to much of Michigan's remaining forest land, the price of good pine land rose to \$150 an acre, and that of hardwood land from almost nothing to perhaps half of this.<sup>10</sup> Most lumber concerns held onto their lands after an initial cutting; with growing demand for hardwood, hemlock, and other timber, logging crews returned to them again and again. Indeed, owners of some clearcut parcels let contracts for the remaining stumps, which were sawn into shingles, and cordwood.<sup>11</sup> The effects of these changes upon the landscape were immense. More and more land was stripped bare; even contemporaries engaged in the lumber industry were surprised at the extent of the onslaught. W.B. Mershon, a successful lumberman and avid fisherman, wrote to the American Lumberman in 1904 after a fishing trip in Northern Michigan:

. . . I had thought that the small growth of Jack pine and scattering Norway that had stood so long on the banks of this trout stream would be allowed to remain undisturbed and unmolested and add to the beauty of the winding stream. But I was deceived this time, for two or three little portable mills were running, or are being erected, camps were being built among this small stuff and the trout stream, instead of being undisturbed as I had fancied it would be after the logging days were over, was again awakened to the activity of lumbering. Jack pine no larger than four inches in diameter, tamarack no larger than a man's leg cut in lengths all the way from a fence post up to a 24-foot saw log, cedar in all shapes and sizes, dwarf, Norway, spruce and other remaining forest growths were being slaughtered close to the ground, and the last ruin soon to be completed and the young growth that was struggling for existence--for thousands and thousands of white pine and Norway pine could be counted--was



again destined to be wiped off the face of the earth by fire, for these heaps of tree tops, scattered<sup>12</sup> around, will cause, sooner or later, forest conflagration.

The forest was exploited to the utmost, and this had profound long-term ecological consequences for Northern Michigan.

Northern Michigan timberland remained concentrated in large tracts owned by a few lumber concerns. In 1910 twelve land owners held an estimated 28 percent of the remaining privately-owned timberland in Michigan, while 110 owned nearly two-thirds of it.<sup>13</sup> During the rush for pine land after the Civil War a few speculators were able to amass large holdings in such distant counties as Antrim, Otsego, and Cheboygan, which were not reached by the logging frontier until the 1890's. Of the remaining pine stands in northern Michigan David Ward's compact holdings above the headwaters of the Manistee River were the largest. These lands in southeastern Antrim and adjacent counties, exemplify the pattern of large, contiguous timberland holdings. Estimates placed the extent of Ward's land at 75,000 to 130,000 acres; roughly one quarter of this was pine, the rest hardwood.<sup>14</sup>

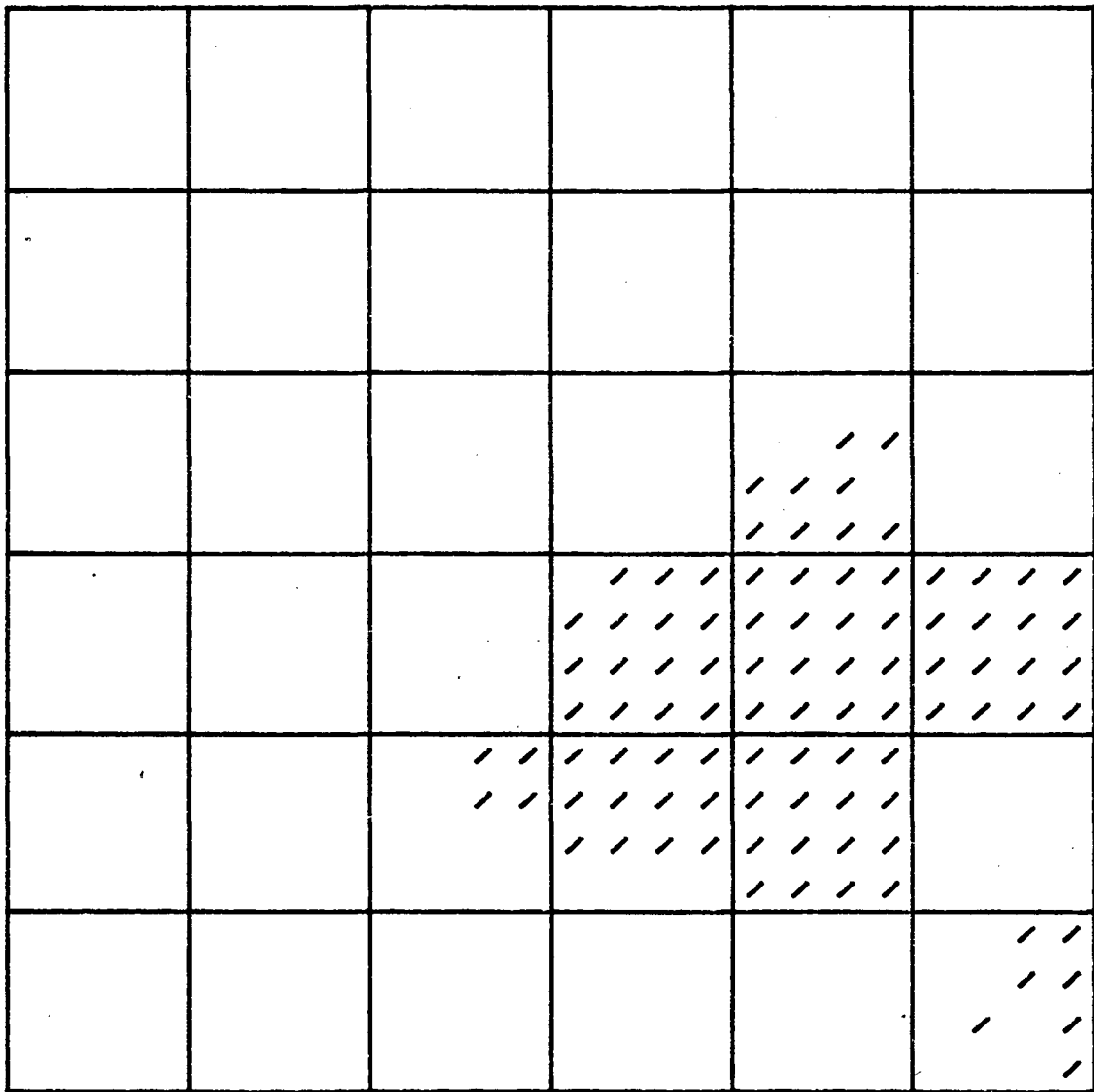
There was a remarkable persistence in the land ownership patterns of the northern Michigan lumber region. Speculators and lumbermen acquired large concentrated tracts of Michigan timberland in the bonanza land market of the 1850's and 1860's. Stumpland sales were not uncommon in the decades that followed; during the 1870's and 1880's lumber concerns often sold small isolated parcels, or parcels along the borders of their holdings.

Larger tracts changed hands occasionally, as lumbermen filled in their holdings and as speculators took their profits. But most owners were inclined to keep their larger tracts intact. In general terms land ownership patterns stayed the same until after 1910. Lumber concerns were inclined to hold onto their logged lands because assessments (and taxes) were low--typically far below the real value of the land--and pine land owners anticipated growing demand for secondary species. It was common practice to re-cut timber stands as early as 1870, and the minimum tree size constantly changed during the last half of the 19th century. If timber of any form remained on a parcel there was a strong possibility that it would become more valuable.

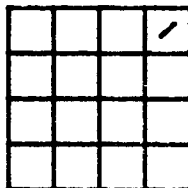
Moreover, there was little demand for northern Michigan land outside the lumber industry. A parcel was invariably worth more to the lumber industry than the value of the land for agricultural purposes. Land parcels did change hands during the 1880's and 1890's, but purchasers were typically lumber companies interested in the parcel's remaining wood, who kept large tracts intact. Though Michigan lumbermen had no interest in re-planting, they were not as quick to abandon their land as lumber concerns elsewhere.<sup>15</sup> Among them, Delos A. Blodgett still owned nearly 22,000 acres of stumpland in 1901. In Haring Township, for example, he retained 86 percent of the land that he logged in the 1880's (Figure 30, compare with Figures 17, & 7).<sup>16</sup> This land had little value outside the forest industry.

By 1910, however, the forest of the Lower Peninsula had

FIGURE 30  
BLODGETT STUMLAND - 1901  
HARING TOWNSHIP T22N R9W  
(WEXFORD COUNTY)



ONE MILE



DELOS A. BLODGETT

OWNERSHIP SHOWN BY 40 ACRE PARCEL

SOURCE: BLODGETT STUMLAND INVENTORY, MAY 1981.

been exploited to the utmost, and lumbermen attempted to rid themselves of large areas of stumpland. Agricultural settlement had followed the logging frontier in the eastern United States, and many people, including lumbermen, railroad executives, and state officials, hoped the same would occur in Northern Michigan. Agricultural colonization schemes were launched to encourage settlement in northern Michigan.<sup>17</sup> Stumpland was sold by lumber companies directly to settlers, through a land agent, or by settler associations. Lumber companies sold small parcels of stumpland to settlers on land contracts, which allowed the purchasers to make payments over time. In effect, lumber concerns financed the purchase of the land by this arrangement, and they retained title to it until the final payment was made. Land contracts could be cancelled if the land were abandoned, if the taxes were not paid, and if the contract payments were not made on time. Parcels of 40 or 80 acres (or, rarely, 160 acres) were sold for \$.50 to \$10.00 an acre. Blodgett's stumpland was carried on his books at \$.50 to \$8.00 per acre, but many thousands of his acres had "no value".<sup>18</sup> Speculators and land dealers also purchased stumpland. Among them, William Schwager, a Chicago land dealer, purchased cutover from the Ruggles Lumber Company and the Buckley Lumber Company for \$1.50 an acre, and sold it for as much as \$25.00 an acre. In general, settlers paid less than \$10 per acre. Settlement associations, such as the Western Michigan Development Bureau, and land agents advertised widely. The people attracted to this land were usually recent immigrants, such as Charles Kasarskis who arrived

from Lithuania in 1908. Stumpland was cleared and not expensive. Kasarskis purchased land in Lake County, near Irons, in 1914; in the ensuing years as many as 100 Lithuanian families were attracted to the Irons area.<sup>19</sup>

Yet advertisements and optimism could not alter the poor quality of northern Michigan land.<sup>20</sup> H.C. McKinley, an early settler in Crawford County, described settlement there:

The homesteads these pioneers took up proved so sandy and sterile, having little or no reproductive power, that they could not eke out a living, and one by one the places were abandoned and soon the once happy little settlement was a place for bats and owls and lapsed into barren wilderness and remains so to this day. Time and the elements have so changed the face of the county that little or no evidence of its ever<sub>21</sub> having been inhabited by white men is now visible.

Agricultural settlement was promoted at a time of declining rural population in northern Michigan. In the end, stumpland was simply abandoned, and reverted to the state for non-payment of taxes. Widespread land abandonment continued through the 1920's and 1930's.<sup>22</sup>

#### LANDSCAPE

By 1920 much of northern Michigan was a barren, scorched wasteland. Agriculture clearly was not feasible for most of the region and the industry had shown no interest in re-forestation. As the land lay neglected it was ravaged by fire and erosion. More efficient, turn of the century logging methods and the harvest of smaller and secondary species left barren land

littered with tops, limbs, and stumps. Fires burned--"quite regularly and systematically"<sup>23</sup>--through the slash each summer, sweeping unchecked through the large tracts of land owned by the lumber concerns.

Fires had been a serious problem for decades in northern Michigan, but after 1890 the frequency and extent of forest fires grew enormously. Fires killed standing timber, damaged logs at rollways, and wiped out entire logging camps and villages. Fire fighting was a frequent task--and a matter of survival--in the camps, mills, and villages of northern Michigan. Smoke-darkened skies were a common sight. In July 1911 Alcona and Isoco Counties were swept by slash-fed fires; the residents of Oscoda and Au Sable saved themselves by taking refuge in the river and lake.<sup>24</sup>

These frequent fires also had enormous impact upon the environment, the soil was greatly damaged and vegetation succession radically altered (Figure 31). Trees and saplings of some species were killed by a single fire. Young white pine (unlike the mature tree) are sensitive to fire and rarely survive a mild burn. Aspen, poplar, pine, and oak emerged in the burned over areas. A second fire a summer or two later would kill remaining saplings of all species and all mature trees (the pine having been damaged by the first blaze), and burn much of the organic material on the ground. Re-seeding was slow, yet aspen seeds blew in and oak roots re-generated. A third fire burning along the surface would permanently damage the soil and again kill all saplings. The disappearance of white pine and other

Figure 31



Burned-over slash in northern Michigan.

Source: State Archives, Michigan Department of State.

species in most of northern Michigan was due to the loss of seed sources, periodic fires, and the destruction, and subsequent erosion, of the soil. Big tooth aspen and pin cherry emerged in burned areas, while bracken fern, golden rod, and various grasses and sedges dominated in areas subjected to more frequent burning. Even today open grassy plains dotted by old stumps (often called stump plains) are a common sight in northern Michigan.<sup>25</sup>

The devastated landscape of northern Michigan focused greater attention upon the inadequate management of Michigan's forest lands. The widespread detrimental impact of man on America's forests and the importance of proper management and conservation practices had been argued by a few prescient authors for decades.<sup>26</sup> Professional forestry emerged by the last decade of the 19th century, but not until after 1900 were professional foresters given a role in the development of forest management policy in the state of Michigan. The Michigan Forestry Commission was founded in 1899, and the Michigan Legislature appointed a State Forester in 1903. The State Forester was entrusted with the reforestation of the 1000's of acres of cutover that had reverted to the state. By 1920 perhaps 9 thousand of the more than 10 million acres of Michigan cutover had been replanted.<sup>27</sup>

But state action was too limited in scope and too late in implementation. Erosion radically altered the ecology of stripped and often burned timberland. A scrub forest replaced the pines and hardwoods. Russell Watson, a Professor of Forestry at The University of Michigan, wrote in 1923:



In no place do we find any quantity of second-growth of desirable species taking the place of the previous stand. A little trembling aspen, a few scrubby jack pines, bush oak, and in the swamps, pole and post size cedar, have taken the place of the old forest.<sup>28</sup>

Where pine seedlings remain the forest might take 100-200 years to revert to its earlier condition. Where seeds are not available it will take much longer. And it is likely that hemlock will never return to Northern Michigan in quantity due to permanent damage to the soil.<sup>29</sup>

#### THE TOOLS AND TECHNIQUES OF FOREST PRODUCTION

Logging technology adapted to the unique conditions of the decline period. The demand for new species and the increased distance between logging camp and sawmill had a significant impact upon the tools and techniques of forest exploitation. Hardwood logs, and many of the other new products of the forest, floated poorly and thus railroads were used increasingly to haul products out of the forest. Railroads also suited the longer transport distances typical of this time, and they brought steam power--in particular steam-powered log loaders--closer to the stump. Other tools of the forest, such as saw, ax and dray, were improved, and increased attention given to their maintenance. These changes in forest technology had widespread impact upon the forest landscape and the spatial organization of the industry.

Cross-cut saws remained the principal felling tool used

in the Michigan woods, although axes were used to notch and limb the trees. The size and shape of saws remained much the same; those used in the H.M. Loud & Sons Lumber Company's hardwood operation in Oscoda County were six feet long and cost \$3.90 apiece.<sup>30</sup> By 1890, however, a greater variety of teeth patterns and teeth shapes were available to suit the type of timber and the inclination of the sawyer.<sup>31</sup> Hardwood felling and bucking was harder work than cutting soft pine.

As cross-cut saws were improved and the scale of production in the woods grew, increased attention was given to saw maintenance. In the early 1870's Joseph Proctor, a contract logger on the Flat River in Montcalm County, had spent Sundays and evenings filing saws and grinding axes.<sup>32</sup> By the 1880's a filer had become an important member of every logging camp. In the Loud & Sons turn-of-the-century camp a filer accompanied the sawyers into the woods with his tools and an extra sharpened saw, to spend each day trading freshly sharpened saws for dull well-used ones. Because saw teeth were worn down and re-sharpened, saw gumming, which deepened the gap between saw teeth, became an important aspect of saw maintenance. Saw gumming was done in the Loud & Sons camp using a small emery wheel powered by a belt drive to a fly wheel turned by two men. Even then, an hour might be spent on each saw.<sup>33</sup>

Trees were notched, felled and bucked into logs by two-man crews. The logs were cut three or four inches larger than the required size to protect against damage and imperfect bucking. If good sawyers were not available, an axman might be

assigned to every gang or two of sawyers to notch the trees. The notcher or the senior sawyer determined the direction the tree should fall and the size of the logs to be cut.<sup>34</sup> Skilled felling kept skid roads free of trees, prevented trees from breaking over other fallen trees, and "bunched tops" thereby minimizing swamping. Accurate felling was especially important near big wheel or sleigh roads because these routes had to be completely free of debris. The Loud hardwood camp used five gangs of two sawyers each.<sup>35</sup>

Average daily output per saw was 4000 to 8000 feet. In general hardwood camps produced at the low end of this range and pine, which could be cut more easily, provided the high figure. The size and the type of logs were important factors in logging output. Despite significant improvements in cross cut saws white pine production per saw in 1900 was roughly half of the average output of the early 1870's due to the drastic drop in log size. On the other hand, the improved design of the saws speeded production and reduced the cutting crew from three men (common in the early 1870's), to two, and thus production per man dropped only slightly. The average output per saw in the Loud hardwood camp was 32 logs and 4340 feet per day in 1905.<sup>36</sup>

Steam skidders were used occasionally by 1900, but traditional dray and big wheel skidding remained the norm in Michigan woods. Logs continued to be tonged a short distance to a central work area where they were rolled onto a dray or hoisted by the big wheels. As skidding distances grew, more care was spent engineering increasingly elaborate roads that could be used

by the drays in the winter and the big wheels in the summer.<sup>37</sup> Loud & Sons used drays of the "Cheboygan or jack-knife" style that measured 5' 8" x 11'. The dray runners were fashioned from beech or maple trees that grew on hillsides so that the tree trunks had large curved roots on the downhill side. They were cut 8" square with a broad ax and the curve was incorporated as the front or up-turned end of the runner. The hardwood bunks on which the logs were carried were spiked to keep the load from rolling off once it was positioned.<sup>38</sup>

Big wheels were widely used in Michigan when there was no snow cover. They were used in camps where white pine was still being cut, such as the David Ward Estate operations in Antrim County, and also in Michigan's hardwood camps.<sup>39</sup> Big wheels were usually 9 feet in diameter and required flat roadways; rocks, roots, and stumps hindered their movement. They could be used on slopes up to 15 percent, and at the Loud & Sons camp run by J. Ganley they carried an average load of 500 feet, or about 4 or 5 logs each trip, over distances of 20 rods to a mile.<sup>40</sup>

#### STEAM-POWERED LOG LOADING

The most striking development in logging technology at the turn of the century was the application of steam power to the loading of logs. Early experiments in steam skidding and loading occurred in the early 1880's, but as Fitzmaurice wrote of them in The Shanty Boy (1889): "Their utility is still largely questioned by experienced lumbermen, and they have not yet come into universal use."<sup>41</sup> Not until the late-1890's did

steam-powered skidders and loaders appear as refined innovations for public sale, and by this time the Michigan forest industry was in decline. Steam loaders, skidders, and yarding systems all operated on the same principle: a steam engine was used to drive a revolving drum around which a cable or line was wrapped; the line passed through a series of pulleys or spars and when it was reeled in a log was dragged or hoisted into position. Steam skidding systems were never widely adopted in Michigan though steam log loaders were common.<sup>42</sup>

Steam-powered yarding and loading systems were first used in Michigan in the early 1880's. Charles A. Beagle, a Michigan inventor, is said to have conceived in 1878 an aerial cable system powered by horses or steam to transport logs,<sup>43</sup> but Horace Butters, a Ludington (Michigan) lumberman, is generally credited with the development of the aerial cable method of yarding and skidding logs.<sup>44</sup> In 1883 he received a patent for a steam-powered skidding system that hoisted logs from stump to skidway using overhead cables and pulleys suspended from the tops of limbed trees. This system was not widely adopted in Michigan where the land was relatively flat, and swamps froze in the winter.<sup>45</sup> A steam skidding system had a maximum radius of 800 to 1200 feet,<sup>46</sup> which compared poorly to drays and big wheels which could be used up to one mile or more. Refined, re-invented versions of Butters' system were successful in the cypress swamps of the south and in the western Coastal Mountains.<sup>47</sup>

Steam power was applied to block and tackle loading

systems once heavy machinery could be transported to the skidways. Some of the earliest steam powered loaders in Michigan were donkey engines that were used to roll logs up to the level of a flat car.<sup>48</sup> Later steam powered loaders typically hoisted the logs from skidway to logging car. Fitzmaurice described a steam loader he observed at work in Michigan in 1883:

Over a high derrick ran a wire rope, wound on a barrel by steam power. To the other end of the rope was attached large skidding tongs by which the log was grasped in the center and like a flash was hoisted and swung to its place on the car.

Though rarely adopted in the 1880's, log loaders were used by several of Michigan's larger logging operators before 1900. Perhaps most common was the Decker log loader, developed by George W. Decker of the Pond Decker Lumber Company of Newport, Arkansas, in the mid 1890's, and made available for general sale in its third version in 1898.<sup>50</sup>

Steam-driven log loaders were designed to be moved by rail and to load railroad logging cars at the skidway. Loaders were expensive, from \$3,500 to \$6,500, and were generally of three types. 1). The semi-portable loader was left on a prepared foundation on the side of the tracks, or on a short siding next to the rail line. Mobile loaders were more popular but they had to deal with the tricky problem of allowing the constant movement of unloaded cars into position. Alternatives included 2). loaders that moved on top of railroad flat cars along their own movable track, and 3). loaders that moved on the railroad track under their own power, but were built high off the tracks to

allow logging cars to pass underneath. This was accomplished by a special set of tracks that, when laid out, diverted the cars up and through the loader, or by using a jack system whereby the loader planted legs into the surrounding ground and then hoisted its own wheels leaving the track free and clear. All log loaders had some type of boom or derrick that was used to hoist the logs onto the cars (Figure 32).<sup>51</sup>

The log loaders increased production at forest skidways tremendously. In 1897 a foreman in one of David Ward's camps reported to a local paper that they were loading 150 M per day with a steam loader. The David Ward Estate camps reported totals of 245 M for a ten hour day in July 1904, and an average of 232 M feet for six days in May 1905.<sup>52</sup> An advertisement for the Decker Log Loader in 1898 claimed that 150 M had been loaded in 10 hours by four men with that machine.<sup>53</sup> In the 1880's 100 M a day was a high rate of loading; steam loaders greatly increased, and occasionally doubled, that rate. In contrast a horse jammer used by the Louds & Sons in 1905 loaded an average of 27 M per day.<sup>54</sup>

At the turn of the century both sleighs and railroads were used to haul logs out of the forest. In general Lake States lumbermen preferred to use sleighs and river drives; as a second choice logs were hauled by "short haul railroads that were here today and somewhere else tomorrow"<sup>55</sup> to a stream capable of being driven; sending logs directly to mill by rail was a final solution.<sup>56</sup> In turn of the century Michigan the remaining pine was often far from streams suitable for log driving, and

Figure 32



A steam log loader.

Source: Michigan Historical Collections, Bentley Historical Library, University of Michigan.



thus railroad transport was necessary.<sup>57</sup> As the annual drives on Michigan's great lumbering rivers diminished, and most of the chartered boom companies disbanded, Michigan mill men turned to the public carriers to deliver logs from the far north. Forest hauling thus became, in many cases, simply an extension of the public railroad system. Sleighing and the light logging railroads were used, but they were generally supplementary to the major northern rail lines.

Railroad companies, anxious for traffic, often built branch lines into isolated pine tracts in northern Lower Michigan. This had been a common practice for many years, but now the rail distances were much longer and they assumed greater economic importance. For example, in 1911 the Grand Rapids and Indiana Railroad constructed a 6 mile spur out of Alba in Antrim County, to carry logs from about 4500 acres to the Cadillac mill of A. Anderson & Co., roughly 60 miles away.<sup>58</sup> In other cases lumber companies built their own feeder lines. In 1898, the Thayer Lumber Company built a 32 mile feeder to the Chicago and Western Railroad that transported nearly 100 M of logs a day to its Muskegon mill almost 200 miles away.<sup>59</sup> And in 1897 David Ward sent about 7 million feet of logs cut near Frederick, in Crawford County, 100 miles via the Michigan Central Railroad to a Bay City mill. A few years earlier David's son, Henry C. Ward, had sent the entire season's output of a logging camp in the Gaylord area to Bay City mills by public carrier.<sup>60</sup>

Lumber concerns also built their own chartered railroad systems when they were poorly served by the existing network.

The Frederick and Charlevoix Railroad, for example, was the backbone of the Ward Estate operations. Built by David Ward, it funneled logging cars from forest branches to the mill at Deward and shipped lumber and other products to East Jordan. This 45 mile railroad was also a passenger line and it was valued at over \$450,000 in 1901.<sup>61</sup> Other important regional railroads included the Manistee and Northeastern Railroad and the Detroit and Mackinac. In effect, the lightweight, temporary logging railroads of the 1880's had been largely supplanted by public carriers and small regional lines owned by the lumber companies.

#### LAND YIELD

As improved saws, steam loaders, and railroad hauling increased the capacity of forest production and provided dependable, year around operation, Michigan timber stands were cut and re-cut; trees as small as 3-4" in diameter were felled.<sup>62</sup> In 1905 lumbermen looked at timber stands differently from their 1870 counterparts whose timber estimates included roughly 1/3 of the timber of value in 1905.<sup>63</sup> A young man who worked in an 1890's logging camp in northern Michigan reminisced later in life that his camp had been told to "cut everything from eye teeth to Bird's eye Maple."<sup>64</sup> In Michigan, as in northern Minnesota in 1906, it was not exaggeration to claim that

. . . everything of value is cut. . . millions of feet of logs, thousands of telegraph poles, posts, ties and a great deal of pulpwood.<sup>65</sup>

Production per acre remained high--as much as 40 M or more--where white pine stands were cut for the first time. Camps cutting hardwood and other secondary species, and camps re-cutting old pine lands, produced only moderate yields, perhaps 10 M to 20 M per acre.<sup>66</sup> Parcels denuded of pine perhaps 15 years before might yield 12 M of hemlock and hardwood per acre; cedar posts and cordwood might be cut a few years after the hemlock. Thus production per acre was well below the levels of a decade or two earlier, but many forest products, such as posts, poles, and cordwood, were not included in board measures. When they are taken into account it is clear that much more of the forest was being removed. During the 1904-5 season the Loud & Sons operation cut 40,000 cedar telegraph and telephone poles, 250,000 posts, and 150,000 railroad ties, in addition to more than 5 million feet of hardwood saw logs.<sup>67</sup> Similarly, average log size remained low. Hardwood logs are heavier and, as a rule, smaller than pine logs, although Ganley's camp of the Loud operation cut more than 52,000 logs that scaled roughly 7 million feet (or 7.4 logs per M) in 1904. More commonly, hardwood logs scaled less than this. A forty acre parcel cut by Ganley averaged 9.75 logs/M, and a 10 month sample spanning 1904 and 1905 ran at 9.5 logs/M.<sup>68</sup>

Logging camps typically cut a variety of species. Proportions and yields varied according to topographic, edaphic, and pedologic conditions. The Loud & Sons camp cut mostly hemlock and maple. One forty acre parcel cut by Ganley's camp in

1905 yielded 65 percent hemlock and 25 percent maple, but during the 10 month period in 1904/5 during which it was cut, Ganley's camp produced a total of 41 percent maple and 38 percent hemlock (Table XIV). A surprising 16 percent of the year's cut was accounted for by white and Norway pine which may have included timber that had matured since the area was logged of pine 15 years earlier, as well as trees that were left behind because they were diseased, in a distant location, or on uneven ground. The forty acre parcel included in this sample had not been logged previously; yields from it were correspondingly high for hardwood land, yet its average of 14.7 M/acre is much lower than that for good pine land.<sup>69</sup>

Log size and land yield stabilized somewhat during the decline of lumbering, but the cutting of all the new secondary products of the woods--ties, posts, cordwood, and bark--left precious little behind. Spruce pulpwood was also a common forest product of northern camps and hardwood cordwood was often cut and removed when the logging was finished.<sup>70</sup> Though there had been hemlock bark camps and railroad tie camps in Michigan for many years, it was not until the end of the century that these camps assumed industry-wide importance. As the pine diminished the industry moved on to secondary products, and railroad tie camps, post and pole camps, and cordwood camps emerged side by side with the hardwood camps as important factors in the post-pine forest economy. Technological innovations in manufacturing and transport, as well as, the dwindling pine resource focused the industry's attention upon every tree of the

Table XIV

## PRODUCTION OF A HARDWOOD LOGGING CAMP -- 1905

(BY SPECIES AND PER M)

H.M.LOUD &amp; SONS, OSCODA COUNTY

SAMPLE FORTY ACRE PARCEL<sup>a</sup>

SPECIES	LOGS *****	FEET	LOGS/M	%	% ANNUAL OUTPUT <sup>b</sup> *****
Maple	1096	150,170	7.3	25.0	41.0
Hemlock	4144	383,740	10.8	65.0	38.0
White Pine					9.0
Norway Pine					7.0
Beech	315	33,580	9.4	6.0	3.5
Basswood	38	3,530	10.8	.6	3.0
Oak					1.0
Birch	133	15,670	8.5	3.0	.4
Bird's Eye Maple					.3
Elm	12	1,640	7.3	.3	.2
Ash					.2
Bum Basswood					.2
	5738	588,330	9.75	99.9%	103.9[sic]

Source: Frothingham, "Review of Hardwood Lumbering," p. 9.

<sup>a</sup>The forty acre parcel yielded 14.7 M per acre.

<sup>b</sup>Annual output represented 10 months of logging; total cut was 5.2 million feet, at 9.5 logs per M.

forest. New tools and techniques emerged, and old ones were adapted, to aid the industry in its total exploitation of the northern woods.

### THE SCALE AND ORGANIZATION OF PRODUCTION

Large, vertically integrated lumber concerns dominated the industry during the decline years. In a constricted market large lumber companies with access to stumpage and control of all stages of production were better able to maintain a competitive position. Stumpage costs and investment requirements soared at the end of the 19th century, squeezing most small- and medium-sized concerns out of business, or into less profitable operations such as cutting hemlock bark or fence posts. Rail transportation emerged as an important part of an integrated lumber operation as the river drive associations closed and as hardwood became an important forest product. As the logging frontier receded, railroads penetrated deeper into the woods and logs were transported greater distances. Moreover, the scale of production had grown, at least in a few cases, due to the steam log loader and direct rail delivery. After 1895 the Michigan lumber industry was dominated by large concerns that in many cases stretched hundreds of miles from stump to mill to retail lumber yard.

The Ward Estate operation in Antrim, Otsego, Crawford, and Kalkaska Counties provides an excellent example of a large,

fully-integrated lumbering concern. This company was organized for the sole purpose of cutting a large tract of timber in an isolated area of northern Michigan. Perhaps the largest timber tract ever owned by an individual in Michigan, Ward's "Manistee tract" consisted of roughly 25,000 acres of pine and another 75,000 acres of hardwood. This tract was assembled by Ward during the 1850's (pine) and the 1880's (hardwood).<sup>71</sup> Ward died in 1901, and his heirs decided to cut the pine on this tract; in 1902 a small mill village called Deward was built in the northeast corner of Crawford County. Deward, a village of some 700 people in its heyday, was primarily a mill town, but it served as a center for some of the last white pine logging in Lower Michigan. On July 14, 1904 the Mancelona Herald reported that a Ward Estate logging camp run by J. C. Clearly had 130 men and 18 horse teams at work. According to this account the camp cut, wheeled, and steam loaded onto cars 200 M per day. A similar report from June 1905 noted another Cleary camp with 148 men and 16 teams, with a daily average of 232 M for a recent week's work.<sup>72</sup> Certainly these were large camps and extraordinary production levels but the annual output of the Deward sawmill was roughly 40 - 50 million feet which would require a daily production rate of 130 - 160 M in the forest year around. As a further example of large levels of production, the Thayer Lumber Company of Muskegon was said to be cutting 100 M per day in May 1898.<sup>73</sup>

The Ward Estate oversaw every step of production from stump to their docks at East Jordan. A large logging railroad

network transported saw logs from skidway to the company's main line, The Frederick and Charlevoix Railroad (F&CRR), and then on to the mill at Deward. The finished lumber was then loaded onto cars and sent to East Jordan via the F&CRR. At East Jordan the lumber was loaded onto lake freighters.<sup>74</sup>

The H.M. Loud & Sons Lumber Company provides a useful contrast to the Ward Estate operation.<sup>75</sup> Smaller than the Ward concern and devoted to hardwood logging, the Loud operation was also a fully-integrated lumbering venture. Loud & Sons ran two camps in 1905, one of which had 45 men, 8 teams and an annual output of 7.15 million feet. In 1902 they had 4 camps with a total output of 24 million feet. In addition, Loud & Sons ran a chartered railroad system and two sawmills. In 1905 a logging train loaded with 27 M of logs left each camp every day bound for the Loud & Sons mills in Au Sable/Oscoda.<sup>76</sup>

Though many lumber companies expanded vertically to reduce costs, others did so out of necessity to provide services for which they had previously depended upon others. In any event, at a time of increased competition and rising costs the industry was dominated by large, fully-integrated lumber concerns. Between 1900 and 1904 lumber and timber product proprietorships in the state dropped from 997 to 338, while the number of corporations stayed relatively even: 186 (1900) to 170 (1904). The corporations, which constituted 22 percent of the lumber and timber product firms in 1904 (up from 11 percent in 1900), contributed roughly 60 percent of the industry's total capital invested, number of wage earners, and value of products.



The average incorporated company was roughly eight times the size of the average individually-owned firm in terms of capital, average number of employees, and value of products.<sup>77</sup>

Rising costs and growing investment requirements made it difficult for all but the largest concerns to operate during the decline period. The value of stumpage soared at the end of the 19th century due to the growing scarcity of timber. The value of standing timber in the 1880's was roughly \$4 - \$5 per M, but by 1900 it had doubled (Table XV). For example, David Ward's Manistee tract was assessed at \$12 per M in 1902.<sup>78</sup> Of course actual stumpage costs varied widely depending upon the timing and conditions of acquisition. The pineland of Ward's Manistee tract was purchased for a dollar or so an acre (about \$.05 per M) and the hardwood for an average of \$6.00 an acre (perhaps \$.50/M). Many lumber concerns, such as the David Ward Estate, had very low stumpage costs and their profits reflected the soaring value of timber. Other companies had higher stumpage costs. Among them, W.H. White & Co. of Boyne City bought 14,000 acres from the Ward Estate in 1902, and Kneeland-Bigelow of Bay City purchased 3440 acres from the Estate in 1912.<sup>79</sup> The costs of cutting and skidding also varied widely, but \$3.00 per M is an average figure.<sup>80</sup> For example, the cutting and skidding costs in Loud & Sons four logging camps in 1902 ranged between \$2.77 and \$3.23 per M, for an average of \$3.01 per M.<sup>81</sup> This was up slightly from the mid-1880's because wages, which made up the major part of these costs, had risen from an average \$26.00 per month to \$ 28.00 to \$30.00.<sup>82</sup> In the Loud

Table XV  
 MICHIGAN STUMPAGE PRICES 1892 - 1905  
 (\$ per M)

1892...\$6.00 - \$8.00	1899...\$8.00 - \$10.00
1893....4.00 - 7.00	1900....8.00 - 12.00
1894....4.00 - 6.50	1901...10.00 - 15.00
1895....4.00 - 6.50	1902...10.00 - 16.00
1896....4.00 - 6.50	1903...10.00 - 17.00
1897....6.00 - 8.00	1904...10.00 - 18.00
1898....8.00 - 10.00	1905...10.00 - 20.00

Source: American Lumberman, 6 January 1906, p. 21.

operation the average wage was \$28.50 per month.<sup>83</sup>

The cost of railroad hauling was generally higher than the traditional river drive, but it was largely determined by the distance logs were hauled. Short hauls of a dozen miles or so might be \$1.00 per M, while longer hauls of 100 miles could be \$4.00 or more. In Michigan, of course, there was a growing distance between mill town and the logging frontier. In 1902 Loud & Sons transported 26 million feet over their own railroad at a cost of \$1.74 per M; in 1905 the cost was \$2.05 per M for a 60 mile haul, or \$.034 per M/mile.<sup>84</sup> This was roughly the rate charged by the other regional forest railroads, e.g. the Manistee and Northeastern (\$.045 M/mile), while the public carriers, such as the Grand Rapids and Indiana Railroad, had rates of \$.021 to \$.026 per M.<sup>85</sup>

Detailed records of logging costs in a hardwood logging camp in 1905 are itemized in Table XVI. Column A shows monthly wages and boarding costs broken down into each stage of logging. Column B includes the wages and costs for those men not directly active in logging, e.g. the foreman, scaler, cook, and blacksmith, distributed proportionally among the various stages of production. Excluding stumpage the total cost of logging in this camp was roughly \$5.30 per M. By comparison, the total costs in a large Lake State white pine camp, described by Bryant in his Logging, were \$2.63 to \$3.45 per M in 1909. But at least part of the difference is attributable to the cost of hauling. The hardwood operation hauled logs 60 miles; its rail cost was 4 to 5 times that of Bryant's pine camp, which had only

Table XVI

## LOGGING COSTS IN A HARDWOOD LOGGING CAMP C. 1905

(\$ per M)

	WAGES & BOARD (A) *****	TOTAL EXPENSE (B) *****
CUTTING	\$.62	\$.74
SWAMPING	.44	.52
SKIDDING	.78	.93
LOADING <sup>a</sup>	.28	.34
MISC. <sup>b</sup>	.42	.50
	*****	*****
	\$2.54	\$3.04
RAILROAD HAULING		\$2.29

Source: Frothingham, "Review of Hardwood Lumbering," p. 30.

<sup>a</sup>"Tailing Up" included with loading, treated separately by Frotheringham

<sup>b</sup>Building skidways, hauling water, etc.

a 14 mile haul.<sup>86</sup>

Although logging costs increased slightly, logging's capital equipment requirements had increased tremendously. Single camps might have equipment worth over \$5500, including horses, axes, big wheels, harnesses, and saws, but the major capital investment in logging at this time were in railroads and log loaders. Loud and Sons owned the Au Sable and Northwestern Railroad with eight narrow gauge locomotives, six of which were 28 ton Brooks Moguls, each worth \$8,500 - \$9000 new.<sup>87</sup> Log loaders were roughly \$5000 each. Capital improvements were also quite large. When amortized over the life of the line, railroad construction costs averaged \$.50 to \$1.00 per M.<sup>88</sup> Including rolling stock, David Ward's railroad was valued at \$459,646 in 1901.<sup>89</sup> On average, the capitalization of lumber concern doubled between 1884 and 1904, and was up roughly 11 percent between 1900 and 1904.<sup>90</sup>

Increased capital requirements resulted from the vertical expansion of many logging concerns and from the growing use of steam power in the woods. Investments in steam loaders and railroads, albeit large, promised uninterrupted production and reduced daily expenses. They did so by reducing the industry's vulnerability to the vagaries of weather, and by eliminating jobs formerly filled by the highly transient labor force that had been a consistent irritant to the lumber companies. A spokesman for a logging machinery firm fully exploited the latter "advantage" in explaining one of the benefits of a steam log loader. According to him, a loader was ". . .not effected [sic] by flies, heat or

rain, and has no running expense on holidays or shut-downs."<sup>91</sup> Logging machinery was necessary because "The hardy woodsman of the north and west [U.S.], that went in with the frost and stayed till the drive, [was] extinct", replaced by "Drunks. . . foreigners . . . and. . . the negro."<sup>92</sup>

Mechanization may have reduced the size of the logging crew, but transiency remained a problem. Certainly the largest and best capitalized operations were better able to survive the Panic of 1893 and the increased competition in the following decade or two.

The growing reliance upon railroads for the transport of both logs and lumber transformed the spatial organization and seasonality of the industry. The diminished importance of the river drive during the decline period removed the major seasonal anchor of the forest production cycle. Though summer logging had become feasible with the innovation of wheeled carts, winter logging was easier and lumbermen had been hesitant to leave logs at riverside rollways where the danger of fire was great.<sup>93</sup>

Forest railroads enabled daily shipment of saw logs, thus solving the problem of rollway fires. Yet the increased presence of locomotives in the forest contributed to extensive forest fires.

Direct rail shipment tied the production centers of camp and mill closer together. Previously the river drive, conducted by a chartered monopoly, acted as an intermediate stage in the lumbering production line. The increased use of direct shipment by rail facilitated the integration of logging, transport, and milling within a single concern. Between 1865 and 1893 logs were

usually skidded from stump to skidway, hauled by sleigh (and later by rail) to river banking grounds, and driven down river to booming grounds. Direct rail shipment replaced the hauling, driving, and booming stages.

Again, the Loud and Sons operation serves as a useful illustration, this time of the spatial organization of logging at the turn of the century. In J. Ganley's camp 5 pairs of sawyers, supported by 1 filer, cut and bucked the trees. The daily average output per saw was 32 logs, or 4340 feet; an average total output for five saws of 21.7 M per day (Figure 33). Eight men swamped and 1 "knotter" limbed the logs while 2 teamsters tonged the logs from stump to a central loading area. Here 4 men loaded the big wheels and 3 teamsters then wheeled the logs to the railhead. The big wheels worked over a 60 rod road, 18 times a day, with an average load of 500 feet of logs. One man unloaded the logs and moved them into position for loading (called "tailing up"). Two men, plus a teamster and his team, were at work loading cars with a jammer. One other man was employed to keep the big wheel roads clear of debris. Thus 34 men were engaged in logging at Ganley's camp on a typical day. Eleven more men attended to miscellaneous chores and filled such roles as foreman, cook, scaler, and blacksmith. A Loud & Sons logging train left Ganley's camp every day with 15 cars, each loaded with an average of 13 logs, or 1826 feet. The sawmills were located in Au Sable/Oscoda some 60 miles away.<sup>94</sup>

By the end of the 19th century Michigan logging had become less seasonal than ever before due to the unique

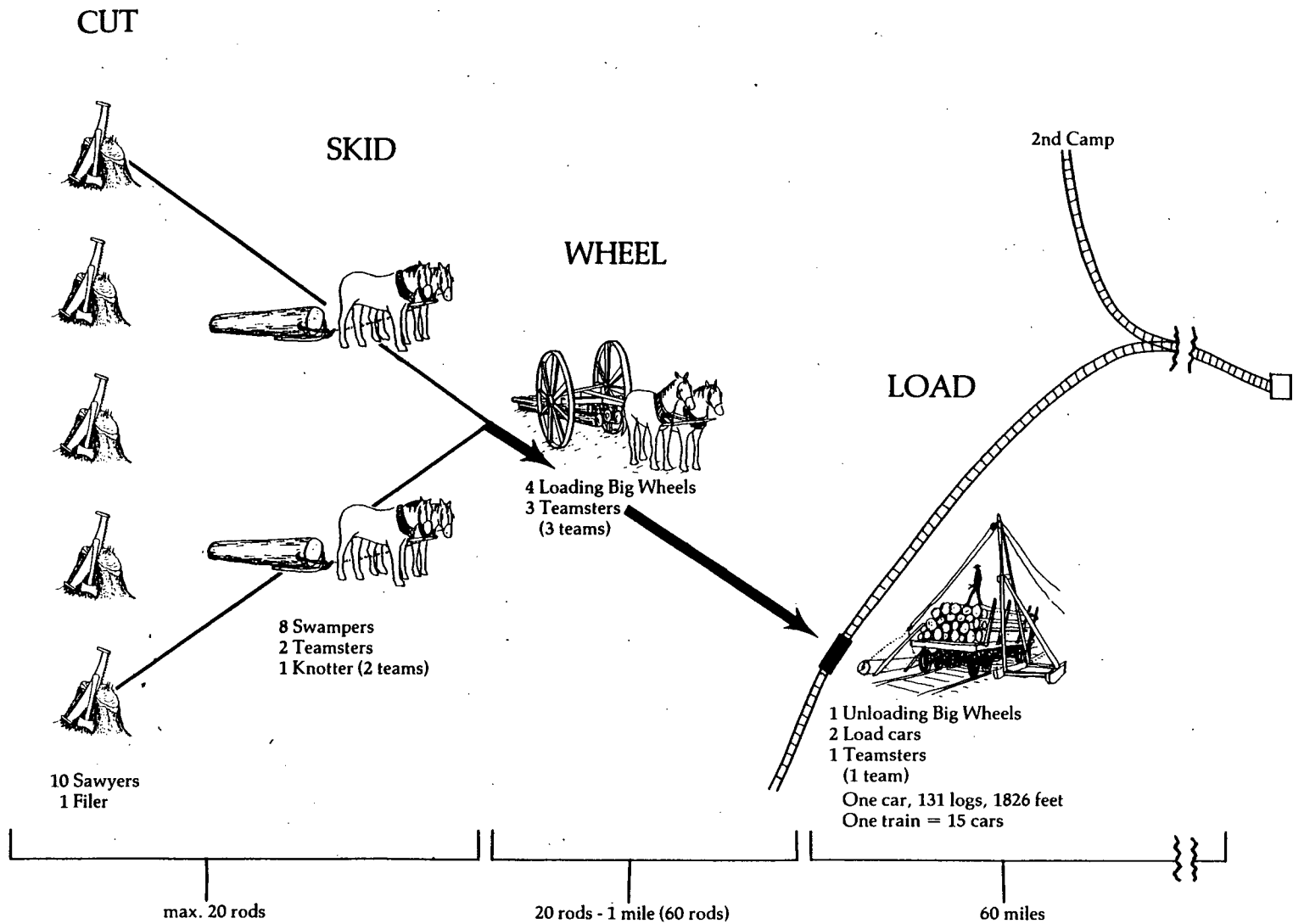


Figure 33. Organization of Logging production c.1905.



conditions of the decline period. Yet loggers preferred the traditional rhythm of winter hauling, spring drives, and summer shipping because of its ease and economy. Fire, mosquitos, swamps, and running sap were some of the problems of summer logging. As the American Lumberman explained in 1906:

Summer logging in the northern districts is attended with some difficulty and cannot be<sup>95</sup> carried on to as good advantage as is possible in the winter.

Lumbermen were attracted to the low cost of winter skidding and spring river drives but they disliked the limited seasons and frequent disruptions associated with these methods. Consequently, lumbermen struggled throughout the late 19th century to reduce the seasonality of the industry by lengthening the seasons and developing a seasonless technology. Winter continued to be favored for logging because of frozen swamps, and the lack of brush and bugs. But as the logging frontier in Michigan spread far from the major rivers and included new species that floated poorly, direct railroad transport, which had no seasonal preferences, emerged as the dominant method of log delivery. The spring river drive was no longer the crucial link between camp and mill. Lumbering was becoming a year-round enterprise. Yet the transition was not complete in 1900. Seasonal cycles and seasonal preferences remained in the woods, and these rhythms complimented those of the lumber industry.<sup>96</sup> Hemlock, for example, was typically cut and peeled in the spring and summer, or it was cut after the trees

froze, and peeled in the spring at the mill.<sup>97</sup> Declining rail rates, the cutting of new products, and the break-up of the drive and boom associations contributed to a very diverse pattern of production. A few large operations contrasted with the size and seasons of the occasional pole, pulpwood, and cordwood camps.

The conditions of the decline period increased the lumber industry's impact upon the landscape. Lumber concerns continued to hold vast tracts of timberland, and they found it profitable to cut nearly every size and species of tree in the forest. Technological advances in milling and manufacturing aided and encouraged this increased exploitation as new machines made it feasible to utilize more of the forest. Hardwood logging and distant, isolated pine logging brought railroads deeper into the woods and steam powered equipment closer to the stump. Output per acre increased greatly, while larger levels of capitalization encouraged a larger scale of production. The Michigan lumber industry grew after the Civil War as part of an emerging national, industrial economy. Growing urbanization in eastern cities and an unfolding agricultural frontier on the Plains (whose goods were ferried by rail to the urban industrial centers), provided the major markets for Michigan lumber. By 1900 industrial technology had reached deep into the forest. Indeed, the tools, the scale of production, and the widespread abuse of land and timber resources were evidence of the growing presence of industrialism in the forest.

The nature of life and work in the forest industry showed

a similar "industrial" character. Logging camps after 1900 resembled factory housing, and production occurred nearly year around. Logging camps were typically wood sheds covered with tar paper, and crossed with occasional strips of lath to keep the tar paper from blowing away. Constructed of old pieces of lumber and posts from the woods, these bunk houses and dining halls were temporary structures that could be knocked down easily and moved by rail. Bunk houses were generally smaller--Loud & Co's were 46 feet by 26 feet--than the large log shanties of the 1880's. A large camp might have two bunk houses, a barn, mess, blacksmith shop, office and foreman's house.<sup>98</sup> By 1900 railroad camps, that is camp buildings erected on flat cars, began to appear. One such camp was built in 1898 by David Ward for 70-100 men.<sup>99</sup>

Camp life had changed also. The bunk houses were more comfortable during this period; mattresses, sheets, and windows were common. Shanty boy laundry was done by a camp washerwoman, or it was taken out and done once a week at a small charge.<sup>100</sup> And despite the movement of the logging frontier into the far north, camps were less isolated than ever before. Due largely to direct rail links peddlars, preachers, and hospital agents were frequent visitors to the camps. Camps often had a phone line and mail was delivered every day.<sup>101</sup>

Despite the decline of the industry, wages and annual earnings increased in the forest. Wages in manufacturing, both actual and real, increased consistently through this period and there were growing job opportunities in the cities and towns of

southern Michigan. Labor was scarce in the northern forest and wages had improved. Moreover, earnings had increased due to the longer logging seasons, and real income (in constant dollars) rose consistently after 1895.<sup>102</sup> Labor transiency, a perennial problem, worsened due to the increased wages, scarcity of labor, and better transportation links.<sup>103</sup> The increased scale of production, and the use of railroads and steam loaders, increased the proportion of unskilled workers in the forest. Young male immigrants, especially Poles and Scandinavians, were attracted to the northern camps.<sup>104</sup> The lumber industry had extended a greater degree of control over the stages of production in the forest, and logging had become a more dependable, less seasonal enterprise. Lumber concerns endeavored to reduce labor transiency by paying bonuses, requiring signed contracts, and holding wages, but the companies were unsuccessful. The seasonal fluctuations of labor needs, the distance between workplace and home, and high wages confounded the industry's efforts to improve the reliability of their workforce.<sup>105</sup>

The decline of the lumber economy lead inextricably to the collapse of many local economies in northern Michigan. The few camps of this era were often distant, and provided too small a market for regional produce. Moreover, the direct rail links to many of these camps bypassed the goods and services of many small northern towns. While northern Michigan settlers were able to work in the logging camps and earn good wages, their farms were less successful. By 1900 the poor agricultural potential of

much of the north was becoming clear--at least to those who had spent a decade or two making a go of it--and many people sold their farms or abandoned their homesteads and moved south to work in the new factories.

In 1910 the landscape of northern Michigan was a scene of utter devastation. Fire swept the slash and silt clogged its streams. The region had experienced the boom and bust of a staple economy. The cycle had left northern Michigan with a brutalized landscape and a declining regional economy.

## Chapter 7

### A REGION ABANDONED: NORTHERN MICHIGAN AFTER 1893

Michigan white pine production had begun to drop after 1888 and hundreds of mills closed, many of them for good, during the Panic of 1893. In the years of economic depression which followed a few dozen mills on the east shore of Lower Michigan continued to cut logs rafted on the Great Lakes but not until 1898 did the demand for lumber return. Michigan remained an important lumber state, but it lost the position of overwhelming dominance that it held in the 1870's and 1880's. In 1899, Michigan was the second largest producer of lumber in the nation, behind Wisconsin, yet the state's lumber output (all species) was only half of what it had been in 1885.<sup>1</sup> Between 1900 and 1904 there was a 20 percent to 30 percent drop in number of wage earners, cost of materials, value of products, and capital invested in the lumber industry.<sup>2</sup> By 1909 Michigan's lumber production was far behind that of Washington, Louisiana, and Wisconsin, the national leaders.<sup>3</sup> In white pine production the decline was even more dramatic. In this sector Michigan ranked a distant 3rd among the Lake States, behind both Minnesota and Wisconsin. By 1901 Michigan's white pine output was 258 million feet--roughly equal to that of Manistee or Alpena during the peak years.<sup>4</sup> This was no more than the capacity of ten large, fully-mechanized mills. Only a shift to maple and hemlock production sustained Michigan's lumber industry after 1905.

These secondary species maintained the lumber industry's preeminence in Michigan's manufacturing sector as measured by number of establishments, capital, value of products, wage earners, and wages paid.<sup>5</sup>

Northern Michigan was especially hard hit by the decline of the lumber industry. In some mill towns of the Lower Peninsula, lumber production dropped as much as 80 percent or 90 percent in the decade after 1890.<sup>6</sup> The population and economic base of northern Michigan, initially settled and subsequently developed as a direct result of the white pine industry, grew at much slower rates after 1890. Although railroads were extended deeper into the far northern woods, some lines were abandoned with the cutting of the last timber. Chartered river drive companies ceased operation in the 1890's; lake rafting from Ontario ended in 1898. Northern Michigan farming, a tenuous enterprise at best, suffered greatly at the loss of local markets. Abandoned farms and cutover lands reverted to the state for non-payment of taxes and fire swept the region each summer.

The mill towns of Michigan were also transformed as the industry declined. Many of the smaller mill towns--especially those in the far north--were virtually abandoned, and some, such as Metz and Oscoda, were burned to the ground by summer fires. In the larger mill towns, such as Saginaw and Muskegon, only a handful of mills remained active. Much of the large unskilled labor force formerly employed in the mills of these cities had moved to Wisconsin and Minnesota, or beyond to California,

Oregon, Washington, and British Columbia. Now the mills cut hemlock lumber and maple flooring. The once dynamic towns were suddenly depressed communities which sought new industry to revitalize their economies. Those industries that survived through the early 20th century were full-time, year-round, secondary manufacturers of wood products, which employed predominantly semi-skilled workers, and came to rely, increasingly, upon raw material from Wisconsin and Ontario.

#### REGIONAL PATTERNS OF TRANSPORT AND MANUFACTURING

As pine grew scarce in the Lower Peninsula, Michigan mill men sought logs from more distant points. In the 1870's and 1880's Michigan lumbermen had acquired rights to tens of thousands of acres of stumpage along Ontario's Georgian Bay, but difficulties in long distance rafting, and Canadian export duties on saw logs restricted their exploitation until the 1890's. Then, the development of the bag boom and the removal of the Canadian tariff in 1890 opened the way for international rafting.<sup>7</sup> Bag booms were pulled by a steam tug and consisted of hundreds of logs, or boom "sticks", chained end to end to form a large circular- or, when under tow, a tear drop-shaped enclosure that contained thousands of free-floating logs. The large diameter (35 inches+) and short length (about 16 feet) of the boom sticks allowed them to ride the waves well and keep their 1 to 6 million feet of saw logs enclosed. At their



largest, such rafts covered up to 20 acres.<sup>8</sup> Pulled by steam tugs at a speed of 1 mile an hour bag booms were a common sight on the Great Lakes between June and October. Although trips from Georgian Bay or the Upper Peninsula to Saginaw Bay took roughly seven to ten days, this was a relatively cheap method of log transport: rates were \$1.00 to \$1.50 per M,<sup>9</sup> and millions of feet of Ontario saw logs were rafted to Michigan's eastern shore between 1890 and 1898.<sup>10</sup>

Roughly 60 percent of these rafted logs went to Saginaw and Bay City mills. Alpena and Cheboygan each received 10 percent to 20 percent with the balance going to Tawas and Detroit. Especially in the Saginaw area, lake-rafted logs accounted for a sizeable proportion of the annual supply. In 1892 32 percent of the logs received by Saginaw River mills were from Ontario and "upper lake points", in 1895 the share was roughly 45 percent with most of the rafted logs coming from Ontario.<sup>11</sup> Here the impact of 1898 amendments to Ontario's Crown Timber Act, that required all timber cut from crown lands to be milled in the province, were particularly severe. Although logs continued to be rafted from Michigan's Lake Superior shore, many of the remaining Saginaw Bay mills closed.

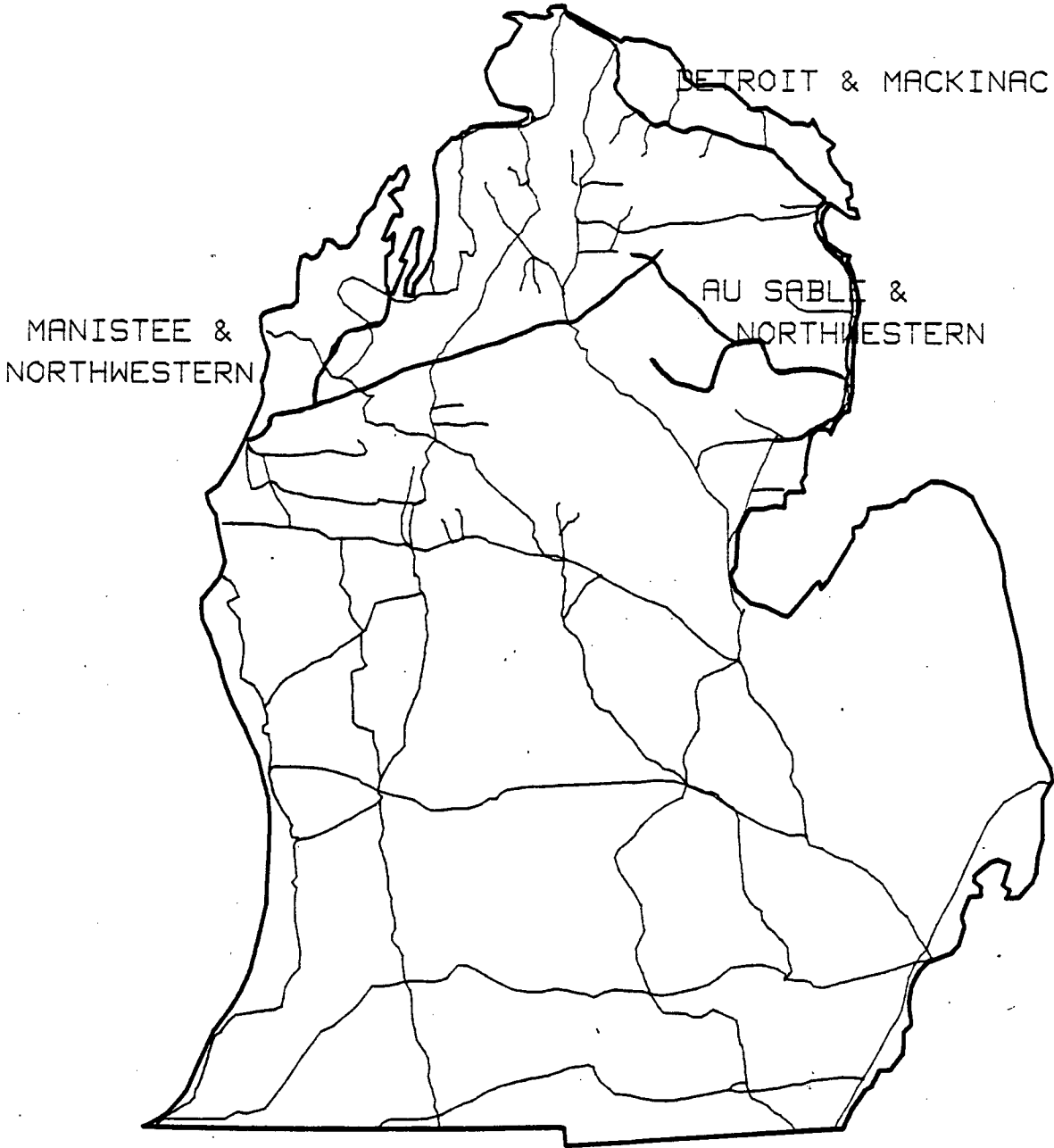
River driving, less expensive than rafting, remained the preferred method of log transportation at the turn of the century. It was common in the Upper Peninsula and Georgian Bay areas, but on the white pine logging frontier of the northern Lower Peninsula there were few rivers suitable for driving. Elsewhere the industry had begun to exploit secondary timber,

such as hemlock and maple, which would not float. By 1895 occasional drives occurred on the Muskegon and the Tittabawasee but most of the large drive and boom companies of Lower Michigan had disbanded. River drives continued on such northern rivers as the Au Sable, Thunder Bay, and Cheboygan, but within a decade their drive associations had disbanded as well and the centralized cooperative drives of earlier years no longer occurred in Lower Michigan.<sup>12</sup>

Michigan mill men developed a greater dependence upon railroad log hauling during the decline period. Railways brought pine logs from the far north, as well as hemlock and hardwood from less distant points to the old river mouth mill towns such as Muskegon, Saginaw, and Bay City. Even at the peak of Lake Huron rafting in 1895, Saginaw Valley mills received nearly half of their saw logs by rail. Other mill towns, such as Muskegon and Cadillac, depended solely on railroads to supply their few remaining mills.<sup>13</sup> As the logging frontier moved farther north, new railroad branches, feeders, and extensions were built to link it to the sawmills of the south. Public carriers built branches and extended their lines to attract new business (Figure 34). Thus the Michigan Central Railroad began construction, in 1898, of a "Clear Lake Branch" that ran 17 miles east from Grayling to a tract of timber owned by the Grayling mill firm of Salling & Hanson. Lumbermen also used the Michigan Central to deliver logs from Roscommon, Otsego, and Crawford Counties the 100 miles or so to Saginaw River mills. And lumber companies built short, private feeders to the public roads so that the rail

Figure 34

# NORTHERN MICHIGAN RAILROADS 1913



Source: Michigan Railroad Commission, Official Railroad Map, 1913.

companies could deliver logs to a distant mill.<sup>14</sup>

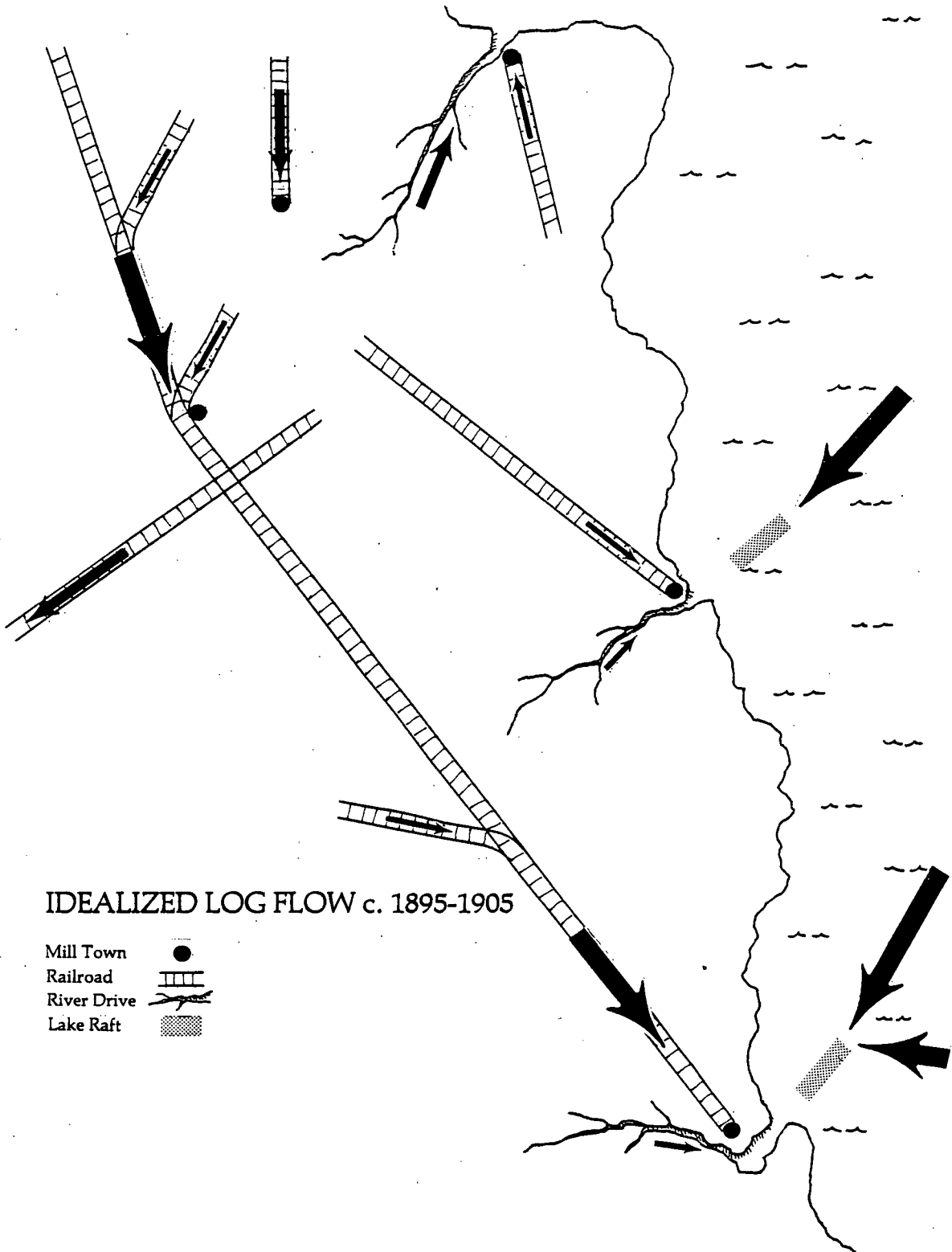
A few large lumber companies maintained their own chartered railroad systems. These railroads served the transport and supply needs of a few counties, but they were operated primarily to ship logs from the company's camps to their mills. Typically, these railroad systems evolved from early logging railroads. Because the public carriers of northern Michigan linked the northern pine lands to towns in the southern part of the state, the northern lakeshore mill towns such as Manistee and Au Sable were poorly served by them. Consequently, lumbermen constructed lines to serve their needs. The Au Sable & Northwestern Railroad (AS&NWRR), for example, was operated by the H. M. Loud & Sons Lumber Company to haul hardwood logs to their lake shore mill in Au Sable. The AS&NWRR was 135 miles long, and ran from Au Sable to Lewiston in Montmorency County, where Loud & Sons cut hardwood. Although they ran two logging trains a day from the forest to their mill (Figure 34), revenue from passengers, mail, and parcels paid for 28 percent of the line's annual expenses.<sup>15</sup> Similarly, the Manistee and Northeastern Railroad was operated by the Buckley and Douglas Lumber Company; it eventually linked the company's sawmill in Manistee with Traverse City and Grayling, and carried freight and passengers through much of the northwest corner of the peninsula (Figure 34).<sup>16</sup>

In the 1880's Michigan railroads had been an important secondary method of log transport, hauling logs from stands far from rivers and from beyond the drainage basin served by a mill

town's river drive. By 1895 they were the primary method of log transport in the state. Rail was singularly suited to the nature of lumbering during the decline period. With much of the remaining timber in Michigan above the headwaters of the Manistee, Thunder Bay, and Au Sable Rivers in Antrim, Roscommon, Otsego, and Crawford Counties, railroads, both public and private, ferried saw logs to nearby production points (e.g. Deward), to northern lakeshore mill towns (Alpena), and south to the old mill centers (Saginaw). The rivers of the north, such as the Thunder Bay, also delivered a large number of logs to lakeshore mills. These patterns are represented schematically in Figure 35.

By 1900 the pattern of lumber manufacturing in Michigan was far different from that of the 1860-1890 period; Muskegon, Saginaw, and Bay City were no longer the dominant centers of production. Northern mill towns now led the state, though the former leaders remained centers of secondary importance (Figure 36). These towns were the focal points of the regional railroad system. Although a few large mills--the Salling, Hanson & Co. mill at Grayling, and the Ward Estate mill at Deward--operated in the northern interior, manufacturing remained concentrated in lakeshore mill towns. Here products could be shipped via the Great Lakes and important economic benefits resulted from locating in manufacturing centers such as Manistee.<sup>17</sup> In general, these lakeshore mill towns had a larger supply of skilled labor, and a better local market for mill products than interior points.

Figure 35



IDEALIZED LOG FLOW c. 1895-1905




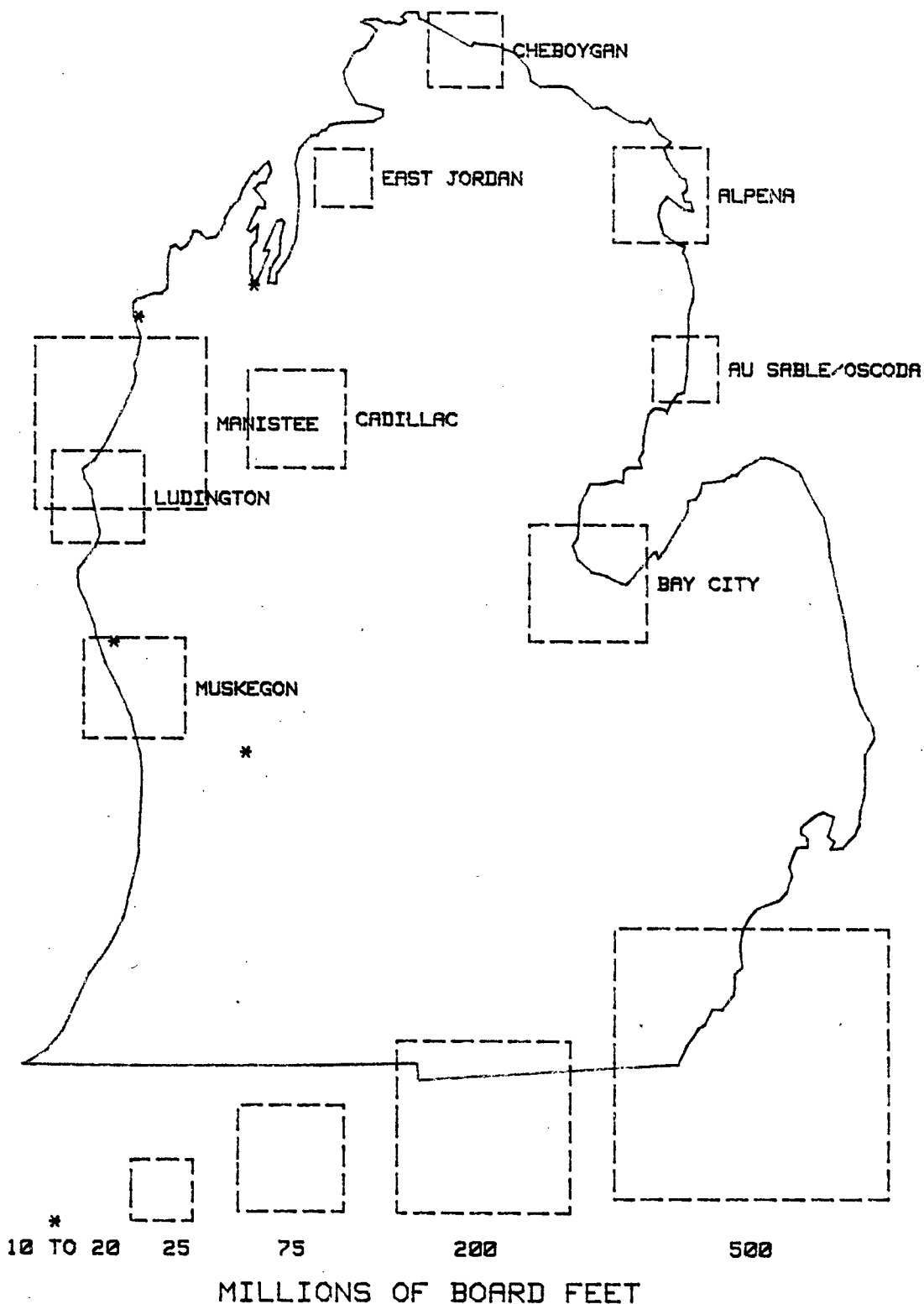
- Mill Town ●
- Railroad 
- River Drive 
- Lake Raft 

FIGURE 36  
LUMBER PRODUCTION -- 1902  
(BY MILL TOWN)



SOURCE: Smith, "Lumbertowns in the Cutover," pp. 43-67.

The population of northern Michigan continued to grow between 1890 and 1910, although the spread of agricultural settlement slowed with the decline in the lumber industry.<sup>18</sup> The numbers in the 27 northern counties of the Lower Peninsula increased 24 percent between 1890 and 1900, and 9 percent during the next decade.<sup>19</sup> Fully eighty-five per cent of the townships in northern Michigan increased in population in the first of these periods; 63 percent in the second.<sup>20</sup> The number of farms and improved acres, as well as total population, continued to grow between 1890 and 1910, though at much lower rates than those of the previous decades.<sup>21</sup> In Cheboygan County, for example, the number of farms increased by 50 percent (a net gain of 389 farms) between 1890 and 1900, and 29 percent (up 335) between 1900 and 1910.<sup>22</sup> Agricultural settlement increased due in large part to continued clearing and the widespread availability of cheap stumpland which attracted both recent immigrants and former shanty boys.<sup>23</sup>

Northern towns were also foci of growth. The lakeshore mill towns, such as Manistee increased by nearly 13 percent between 1890 and 1910, while Boyne City, Traverse City, and Cadillac, each with direct rail access to the northern interior, doubled and even tripled in population.<sup>24</sup> New villages appeared, suddenly in northern counties to exploit the last of their standing timber. One such place, Lewiston (in Montmorency County) was established in the early 1890's with a single saw mill. Its 1892 population of 225 grew to 827 in 1900, with 1146 people in the nearby area.<sup>25</sup> Michigan's lumber output



dropped after 1890, but the regional economy expanded into the far north, and population and agricultural output increased in the northern counties of the Lower Peninsula, though at reduced rates. After a lag of a decade or so these too would show precipitous declines.

### LUMBER MANUFACTURE

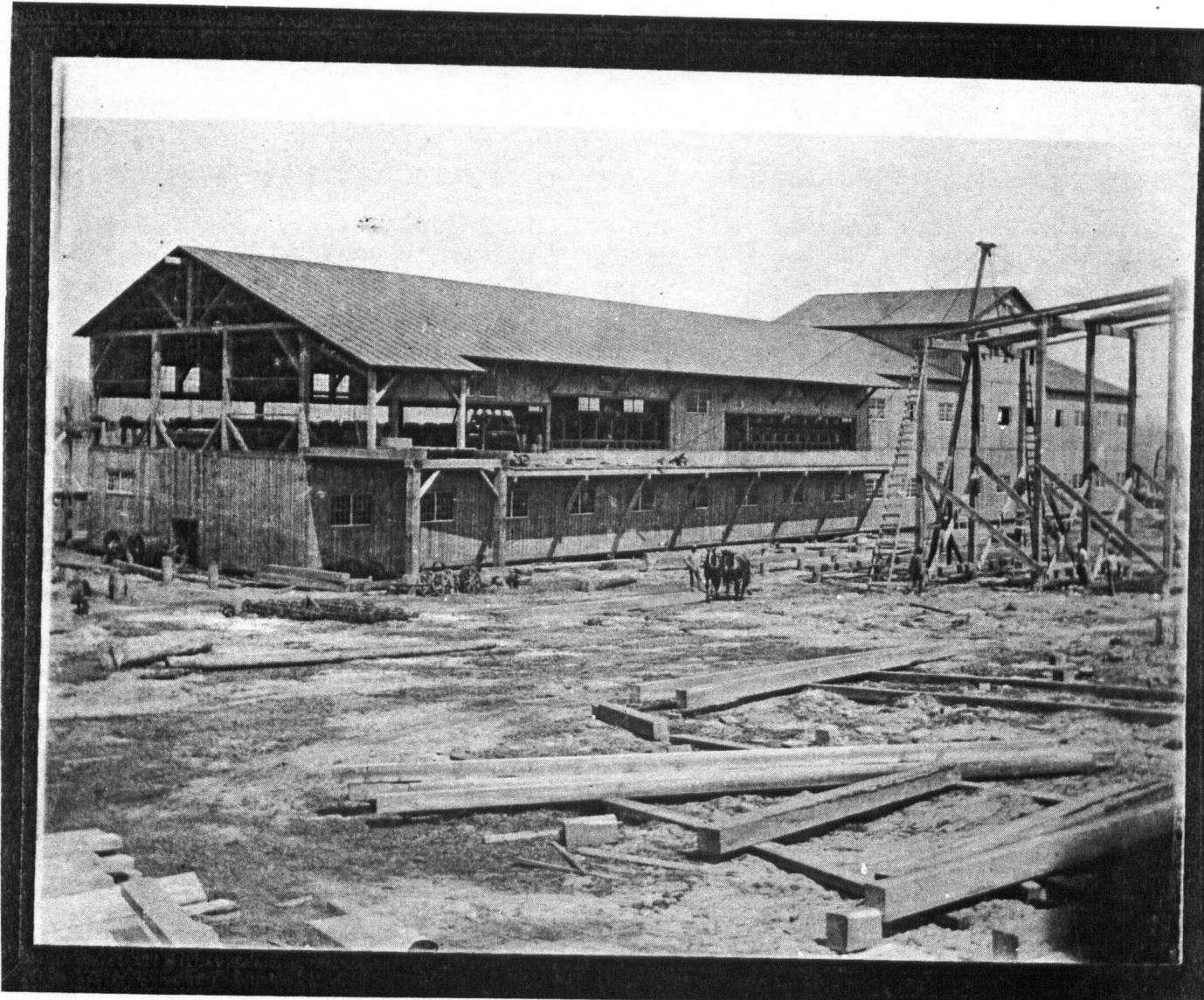
Hundreds of Michigan sawmills closed during the 1890's; those that remained operated in a changed market. Production had diversified to include a variety of new products, and the increased urbanization of the Midwest, as well as growing competition from other lumbering areas, affected the location of markets. Those sawmills that operated in Michigan after 1893 were of two types. There were hundreds of small, simple mills that cut for local markets, and there were a few large, mechanized operations.<sup>26</sup> The numbers of each were far below the levels of the 1880's. Between 1899 and 1904 the number of sawmills in Michigan dropped from over 1600 to fewer than 700.<sup>27</sup> Most of Michigan's large commercial mills closed. The few that remained were typically owned by larger, better-capitalized companies with access to stumpage.

The manufacturing process had changed little since the 1880's. Perhaps the most significant development was improvements in the band saw which had become standard in the large commercial mills.<sup>28</sup> The band's speed had increased

somewhat since the 1880's, and given the scarcity of pine the band's smaller kerf and reduced waste was of great importance. Moreover, the band saw produced a higher quality product which made it even more attractive as direct marketing of finished goods became common. Other mill innovations included automatic sprinklers and the use of electricity to power machinery both of which significantly reduced the occurrence of mill fires.<sup>29</sup> Many of the premier sawmills of this period were new, or had been re-built for a final milling contract. The pine mill at Deward, one of the last commercial mills built in the Lower Peninsula (in 1902), was 54 feet by 307 feet with two band saws powered by a 500 horsepower Corliss engine (Figure 37).<sup>30</sup> Loud & Sons of Au Sable/Oscoda also operated a two band mill to cut hemlock and hardwood; their circular mill cut cedar posts, ties and shingles.<sup>31</sup>

Though year-round milling was not uncommon most lumber was manufactured between March and December. Great Lake steamers were still widely used for lumber transport, and lumbermen were hesitant to log in the summer and risk the consumption of their accumulated cut in the common summer fires.<sup>32</sup> Those mills that relied upon rafted logs operated during the traditional summer season, while other lakeshore mills, as well as interior mills along the rail lines, typically cut longer seasons, if not year-round. Most mills added a night shift during the summer months. Increased use of railroads to haul logs and to ship lumber facilitated an expanded season.<sup>33</sup> Typical was the Bay City mill operated by Smallery & Woodworth which ran from

Figure 37



Deward sawmill under construction.

Source: Burton Historical Collection, Detroit Public Library.

February 24 to December 1 in 1897 (229 1/2 days), with a night shift added from March 20th until December 1 (211 3/4 nights).<sup>34</sup> In sum, a brief winter hiatus was common, but most mills worked at least nine or ten months. The milling season was altered somewhat by the sawing of new species. Because hardwood was easier to log in the winter (when the "'sap is down'") firms served by rail tended to mill hardwood during this same season.<sup>35</sup>

The cost of lumbering sky-rocketed at the end of the century due to the scarcity of timber. The cost of milling remained relatively constant at roughly \$3.00 or \$4.00 per M, but by the last years of the 19th century the cost of stumpage was double the \$4 to \$5 per M of the 1880's; by 1905 it was \$10 to \$20.<sup>36</sup> Hemlock and hardwood, once ignored as worthless species soon rivaled in cost the small, low-quality pine then being cut in most of the state. In general terms, both hemlock (\$9 to \$15 per M) and maple (\$10 - \$17 per M) sold at almost the same price as white pine. Average white pine prices were \$14 to \$21 per M; high quality pine brought much higher prices.<sup>37</sup>

At a time of soaring stumpage value, lumber prices increased only 50 percent to 100 percent between 1895 and 1910, and profit margins were relatively slim. The Michigan Bureau of Labor estimated the profit margin of the Lake State lumbering industry at 7 percent in 1893.<sup>38</sup> Over the next twelve years the cost of stumpage increased 250 percent, and the average profit margin fell even lower. Yet as was the pattern with white pine, lumber concerns that anticipated the increased value of

secondary species and had purchased such stumpage at low prices a decade or more earlier made enormous profits.<sup>39</sup> During the late 1890's both David Ward and Delos A. Blodgett reaped large profits from pine land investments made decades earlier. There were some costs in holding timberland (notably taxes and fire damage), but in 1900 the pine lands of David Ward were worth 100 to 200 times their original cost.<sup>40</sup> When Delos Blodgett joined with Wellington Cummer and Delos Diggins, who owned a saw mill in Cadillac, to manufacture and market the last of Blodgett's timber lands, he contributed the stumpage, while Cummer and Diggins logged and milled the timber. Blodgett received 55 percent of the firm's paid out earnings between 1893 and 1899; in the late 1890's his dividends were \$25,000 to \$30,000 per month.<sup>41</sup>

These large profits were largely "unearned", that is they were the result of clever and, at times, risky investment. Large profits of this sort were not uncommon in the American lumber industry at this time, and they fueled rising popular concern over the management of the nation's resource base. As the 19th century drew to a close and the extent of the devastation in the Lake State cutover became clear, American forest resources no longer appeared inexhaustible. The federal Bureau of Corporations addressed these "grave problems" in a 4 volume report The Lumber Industry, published in 1913.<sup>42</sup> The Commissioner of the Bureau recognized the public mood when he summarized the major conclusions of this report: the United States lumber industry was characterized by 1). "The

concentration of a dominating control of our standing timber in a comparatively few enormous holdings, . . .", 2). "Vast speculative purchase and holding of timberland. . . " and 3). "An enormous increase in the value of this diminishing natural resource, with great profits to its owners."<sup>43</sup>

During the 1880's the industry had moved towards finer grading and more complete finishing of lumber. As pine became scarce the industry continued this trend by further manufacturing the timber that was available so as to add as much value as possible to its products. Thus hardwood flooring, siding, and dressed lumber became major products of the Michigan forest industry. Hemlock and hardwood have been mentioned as the principal types of lumber sawn during this period. In 1899 pine output in Michigan equaled that of hemlock and maple combined. By 1905 Michigan pine output was one-half of the total of these other woods, and by 1910 it was one-tenth the total production of hemlock and maple in the state.<sup>44</sup> The lumber sales of Salling, Hanson & Co., a Grayling mill firm, reflect this transition. In December 1900 they sold equal parts white pine, Norway pine, and hemlock; six years later December sales of hemlock and maple were nearly triple the combined sales of white and Norway pine.<sup>45</sup>

Saw mills also produced a wider array of products during the decline as illustrated by the H.M. Loud & Sons Lumber Company, which had produced primarily pine lumber during the 1880's. In 1905, Loud & Sons produced 40,000 cedar poles, 250,000 posts, 150,000 ties, 5 million shingles, and 3 million

lath, in addition to 21 million feet of lumber, of which 47 percent was hemlock, 33 percent maple, and 8 percent basswood.<sup>46</sup> The firm of Mitchell Brothers in Cadillac further illustrates the diversification of the industry. In addition to their large maple flooring plant, the Mitchell Brothers operated the Cadillac Handle Company which produced 40,000 maple broom handles a day in 1902.<sup>47</sup>

The marketing of Michigan's forest products at the turn of the century reflected declining output and the dominance of the remaining large concerns, as well as the changed nature of the industrial product. Traditionally the Michigan industry had marketed rough-sawn boards delivered by ship to wholesale yards in the Great Lake ports of Chicago, Buffalo, and Tonawanda. After 1893 these points continued to receive a good share (perhaps one-third) of Michigan's lumber production, but a large proportion went by rail to Michigan and Midwest markets. In general, sawmills along the northern lakeshore, and even some in the northern interior, continued to rely upon lake shipping. These towns did not have good rail connections, and lake shipping avoided "much of the delay and inconvenience arising from chartering cars. . .,"<sup>48</sup> according to a contemporary observer. The David Ward Estate, for example, railed a large portion of their lumber from Deward to East Jordan to be loaded onto lake steamers for onward shipment to such places as Ogdensburg, New York.<sup>49</sup> On the Great Lakes lumber was shipped by steamer, as well as by the more common barge (that is, old, stripped-down schooners), which was towed by a

steamer.<sup>50</sup>

Yet Michigan lumbermen had railed lumber directly to market since the early 1870's, and by 1895 this was a common, if not dominant, method of lumber transport. Mills received higher prices by avoiding the lake port middlemen, and with the decline in rail rates during the 1880's and 1890's (Saginaw to Cincinnati rates dropped from \$80 to \$28 per car between 1870 and 1892)<sup>51</sup> direct dispatch by rail was more attractive than ever. In 1891 Saginaw River mills railed 408 million feet of lumber, and shipped 405 million by lake. Six years later 81 percent of Saginaw lumber left by rail.<sup>52</sup> Finished products were typically shipped by rail. They had more concentrated value per pound; dressed lumber was lighter than rough, green lumber; and lumber shipped by boat was subject to water, wind, and sun damage.<sup>53</sup> E.D. Cowles, an industry spokesman, explained the situation in the Saginaw Valley in 1898:

A few years ago the manufacturer, with hardly an exception, sold his product by the cargo, and it was shipped by water to other cities, where the finer manipulation of the stock made business for large capital and armies of mechanics and laborers. Now the manufacturer sorts his stock and sells it in car lots as wanted by the consumer. In other words, he combines the business of wholesaler with that of the retailer, and this accounts in large measure for the falling off in lake shipments. Local dealers who do not operate manufacturing plants also have established yards and buy lumber at interior points in the State and on this river, sort it up or convert it into box material <sup>54</sup> or plain stock, and ship it out by rail to their consumers.

Despite the importance of direct shipment by rail, wholesalers were still important in this marketing system. In



previous decades wholesale lumber firms in the major lumber markets, such as Chicago, often had offices in Michigan mill towns to facilitate their dealings with local mill owners. As rail shipment became more common, local wholesale dealers were well placed to handle this business. As early as 1892 there were a half dozen or so wholesale hardwood dealers in the Saginaw Valley, which shipped roughly 50 percent of the area's hardwood output via rail.<sup>55</sup> On the other hand, the large lumber companies often opened their own retail yards in Indiana or Ohio to which they could ship direct via rail.

Market location also reflected dwindling production. Michigan lumber companies encountered increasing competition from new lumber frontiers in the south and the west, as well as from the other Lake States. Michigan's forest products typically were marketed in retail yards in southern Michigan, Ohio, Illinois, Indiana, and New York. Farther west, the product of the Wisconsin and Minnesota mills held sway due to rafting on the Mississippi and direct rail shipment. As production declined, Michigan's market contracted under pressure from Wisconsin and Minnesota, and from Louisiana and Mississippi. Furthermore, growing urbanization in Michigan and elsewhere in the Midwest meant increased demand for forest products in the region. In Ohio, for example, the proportion of urban population increased 49 percent between 1880 and 1900.<sup>56</sup> In Chicago, 41 percent of the lumber received in 1897 was consumed locally.<sup>57</sup> Thus during the decline years, much of the output from Michigan's forest industry remained in the eastern Great Lakes region.<sup>58</sup>

After decades of soaring output, the scale of production did not significantly increase after 1893. The largest sawmills of the 1900-1910 period sawed no more lumber than the leading mills of a decade or two earlier. Twenty-five million feet per year, and 100 M per ten hour shift was standard for Michigan's largest mills after 1885. There were, after all, limits to the economies of scale that had so dramatically reshaped the industry since 1860. As the Bureau of Corporations, in its extensive study of the lumber industry, explained:

To enlarge a mill beyond a capacity of 20 or 25 million feet a year is to duplicate mechanical units, with small or doubtful advantage in manufacture, and with certain<sup>59</sup> disadvantage in the cost of transporting the logs.

The David Ward Estate sawmill at Deward produced roughly 90 M of pine per day (175 M when they ran a double shift) and averaged 25 million feet annually. This double band mill cut 23 million feet of pine, 1 million feet of hemlock, 3.8 million lath and 2 million shingles in a 12 month period ending June 1908.<sup>60</sup>

After 1900 the Deward mill was probably the only sawmill sawing largely pine.<sup>61</sup> Equally representative of the few large operations that remained in the state was the H. M. Loud & Sons mill of Au Sable which, in 1905, produced 25 million feet of lumber, with an averaged daily producton of 80 M, which varied from 55 M per day when they cut maple to about 100 M when they were cutting the softer hemlock.<sup>62</sup> Cutting hardwood tended to reduce both output and the number of men working in the mill due to the significantly slower rate of milling.<sup>63</sup>

As hundreds of mills closed and state output declined precipitously, the few remaining large mills commanded a much larger share of this constrained market than in the previous decades. In 1904, 107 (or 14 percent) of the sawmill concerns in Michigan had an annual product value between \$100,000 and \$1,000,000, and this group accounted for roughly 2/3rds of the capital invested, employees, wages paid, product (by value), and cost of materials in the industry. More than 56 percent of the mills produced less than \$20,000 annually; these mills accounted for less than 10 percent of wages, capital, value of product, and employees.<sup>64</sup> At the turn of the century, the few remaining large lumbering operations were typically well-integrated enterprises which directed each step of lumbering, from forest to retail lumber yards. Such a large operation required an enormous amount of capital, far beyond the reach of many lumbermen. Often partnerships were formed to oversee a single venture, such as the firm of Blodgett, Cummer and Diggins. Moreover, corporations held a dominant position in the industry during the decline period.

The white pine industry was traditionally highly individualistic; proprietorships and partnerships had long been the predominant form of business. Yet in 1904 the 22 percent of Michigan's sawmill concerns that were corporations accounted for roughly 60 percent of 1) the amount of capital invested in the industry, 2) number of wage earners, 3) amount of wages paid, and 4) value of products produced.<sup>65</sup> In sum, the business of lumbering had changed greatly; access to stumpage was the crucial

factor for a company's continued viability. The era of many large lumber concerns had given way to one of a few dominant partnerships and corporations that were able to survive in the new, constrained, economic context. The technology of lumber manufacture had not changed significantly since the late 1880's, but both the mills' products and their method of marketing reflected the very different nature of the decline period.

#### MILL TOWN LIFE AND WORK

Declining lumber production greatly affected the nature of mill town economy and society after 1890. Many mill town economies were already contracting when the Panic of 1893 effectively shut down the lumber industry. The depression was short, and yet lumber production continued to decline during the 1890's despite the development of lake rafting and hardwood logging. Muskegon produced only 41 million feet of lumber in 1895, one-fifteenth of its 1888 output.<sup>66</sup> The timing of the decline varied, the older mill towns, such as Saginaw and Muskegon, reached maximum production levels in the mid-1880's, while the northern mill towns peaked a decade or so later. Whenever decline occurred, it had a widespread impact upon these one-industry towns. In Michigan mill towns all indices of manufacturing were down (Table XVII), and all of the major

Table XVII

DECLINING MILLTOWN MANUFACTURING  
1890 TO 1900

	BAY CITY		SAGINAW		MUSKEGON	
	Saw Mills	All Mfg	Saw Mills	All Mfg	Saw Mills	All Mfg
DECREASES IN:						
CAPITAL (\$1000)	\$5601	\$4009	\$5623	\$4848	\$5695	\$5258
EMPLOYEES	1482	896	1162	439	1159	647
WAGES (\$1000)	\$412	\$110	\$357	\$335	\$464	\$422
PRODUCT VALUE	\$3040	\$1982	\$2995	\$1269	\$2891	\$3178

Source: U.S., Twelfth Census, 1900, Manufacturing, Part I,  
pp. cclxxxvi-cclxxxviii.

industries declined, including foundry and machine shops, planing mills, boxes and wood packing, and saw manufacturing. Though the decline in the lumber and associated industries was great, it was offset in part by growth in the "hand trades" and other new industries. In 1886 Muskegon had 37 mills and a population of 24,000 people; by 1896 there were 3 sawmills and 18,000 people.<sup>67</sup> At a time of growing urbanization and industrial employment, the mill towns of Michigan, both large and small suffered economic decline.

Lumber and wood manufacturing remained prominent during this period. Saw milling relinquished its dominant position in the local economy to foundries and secondary manufacturers of wood products which declined less rapidly. In Saginaw and Bay City the two latter groups accounted for roughly 45 percent of the local industrial labor force in 1904. The foundries and machine shops were a particularly prominent element of the Bay City economy where they also led in wages paid, cost of materials, and value of products. This group accounted for more than 40 percent of the wages paid in manufacturing in 1904. In Saginaw, foundries and planing mills played a nearly equal role; they led the rest of the industries in number employed, wages, and value of product. The economy of Muskegon, on the other hand, had contracted so severely that the four remaining sawmills had the largest value of annual product, while furniture manufacturing employed the largest number of people.<sup>68</sup>

Despite the strong link between the lumber industry and the foundries and wood product manufacturers, these industries

were able to operate during the decline by diversifying. By 1906 Saginaw and Bay City manufacturers were importing 75 to 100 million feet of white pine lumber annually from Canada,<sup>69</sup> as well as a large amount from Wisconsin.<sup>70</sup> Wood product companies experimented with new woods as pine grew scarce. New equipment, such as veneer sawing machines, also aided in this process of resource substitution. Hemlock was used to make paper pulp, old Norway pine stumps were collected to produce turpentine, and tanin was extracted from hemlock bark for the many tanneries of the north.<sup>71</sup> The foundries and machine shops, which had prospered producing sawmill machinery, began to produce equipment for the growing machine tool industry, especially in the areas of bicycles, carriages, and automobiles. Although wood manufacturing companies diversified, many found it difficult to operate as the price of hardwood rose. Woodenware firms had flourished when hardwood was cheap, but as it was used more and more for siding and flooring, these butter tub and broom handle companies found it more difficult to stay in business.<sup>72</sup>

Growth in new industries reduced the impact of lumbering's decline. Mill towns were attractive to new industry because of the availability of skilled labor, good transportation connections, low wages, and economic incentives offered by the communities. In Muskegon, for example, thousands of Scandinavian and Dutch workers had remained after the closing of the mills.<sup>73</sup> The City of Muskegon offered new businesses a \$100 bonus for every new job created, and a few Muskegon lumbermen

purchased companies and moved them to Muskegon. For example, Charles Hackley bought the Chase Bros. Piano Company and re-established it in Muskegon in 1890. Between 1888 and 1905 many new industries were founded in Muskegon, including refrigerator, machinery, casting, electric crane, washing machine, and furniture companies. A few of these concerns, such as a shade roller firm, were attracted to Muskegon by the products of other manufacturers. Though many firms commenced operations in Muskegon, three-fourths of them closed in a few years.<sup>74</sup>

The changed nature of mill town economy is indicated by the largest employers in these towns at the turn of the century (Table XVIII). In Alpena a few sawmills were still at work, while tanning and paper had emerged as important industries. On the other hand, little remained of the sawmill era in Muskegon. Unlike Saginaw, where Canadian logs and lumber had kept many woodenware establishments active, Muskegon's industrial base had greatly diversified.

The decline in total manufacturing between 1890 and 1900 was not as great as that in sawmilling (Table XVII), yet there was a significant decline, nonetheless. This contraction of the manufacturing sector was not limited to Michigan mill towns, however.<sup>75</sup> Between 1870 and 1900 manufacturing became increasingly concentrated in the major cities of the Midwest. Manufacturers in Detroit and Chicago, for example, benefitted from agglomeration and scale economies, and were able to gradually usurp the markets of local manufacturers. In the last



Table XVIII

MANUFACTURING IN MUSKEGON AND ALPENA  
LARGEST EMPLOYERS IN 1900

MUSKEGON		
	Employees	Product
Amazon Knitting Co	900	Gloves, etc
Champion Iron & Steel Co	600	Iron, etc
Champion Iron & Steel Co	370	Tin plate
Standard Malleable Iron Co	300	Castings
Alaska Refrigerator Co	280	Refrigerators
Stewart-Hartshorn Co	260	Rollers
Shaw Electric Crane Co	240	Cranes
Grand Rapids Desk Co	225	Desks, etc
McCracken & Hovey Car Co	200	Cars
Pere Marquette Railroad Shops	200	Repairs
E.H. Stafford Desk Co	150	Furniture
Muskegon Valley Furn. Co	150	Furniture
Crescent Manufacturing Co	150	Keg stock
Thayer Lumber Co, Mill 1	140	Lumber
Central Paper Co	135	Paper
Chase-Hackley Piano Co	125	Pianos
Munroe Mfg. Co	100	Boxes, etc
ALPENA		
C. Moench & Sons	102	Leather
F.W. Gilchrist	100	Lumber
Minor Lumber Co	90	Lumber, etc
Churchill Bros.	90	Lumber, etc
Fletcher Paper Co	80	Paper
Fletcher Paper Co	80	Wood Pulp
Geo. N. Fletcher & Sons	80	Lumber
Huron Mill	70	Lumber, etc
Alpena Hoop & Lumber Co	65	Lumber, etc
Huron Handle & Lumber Co	55	Handles
Northern Extract Works	50	Hemlock ex
Besser Churchill Co	50	Staves, etc

Source: State Factory Inspector, Annual Report, 8 (1900), Appendix to Michigan Bureau of Labor, Annual Report 18 (1900), pp. 100-103, 124, 135, 142.

decades of the 19th century nearly every county in the Midwest experienced absolute or relative decline in manufacturing.<sup>76</sup>

Thus secondary industry in Michigan mill towns faced the loss of the leading industry, as well as the growing dominance of regional manufacturing centers. At the turn of the century most Michigan towns had a relatively diverse industrial base, but the transition to specialization and concentration was well underway.<sup>77</sup>

The nature of milltown life and landscape varied greatly during the decline period. Events in Cheboygan illustrate the nature of decline in the smaller, northern mill towns.<sup>78</sup> In 1898 the Cheboygan Democrat published a pamphlet titled Cheboygan, Up-To-Date, which assessed optimistically local manufacturing prospects:

Although Cheboygan's own supply of white pine is about used up, her situation is such that she will be one of the last towns on the lakes to produce lumber, being so situated that the almost limitless supplies of pine and other timber of the Upper Peninsula naturally come here, as the danger of towing logs is reduced to a minimum, owing to the short distance they have to be towed in the open lake, and the magnificent waters for handling logs in the straits and harbor in all kinds of weather. This season every industry will be reached by a railroad switch and competitive freight rates by rail will prevail. This will make freight rates equal to the Saginaw Valley, and superior on westbound freights, and must result in the closer manufacture of lumber into the finished product, such as box shooks, flooring, siding, ceiling, and sash, doors and blinds, mouldings, etc., and in building up a heavy car trade direct to the local yards of the country, doubling demand for labor.

Despite professed optimism, the local Business Men's Association was deeply troubled at the drop in manufacturing output. Local

papers appealed for people to attend public meetings, and committees were organized to look into new industries (e.g. salt), and to improve trade connections. Population growth slowed after 1890; numbers in the City of Cheboygan decline 1 percent between 1894 and 1910.<sup>80</sup> And the male/female ratio leveled off by 1910 at 1.01 (101 men for every 100 women), down from 113 in 1890, reflecting the loss of much of the transient male workforce.<sup>81</sup> Cheboygan's response to mill closings was hampered in part by a lack of local leadership. The sawmill owners had acted as the city's leaders for decades, a relationship which had created a dependent psychology within the town. Local churches, for example, depended upon these wealthy businessmen to come to their aid during times of economic stringency.<sup>82</sup> This situation proved debilitating after 1900 when many of the sawmill owners closed their mills and moved away. As the saw mills and associated industries closed, Cheboygan struggled to find new industry and a new identity. Population declined significantly after 1910, and Cheboygan evolved into a small tourist center, providing basic services for the growing number of vacationers.

Similar events occurred in Muskegon, though this town was more successful in attracting new industry. Only a few active mills remained here in 1900, and the shore of Lake Muskegon, once lined with dozens of mills, was a "desolate scene of abandonment and ruin."<sup>83</sup> Boarding houses and tenements stood empty, docks and mills burned, and much property reverted to the state for non-payment of taxes. The dozens of restaurants and saloons

that served the mill workers were closed and the streets were in poor repair.<sup>84</sup> Snap shots of Muskegon taken by a visiting Ohio doctor in 1893 contrast "modern factories" with abandoned mills.<sup>85</sup> Muskegon's new industries had no need of water access nor of docks, and many located south of town in Muskegon Heights where they had better access to rail services.<sup>86</sup> These new industries typically worked year-round, hired largely skilled or semi-skilled workers, and paid better wages than the sawmills.<sup>87</sup>

The small town of Deward contrasts strongly with the desolate waterfront of Muskegon, and the new industry of Muskegon Heights. Deward was constructed in the midst of the northern forest in 1901 by the David Ward Estate. This was a one-mill, one-company town whose single purpose was to cut the white pine of David Ward's Manistee tract. Deward was perhaps the most distinct manifestation of corporate industrialism in the northern woods. Michigan had other company towns, but none this large, with this amount of timber, or with dozens of attorneys and heirs quarreling over the disposition of the estate and the management of the timberland. The Estate built rows of identical wood frame houses that the mill workers could purchase. At one end lived the foremen and skilled workers ("the quality portion of town"),<sup>88</sup> at the other the laborers and their families. On top of a nearby ridge stood a lodge for guests and the homes of the mill manager, and the manager and auditor of the Estate's railroad. This bustling little community grew to 700 people, and it cut pine almost continuously from 1902 until 1912.<sup>89</sup> Both

Muskegon and Deward illustrate the nature of the decline period. One town was struggling to attract new industry and regain the prosperity of the 1880's; the other was located in the isolated north to exploit some of the last standing timber of the Lower Peninsula. Michigan mill towns at the turn of the century were diverse. The modern town of Saginaw, with its electric railroads, grand public buildings, and imposing downtown facades contrasted strongly with Alpena (Figure 38).<sup>90</sup> In 1900 Alpena had not yet felt the full effects of the decline, and its modest business district was rather impressive compared to the lumbering village of Millersburg, founded just three years earlier, along the Detroit and Mackinaw Railroad (Figure 39).

The Michigan lumber industry left behind a limited infrastructure. Sawmills had few industrial linkages, and little of the large profits was re-invested in the area. Despite the generous gifts of many lumbermen,<sup>91</sup> a very large part of the capital accumulated in the industry left the state. Capital invested in lumber manufacturing declined 48 percent between 1890 and 1910, compared to an increase of 123 percent in total manufacturing.<sup>92</sup> Of course capital flows are difficult to trace, but Delos A. Blodgett's assets in 1901 hint at the scale of this flow (Table XIX). In general, Michigan lumbermen had made their fortunes by waiting for the value of standing timber to increase, and then transforming it into cash. As profits accumulated, they looked for new investment opportunities in an industry they knew well. Thus much of the profit of the Michigan lumber industry was invested in timberland, most often in the

Figure 38



Second Street, Alpena, Michigan.

Source: State Archives, Michigan Department of State.

Figure 39



Millersburg, Presque Isle County, Michigan, c.1898

Source: State Archives, Michigan Department of State.

Table XIX

## DELOS BLODGETT ASSETS -- 1901

## MICHIGAN:

Grand Rapids Real Estate	\$311,133
N. Michigan farms <sup>a</sup>	31,467
Michigan Stumpland	10,705

## OUTSTATE

Chicago Real Estate	\$1,004,557
Mississippi Pine Land	746,405
Oregon Land	344,008
Washington Land	69,887
Louisiana Land	63,131
South Carolina Land	20,685

## OTHER:

Stocks & Bonds <sup>b</sup>	\$720,990
Mortgages	311,700
Land Contracts	136,031
Bills Receivable	125,236

Source: Blodgett Inventory, 1 May 1901, Box 20,  
Michigan-California Lumber Company Collection.

<sup>a</sup>This includes the land, stock, and equipment of  
Blodgett's three northern Michigan farms.

<sup>b</sup>Eighty-one percent of this line item was invested in  
Wright-Blodgett Co., a firm which dealt primarily in Southern  
timberland.



South, and on the Pacific coast. Capital investment was the single most important factor in generating growth in these mill towns during the 19th century,<sup>93</sup> and at a time of increasing concentration of manufacturing in the major urban centers, this external flow of capital was devastating to the local and regional economies.<sup>94</sup>

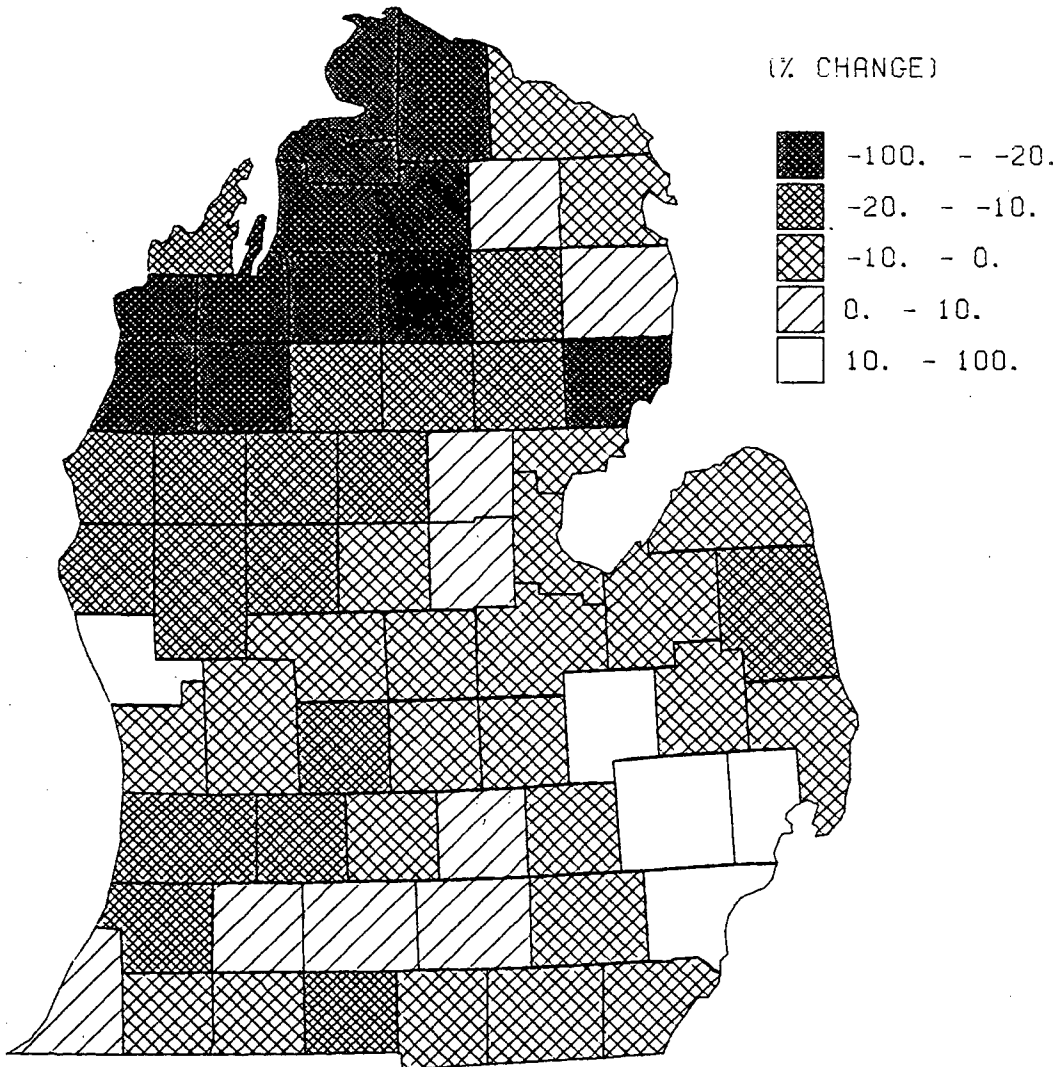
NORTHERN LOWER MICHIGAN AND TWENTIETH CENTURY AMERICA

By 1910 the lumber industry had largely abandoned Lower Michigan.<sup>1</sup> Population growth in the region had slowed after 1890, and although railroads had been built into every last corner of the state in search of standing timber, mills had closed, production had sagged, and loggers had turned to hemlock and hardwood. Lumbering continued in the Upper Peninsula for a decade or more after 1910, but all large sawmills in Lower Michigan were closed. About 1912 lumber consumption in Michigan exceeded production for the first time.<sup>2</sup> Annual production of all woods dipped below 1 billion feet in the mid-1910's,<sup>3</sup> and Michigan fell to fifteenth in terms of lumber production in the United States.<sup>4</sup>

To the devastating environmental impact of lumbering that had been apparent for decades was now added widespread social dislocation. In the decade after 1910 northern Lower Michigan lost one-eighth of its population as the remaining mills closed and small camps (which had been cutting hemlock bark and cedar posts) ceased operation (Figure 40).<sup>5</sup> Many mill hands and shanty boys moved west after 1890, and by 1910 local farmers and shopkeepers were inclined to move on as well. Twenty of the twenty-three Michigan counties that lost more than 10 percent of their population between 1910 and 1920 were in northern Lower Michigan; the remainder were in the Upper Peninsula. Of the thirty-one counties in northern Michigan, twenty-six lost

Figure 40

CHANGE IN RURAL POPULATION 1910-20  
(LOWER MICHIGAN)



population in the decade after 1910, among them Kalkaska and Benzie lost 31 percent and 35 percent of their respective populations, the largest declines in the state. And eighty per cent of the townships in northern Michigan lost population in this period.<sup>6</sup>

Nor was decline limited to rural areas; three-quarters of the area's incorporated villages and towns felt its effects.<sup>7</sup> Cheboygan, an important mill town in northeast Lower Michigan, had grown from 2300 people in 1880 to 6200 in 1890, but its population declined 18 percent during the 1910's and 13 percent (to 4900) in the 1920's.<sup>8</sup> In many small logging villages and one-mill towns, such as Deward (Antrim County), Lewiston (Montmorency), and Lovells (Roscommon), population fell by half after mills closed.<sup>9</sup> The consequences were often dramatic. Waters, a few miles north of Frederick where Ferris Lewis spent his childhood in the 1910's, was once a busy sawmill town; "but" he recalled:

. . . the timber harvest there had passed. The mill was gone. Only a few blocks of houses remained standing . . . During these years the remaining houses were wrecked and sold for second-hand lumber. Many houses were sold for as low as \$10 to anyone who would haul them away before a certain date. At that time the houses, together with the scrap that was left, were burned.<sup>10</sup>

The classic "boom and bust" of a staple economy was complete.

Although many of the northern mill towns continued to decline during the 1910's and 1920's a few of the more southern mill towns found a new economic base in the automobile industry.

By 1910 automobile manufacturing was the dominant sector of the state economy, and many industrial centers of southern Michigan benefitted from its rapid expansion. Saginaw, Flint, and Muskegon all had good transport connections, and they were close to Detroit, as well as other large markets. Moreover, they had many foundries and metal shops as well as a semi-skilled labor force with production line experience. These former sawmill centers grew rapidly as automobile towns. By 1936 roughly half of Muskegon's industrial labor force was employed in foundries and fifteen auto parts factories.<sup>11</sup> Unlike lumbering, automobile manufacturing had strong forward and backward linkages, and a significant local multiplier; the industry carried Michigan, decisively, into the industrial age. Manufacturing became more concentrated in the southern one-third of the Lower Peninsula and many woodsmen, farmers, and merchants of the northern cutover moved south to work in these factories.

The railroad system of northern Michigan was severely truncated as the logging industry declined. As pine grew scarce and the logging frontier moved north declining freights and profits led to the dismantling of many logging railroads and spurs. In the late 1870's, 60 percent or 70 percent of the annual freight tonnage of northern Michigan public carriers was lumber and other forest products.<sup>12</sup> By 1900 this figure had dropped to 30 percent for the Pere Marquette Railroad; on the Detroit & Mackinaw and the Grand Rapids & Indiana Railroads it reached this level in 1915.<sup>13</sup> In response, services were curtailed and hundreds of miles of track abandoned. Each year

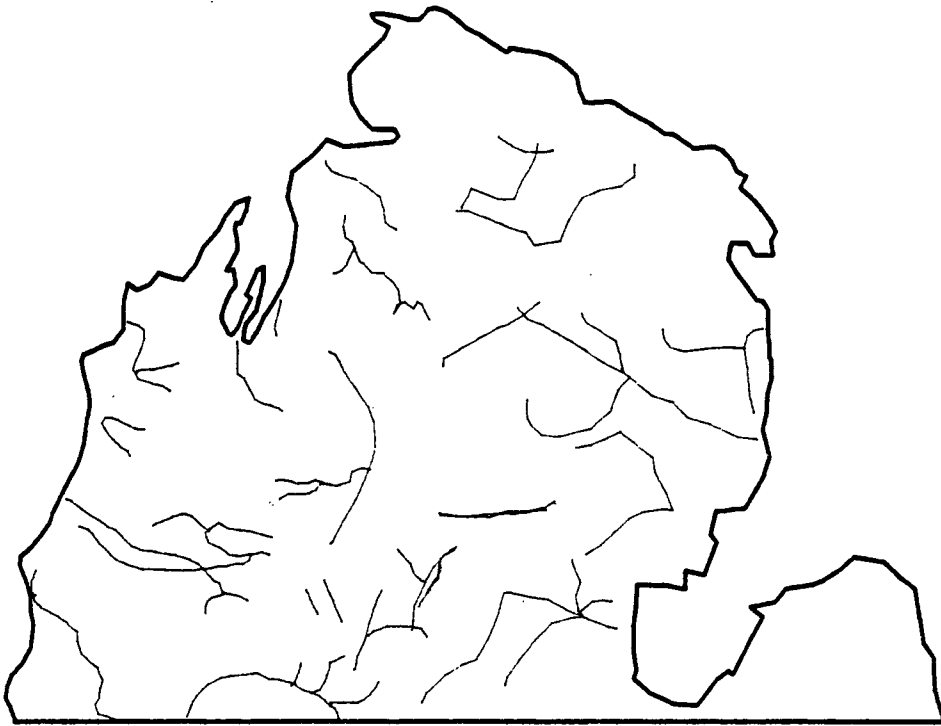
after 1910, the Michigan Railroad Commission heard several petitions to abandon lines in Northern Michigan. Most of them were variants on the single theme identified in a judgement by the Commission in 1917. In giving the Pere Marquette Railroad Company permission to abandon its Kalkaska Branch, which had been built in 1897, the Commission noted:

Settlements and industries formerly existing . . . no longer exist; the line of track is serving no one except the farmers . . . and the inhabitants of Moorestown, a hamlet of about 100 population; the character of the land adjacent to this line of track . . . is described as jack-pine plains. . . No reasonable prospect of future increase in traffic to such an extent that this portion of the road<sup>14</sup> . . . will produce revenue sufficient to pay expenses.

Railroad abandonment continued into the 1920's (Figure 41) and total rail mileage in the state decreased by 559 miles between 1909 and 1924, the largest decline in the nation.<sup>15</sup>

The collapse of the lumber economy resulted in the loss of crucial income for the settlers of northern Michigan. Many people, especially former woodsmen and recent European immigrants, had established homesteads or purchased cutover in this region in the early 20th century.<sup>16</sup> They relied upon the camps and mills for markets and for seasonal employment. Agricultural settlement of the northern cutover had been encouraged by the railroad companies, lumber concerns, land dealers, and even some foresters who either held faith in the adage that "the plow follows the ax" or simply engaged in blind boosterism.<sup>17</sup> But for all the hopes and claims of these groups, cash wages were crucial to the survival of would-be

Figure 41  
ABANDONED RAILROADS  
IN NORTHERN MICHIGAN  
(c. 1915-1935)



Source: Charles M. Davis, "The Development of Settlements in Northern Michigan," Michigan Alumnus: Quarterly Review, 42 (1936), 269.

farmers in this area. The land was poorly suited to agriculture due to the predominance of spodosols, a short growing season, and the damage inflicted by fire and erosion.<sup>18</sup> Moreover, most homesteaders lacked both experience and capital, which were particularly important in this marginal area. With the loss of mill and camp jobs, many farmers relied upon occasional jobs in the new state and national forests to survive. And many women of the northern cutover took jobs as domestics in southern Michigan towns during the winter.<sup>19</sup>

In addition to the loss of local markets, northern farmers found themselves in an increasingly constrained economic situation after 1910. The drastic reduction in the value of most forest land, and the widespread abandonment of land by the lumber industry resulted in higher taxes for those who remained. Property and road taxes in northern Lower Michigan were twice the levels elsewhere in the state,<sup>20</sup> although roads were uncommon--averaging only 1 mile per square mile in many counties<sup>21</sup>--and of poor quality. And at the same time crucial rail links to outside markets were lost to many of these farmers. Though land was cheap, the new settlers found it hard to survive in the wake of a declining lumber economy. Between 1916 and 1919, 294 farms (15,000 acres) with a value of \$260,000 were abandoned in one northern county.<sup>22</sup> The depression of the late 1920's simply worsened the problem; 63 percent of the residents of Cheboygan County received some type of public relief in December 1933.<sup>23</sup>

Land abandonment continued unabated after 1920. Stripped



of their last remaining trees for fence posts, railroad ties, and pulp wood, former timber parcels were abandoned as a matter of course. Though some of this cutover was homesteaded, this simply postponed the inevitable. In 1920 the state held about 600,000 acres of abandoned land. By 1932 this had grown to 2.4 million acres, by 1940 to 4.6 million.<sup>24</sup> Ninety five percent of the northern two-thirds of Lower Michigan had been cut-over. In 1920 two thirds of northern Michigan was wasteland, cutover, or unproductive forest land. Only 19 percent of the area was improved farmland, one quarter of the proportion of agricultural land in southern Michigan.<sup>25</sup>

Due in part to the environmental problems of northern Michigan, the management of public lands and resources had become a national issue during the 1910's. Professional foresters pushed for governmental agencies that would manage public forest land and protect it from fire, theft, and excessive exploitation.<sup>26</sup> Michigan's first state forests were established in 1903 with 34,000 acres of cutover near Houghton and Higgins Lakes; five more state forests were created between 1910 and 1920. By 1940 13 state forests in northern Lower Michigan contained some 1.1 million acres.<sup>27</sup> Much of the remaining abandoned land in northern Michigan was grouped into the Huron and Manistee National Forests (.6 million acres in 1940), state game areas, and state parks.<sup>28</sup> The large, concentrated land holdings of the lumber industry were replaced by a similar pattern of concentrated state and federal ownership. Today, a large proportion of northern Michigan remains under the

jurisdiction of governmental agencies.<sup>29</sup>

During the first decades of the 20th century Michigan moved from an extractive to a manufacturing economy, and tourism emerged as the major enterprise of northern Lower Michigan. Encouraged by the railroads and steamship lines, northern Michigan had become a tourist and resort center during the 1880's. Gentlemen took fishing trips, church groups held summer encampments, and many people fled the heat of the large cities for the cooler shores of the northern Lakes. The Grand Hotel was built on Mackinaw Island in 1882 by a consortium of railroad and steamship companies and has served as a symbol of northern resort life ever since. The public carriers operated special trains, such as the Grand Rapids and Indiana's "Resorter," which were formed in Cincinnati or Chicago and sent non-stop into northern Michigan daily during the summer. As lumbering declined the railroad companies advertised widely for tourist trade.<sup>30</sup> Both fishing and hunting were popular. Though the famous sport fish, the grayling disappeared from northern Michigan streams as a result of the alteration of its environment by logging, deer, game birds, and other wildlife flourished in some areas due to the cutting of the forest. Automobiles had a widespread impact upon northern Michigan tourism as leisure time and personal income grew. The sand plains and second-growth forest of northern Lower Michigan became a recreational hinterland of the urban-industrial region of the southern Michigan, and today snow mobiles and dirt bikes follow the grades of former logging railroads built a century earlier.

As we have seen, national context, local circumstance, and the character of lumbering were instrumental in shaping this landscape. More than half a century after the demise of logging in Michigan, the geographical patterns of the state cannot be understood without reference to the development of these crucial years 1860 to 1910, upon which this study has focused. Beginning at mid-century when Maine, New York, and most of Pennsylvania were already logged of their pine timber and the forests north of Lake Ontario were depleted, the onslaught on Michigan forests proceeded at an unprecedented rate for the remainder of the 19th century. Located between growing urban markets for lumber in the east and rising agricultural settlements on the prairie, and with direct, cheap shipping routes (via the Great Lakes) to both, Michigan's bountiful white pine forests were prime targets for rapacious exploitation. For one-half century the state was America's woodlot. Michigan white pine went to construct tenements in Paterson, New Jersey, and to build hay barns and fences in Ottuma, Iowa. And Michigan hardwood was used to make furniture, flooring, and butter tubs for growing urban markets.

Michigan reigned as the United States' largest lumber producer during a half century of unparalleled national growth, and the Michigan lumber industry played an important role in the emergence of a national economy. Many urban centers of the Northeast had become industrialized during the 1830's and 1840's as the construction of turnpikes, canals, and, later, railroads extended their hinterlands up the major river valleys of the east. During the 1850's railroads spread through the Ohio Valley

and the total tonnage of Great Lakes ships nearly doubled,<sup>31</sup> yet not until after the Civil War did the integration of these regional economies begin in earnest. The Civil War was a turning point in Northern economic growth; it encouraged mechanization of war-related industries (such as agriculture, steel, and textiles), and domestic markets expanded due to high tariffs.<sup>32</sup> In the ensuing decades the economies of the Northeast, and the West were increasingly integrated. The growth of national transportation systems, the growing scale of production, and the growth of large urban markets facilitated this integration. Thus regional economic specialization occurred during the last decades of the 19th century; western economies provided primary resources for the industrial heartland. The Great Lakes, for example, produced 48 percent of the nation's iron ore in 1890, 39 percent of its copper, and 31 percent of its wheat.<sup>33</sup> That year Michigan alone produced 20 percent of the total value of forest resources.<sup>34</sup>

Northern Lower Michigan was slowly integrated into this national economy. Eastern land speculators turned their attention to Michigan's northern pinelands during the 1850's. As timber became scarce elsewhere, local entrepreneurs and eastern capitalists rushed to purchase Michigan's northern forest. Already a part of the investment sphere of the industrial Northeast in the 1850's, it was not until the late 1860's that northern Lower Michigan was drawn further into the national orbit by the rising exploitation of its forests. By 1870 modern, well-capitalized sawmills dominated the large Michigan mill

towns. Such mills as John McGraw's, in Portsmouth, cut up to 150,000 board feet per day, and had as many as five saws, as well as edgers, planers, trimmers, lath, and shingle machines. They employed foremen to manage crews of 200 or more men, and they shipped their lumber to yards located around the Great Lakes Basin (in McGraw's case, to his yards in Indianapolis, Tonawanda, and Rochester, New York).<sup>35</sup> By 1870 the larger mill towns had been incorporated into the commercial and technological hinterland of the industrial Northeast. Within a decade industrial capitalism and technology had been extended deep into the bush.

Growing urban demand for wood products and growing mill capacity put pressure on forest operations for more and more logs. By 1880 "railroad logging," that is the use of lightweight locomotives and temporary tracks to remove logs from the forest, was common. Railroad logging brought industrial technology deep into the forest, and production was extended throughout the region. The use of railroads, and later steam-powered log loaders, encouraged the cutting of increasingly small and poor trees, as well as an array of species other than pine, including hemlock, maple, and cedar, that could not be floated down the rivers.

The Michigan lumber industry emerged in response to growing demand for wood products in eastern urban centers and the depletion of white pine in the Northeast, but it soon served markets in the agricultural settlements of the Prairies as well. During the 1860's and 1870's Michigan sent unfinished lumber by

schooner east to New York state (Buffalo or Tonawanda) and west to Chicago. Lumber finishing and the manufacture of wood products, e.g. doors and siding, occurred in these wholesale centers. By the 1880's the nature of demand and marketing had changed somewhat. In Michigan the cost of stumpage and saw logs had risen to such heights that there was little profit in milling boards. Specialized finishing machines--such as planers, kilns, and re-saws--had been refined and were now widely available. Improved rail links and declining rail costs, as well as the higher profit margins, attracted Michigan mill men, and other entrepreneurs, to the manufacture of an array of finished wood products. Mills cut siding, planed lumber, and fine sorted their products. Doors, sashes, and furniture became important sectors of the mill town economy. This trend continued through the end of the century. Timber became increasingly scarce and those operations that continued to function during the decline period did so utilizing new woods, especially hemlock and maple, and by producing more finished goods, such as hardwood flooring. Rail rates had fallen consistently and the Midwest was increasingly urbanized. By 1900, most of Michigan's forest products were delivered by rail to regional centers such as Detroit, Indianapolis, and Cincinnati.

Yet the exploitation of Michigan pine was patterned by the nature of the northern forests and by the economics of lumber production. Due to the large weight-loss in saw milling, lumbering is a resource-oriented industry. Logs and lumber are both heavy, bulky commodities, and the transportation of these

items is expensive. Yet white pine was scattered throughout the maple-beech and pine-oak forests of northern Michigan. These factors greatly influenced the location of lumber manufacturing, the time at which a parcel was cut, and the spatial organization of northern Michigan transportation systems. Water transportation was, as a rule, quite economical and thus the rivers and lakes of the region were utilized whenever possible. River drives collected logs from a wide region and delivered them to the river mouth. Saw mills were concentrated at this break in bulk point and loaded their product directly onto Great Lakes vessels. Logging moved up the drainage system, following first the major rivers, then the smaller streams. The river drives grew in length and volume, and the rivers were dredged, and straightened and dammed (to store water). Only with the beginning of railroad logging, which replaced or supplemented both sleighing and river driving in the 1880's, were the forested uplands beyond and between these rivers exploited systematically. These railroads served as an extension of the river mouth-based transportation system. The first railroads of northern Lower Michigan had bypassed nearly all of the important mill towns, yet as branches, spurs, and new lines were constructed they invariably were designed to serve the river-mouth mill towns.

Improved river drives and lumber railroads extended the lumber economy throughout the region, and dramatically changed the value of land and labor in hitherto isolated areas. Cash wages aided the spread of agriculture into northern Michigan. Yet many men found themselves in logging shanties and sawmill

boarding houses much of the year, rather than building their family farm. Lumbering drew many would-be farmers into areas poorly suited to agriculture, and removed the focus of economic life from the family and farm. Moreover, the logging camps were ephemeral, and the economic vitality of northern towns was often temporary. By 1880 much of northern Michigan had been firmly incorporated into the commercial and technological sphere of the industrial Northeast. Yet few industries other than the closely-related planing mills, foundries, and wood manufactures were drawn to lake shore mill towns. And northern logging villages, which acted as local service centers, either declined after a decade or two, or were utterly abandoned. The multiplier was small in the lumber industry, the linkages limited, and, given the transiency of the labor force, little ancillary industry emerged. Primary resource economies thrive and suffer in accord with the marketability of their staple commodities. In northern Michigan the lumber economy was spread across a large region; nearly all of its rather small industrial base was concentrated on the perimeter (that is the shores) of that region.

In the late 19th century logging and saw milling were transformed by advances in industrial technology. Advances in metallurgy (crosscut saws), steam engine design (light logging locomotives), and mechanical engineering (steam log loaders and geared locomotives) speeded logging operations, and reduced logging's dependence on winter and spring weather. Longer seasons and more dependable methods facilitated increases in the



scale of production, the cutting of more logs per acre, and the cutting of increasingly smaller trees.

In a parallel development, traditional sawmills gave way after 1860 to large, more modern establishments. In a decade or two sawmilling was transformed from a "pre-industrial" operation producing lumber with water-powered mauls and shiving shingles by hand to an activity characterized by large, efficient, fully-mechanized mills which produced an array of finished goods. More powerful engines allowed the addition of more saws and then finishing machines, such as edgers and trimmers. Circular saws, gang saws, gang edgers and trimmers increased production rapidly. By 1885 steam power had been extended to the entire production line. Live rollers hurried products through the mill, and steam powered lath and shingle mills utilized offcuts. Modal output per mill grew from 7 million feet in 1870 to 16 million in 1885. As the 1880's drew to a close, and as pine became scarce many mills introduced band saws to reduce waste. At the same time, specialized sawing machinery, innovations in wood manufacturing, and attempts by mill owners to reduce waste, contributed to product differentiation. An important market for smaller pieces of lumber, mill offcuts, and secondary species such as hemlock and maple emerged as a result. The barren landscape of northern Michigan in 1910 was at least in part the result of technological innovations in logging, log transport, and wood manufacturing.

Federal and state land programs were also fundamental influences upon the Michigan lumber economy. Railroad land grants and the sale of agricultural scrip and military benefit

warrants fueled land speculation throughout the Northwest,<sup>36</sup> and facilitated the rapid transfer of Michigan land into the hands of a few hundred speculators and lumbermen who amassed extensive, concentrated areas of timberland in patterns that were remarkable persistent. Because of the scale economies of logging, large concentrated land holdings conferred advantage upon well-capitalized operators, and limited the opportunities available to the smaller companies. Furthermore, throughout northern Michigan the value of the timber on a parcel far exceeded the value of the land. This generally remained true even after a parcel had been logged two or three times. Thus the lumber economy dominated land use and land ownership patterns throughout the region until the early 20th century when the industry's rapid decline led to widespread land abandonment.

Hard work and individual advancement were perhaps the crucial watchwords of the 19th century entrepreneur. The eager, hardworking, entrepreneurs in the lumber industry held a credo which had developed out of Jacksonian individualism, and bore the imprint of Herbert Spencer's ideas of social survival. As men struggled to succeed in a highly competitive market, business practices, from accounting to management methods, were modernized. The history of the Michigan lumber industry was, in a limited sense, the continuing struggle of Michigan mill owners and logging concerns to develop more dependable operations. They sought reduced costs and increased profits, and production was rationalized as a result. Lumbermen worked to systematize and routinize each step of production. Only in this way were they

able to survive the frequent swings in the price of lumber and the common disruptions of forest output caused by untoward weather.

Late 19th century America valued natural resources primarily as fuel for national and personal advancement, a view which greatly affected the use and management of Michigan's timber lands. The United States appeared to be endowed with a limitless supply of timber; little attention was given to the protection and management of Michigan's forests and forestland. The environment was seen as a force to be conquered. In Michigan the result was the speedy, overwhelming exploitation of the state's forest resource, with rarely a thought given to reforestation and forest management. Not until after 1900, with the emergence of professional foresters, were the "bureaucratic" concepts of planning, efficiency, and management applied to primary resources.<sup>37</sup> But this was much too late for Michigan.

Thus the Michigan white pine industry was more than a distant expression of a modern, industrializing economy. Those very forces of industrialization and modernization which transformed American society also transformed the Michigan lumber industry and in turn enhanced its impact upon the face of modern Michigan. Each step of the lumbering process was transformed by steam powered machinery and by the lumbermen's zeal to make their operations more dependable, more efficient, and more lucrative.

By 1920 the northern cutover was a grim reminder of the landscape implications of late 19th century industrialism.

Industrial technology clearly increased man's ability to alter his environment. Yet it was the combination of industrial technology with the struggle for increased profits and personal advancement which had enormous implications for northern Michigan. With little regard for the social and environmental consequences of their actions lumbermen sought maximum return over the short term. In northern Michigan the philosophy of hard work, personal advancement, and unfettered resource use was taken, by industrial technology and growing national markets, to its logical conclusion. In the case of the Lake States forests Adam Smith's "invisible hand"<sup>38</sup> functioned rather poorly, and increased governmental intervention was required to limit the excesses of private enterprise elsewhere in the West.

## NOTES

### Chapter 1

1. Lawrence M. Sommers, ed., Atlas of Michigan ([n.p.]: Michigan State University Press, 1977), pp. 28-29.
2. Sommers, ed., Atlas of Michigan, p. 32.
3. This and the following paragraphs are taken largely from Sommers, ed., Atlas of Michigan, pp. 17, 18-19, 36-37, 45; see also Jay R. Harman and Michael D. Nutter, "Soil And Forest Patterns in Northern Lower Michigan," East Lakes Geographer, 8 (1973), 5-6; L.H. Wood, Geography of Michigan: Physical, Industrial and Sectional (Kalamazoo: Horton-Beimer Press, 1941), pp. 66, 68-69, 74; E. Lucy Braun, Deciduous Forests of Eastern North America (Philadelphia: Blakiston, 1950), pp. 36-37, 305-309, 341-345; U.S.D.A. Soil Conservation Service, Soil Survey Staff, Soil Classification, a Comprehensive System, 7th Approximation (Washington: Government Printing Office, 1960).
4. L.H. Wood, Geography of Michigan, p. 66; C.F. Wheeler, "A Sketch of the Original Distribution of White Pine in the Lower Peninsula of Michigan," Bulletin, Michigan State Agricultural College Experiment Station, No. 162 (November, 1898), p. 5.
5. Kenneth Lockridge, "Land, Population and the Evolution of New England Society, 1630-1790," Past and Present, 39 (1968), 62-80; William Nowlin, The Bark Covered House, or Back in the Woods Again (1876; rpt. [n.p.]: Readex Microprint, 1966); Willis Frederick Dunbar, Michigan: A History of the Wolverine State (2d ed.; Grand Rapids, Michigan: William B. Eerdmans Publishing Company, 1970), pp. 225, 245, 352.
6. Dunbar, Michigan, pp. 250-255, 322, 352; John Fraser Hart, "The Middle West," Annals of the Association of American Geographers, 62 (1972), 260; Morris Taber, "New England Influence in South Central Michigan," Michigan History, 45 (1961), 305-336. For a treatment of American cultural regions, and the diffusion of New England culture into the Midwest see Wilbur Zelinsky, The Cultural Geography of the United States (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1973); note the useful map of cultural regions on pp. 118-119.

7. See map in Dunbar, Michigan, p. 334.
8. Dunbar, Michigan, p. 247.
9. Nowlin, Bark Covered House, p. 20; Dunbar, Michigan, pp. 249-250.
10. Dunbar, Michigan, p. 355.
11. William B. Gates, Jr., Michigan Copper and Boston Dollars: An Economic History of the Michigan Copper Mining Industry (1951; rpt. New York: Russell & Russell, 1969); Irene D. Neu, "The Mineral Lands of the St. Mary's Falls Ship Canal Company," The Frontier in American Development, ed. David M. Ellis (Ithaca: Cornell University Press, 1969), pp. 162-191.  
Northeastern capitalists were intimately involved with the construction of the St. Mary's Falls Ship Canal Company, whose home offices were in Boston (Neu, "Mineral Lands," p. 176).
12. See, e.g., U.S. Department of Interior, National Resources Committee, Regional Planning, Part VIII, Northern Lake States (Washington: Government Printing Office, 1939), p. 26.
13. Sommers, ed., Atlas of Michigan, p. 49.
14. Dunbar, Michigan, pp. 374-375, 377.
15. Because of the Detroit River and the Canadian law requiring a different gauge, transshipment and ferrying were still required (George Rodgers Taylor and Irene D. Neu, The American Railroad Network, 1861-1890 [Cambridge, Massachusetts: Harvard University Press, 1956], p. 21).
16. Dunbar, Michigan, p. 380; Neu, "Mineral Lands," p. 167.
17. Willis Frederick Dunbar, All Aboard! A History of Railroads in Michigan (Grand Rapids: William B. Eerdmans Publishing Company, 1969), p. 79.
18. The Milwaukee and Detroit Railroad was called the "emigrant route" at this time, Dunbar, Michigan, p. 384.
19. Dunbar, Michigan, pp. 350, 379.
20. Dunbar, Michigan, pp. 387-390; see also Allan R. Pred, "Urban Systems Development and the Long-Distance Flow of Information Through Preelectronic U.S. Newspapers," Economic Geography, 47 (1971), 498-524.

21. Michael P. Conzen, "The Maturing Urban System in the United States, 1840-1910," Annals of the Association of American Geographers, 67 (1977), 88-108.

22. Barbara Ellen Benson, "Logs and Lumber: The Development of the Lumber Industry in Michigan's Lower Peninsula, 1837-1870" (unpublished PhD dissertation, Indiana University, 1976), pp. 211-213.

23. Henry B. Steer, Lumber Production in the United States, 1759-1946, U.S.D.A. Misc. Publication No. 669 (Washington: Government Printing Office, 1948), p. 11.

24. The following sketch focuses upon the nature of the industry and the region at 1860. For an introduction to the early years of lumbering and the early development of the Great Lakes States, see Benson, "Logs and Lumber"; Frederick Merk, Economic History of Wisconsin During the Civil War Decade (1916; rpt. Madison: Wisconsin State Historical Society, 1971); Margaret Walsh, The Manufacturing Frontier: Pioneer Industry in Antebellum Wisconsin, 1830-1860 (Madison: State Historical Society of Wisconsin, 1972).

25. See, e.g., Kathe Cook, ed., Pioneer Reminiscences of An Old Settler by One of the Boys (1884; rpt. Manistee, Michigan: Manistee County Historical Society, 1960).

26. Camps were supplied in a variety of ways due to the lack of railroads and the isolation of some camps. Sleighs were often used once snow had come to the forest, but there were many camps that used rafts, carts, or even canoes to ferry an entire season's supplies into the woods in the early fall. See, for example, David Ward, The Autobiography of David Ward (New York: Privately printed, 1912), pp. 107, 118, 136.

27. Joseph R. Conlin, "'Old Boy, Did You Get Enough of Pie?' A Social History of Food in Logging Camps," Journal of Forest History, 23 (1979), 164-185.

28. For a general background on shanty boys see George B. Engberg, "Who Were the Lumberjacks?" Michigan History, 32 (1948), 238-246; George Baker Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949).

29. For an introduction to river driving see William G. Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 (Glendale, California: The Arthur H. Clarke Company, 1953), pp. 91-191, especially pp. 126-131.

30. Many of the early state-owned railroads were financial disasters, and by this time the constitution prohibited direct participation by the state. Yet grants in aid were still

common.

31. Benson, "Logs and Lumber," p. 230.

32. Benson, "Logs and Lumber," pp. 190-191.

33. Steer, Lumber Production, p. 11; Benson, "Logs and Lumber," pp. 232-233.

34. A. N. Bliss, "Federal Land Grants For Internal Improvements in the State of Michigan," Pioneer Collections, Report of the Pioneer Society of the State of Michigan, 7 (1886; rpt. 1904), 52-68; Dallas Lee Jones, "The Survey and Sale of the Public Land in Michigan, 1815-1862" (unpublished M.A. thesis, Cornell University, 1952).

35. Herbert Brinks, "The Effect of the Civil War in 1861 on Michigan Lumbering and Mining Industries," Michigan History, 44 (1960), 101-107; Kenneth N. Metcalf and Lewis Beeson, Effects of the Civil War on Manufacturing in Michigan (Lansing: Michigan Civil War Centennial Observance Commission, 1966).

36. Thomas C. Cochrane, Frontiers of Change: Early Industrialism in America (New York: Oxford University Press, 1981), p. 13.

37. Cochrane, Frontiers, p. 126. Cochrane stresses the importance of geography and culture in the early industrialization of the Northeast, see pp. 14-15, 126.

38. Allan R. Pred, "Industrialization, Initial Advantage, and American Metropolitan Growth," Geographical Review, 55 (1965), 158-185.

39. Cochrane, Frontiers, pp. 48, 78-80.

40. Cochrane, Frontiers, p. 95.

41. Allan R. Pred, City Systems in Advanced Economies, Past Growth, Present Processes, and Future Development Options (New York: John Wiley & Sons, 1977), p. 37; Cochrane, Frontiers, p. 116.

42. See Richard C. Wade, The Urban Frontier: Pioneer Life in Early Pittsburgh, Cincinnati, Lexington, Louisville, and St. Louis (Chicago: University of Chicago Press, 1959); Edward K. Muller, "Selective Urban Growth in the Middle Ohio Valley, 1800-1860," Geographical Review, 66 (1976), 178-199.

43. Margaret Walsh, "Pork Packing as a Leading Edge of Midwestern Industry, 1835-1875," Agricultural History, 51 (1977), 702-717.



44. Cochrane, Frontiers, pp. 98, 128.
45. Cochrane, Frontiers, pp. 99, 105.
46. Diane Lindstrom, Economic Development in the Philadelphia Region, 1810-1850 (New York: Columbia University Press, 1978), pp. 9 ff.
47. Taylor and Neu, American Railroad Network, pp. 1-14.
48. Harvey S. Perloff and Lowdon Wingo, Jr., "Natural Resource Endowment and Regional Economic Growth," Regional Development and Planning: A Reader, ed. John Friedman and William Alonso (Cambridge, Massachusetts: The M.I.T. Press, 1964), pp. 215-223.
49. Braun, Deciduous Forests, pp. 341-345.
50. Lewis Mumford, Technics and Civilization (1934; rpt. New York: Harcourt, Brace & World, 1963), pp. 109-110. Evelyn M. Dinsdale used Mumford's model to describe the evolving American lumber frontier in "Spatial Patterns of Technological Change: The Lumber Industry of Northern New York," Economic Geography, 41 (1965), 252-274.
51. Important contributions to the forest history literature of New England and the Maritimes include Richard G. Wood, A History of Lumbering in Maine, 1820-1861 (Orono, Maine: University of Maine Press, 1935); David C. Smith, A History of Lumbering in Maine, 1861-1960 (Orono, Maine: University of Maine Press, 1972); Graeme Wynn, Timber Colony: A Historical Geography of Early Nineteenth Century New Brunswick (Toronto: University of Toronto Press, 1981); Charles F. Carroll, The Timber Economy of Puritan New England (Providence: Brown University Press, 1973).
52. William F. Fox, A History of the Lumber Industry in the State of New York, U.S.D.A. Bureau of Forestry, Bulletin No. 34 (Washington: Government Printing Office, 1902). No thorough scholarly treatment of the lumber industry in Pennsylvania is available. An important article on Pennsylvania river driving is Thomas C. Cox's "Transition in the Woods: Log Drivers, Raftsmen, and the Emergence of Modern Lumbering in Pennsylvania," The Pennsylvania Magazine of History and Biography, 104 (1980), 345-364.
53. C. Grant Head, "An Introduction to Forest Exploitation in Nineteenth Century Ontario," Perspectives on Landscape and Settlement in Nineteenth Century Ontario, ed. J. David Wood (Toronto: McClelland and Stewart, 1975), pp. 78-112; Richard S. Lambert with Paul Pross, Renewing Nature's Wealth: A Centennial History of the Public Management of Lands, Forests, and Wildlife in Ontario, 1763-1967

(Toronto: Ontario Department of Lands and Forests, 1967); A.R.M. Lower, The North American Assault on the Canadian Forest: A History of the Lumber Trade Between Canada and the United States (Toronto: The Ryerson Press, 1938).

54. Robert F. Fries, Empire in Pine, The Story of Lumbering in Wisconsin, 1830-1900 (Madison, Wisconsin: The State Historical Society of Wisconsin, 1951); Agnes M. Larson, History of the White Pine Industry in Minnesota (Minneapolis: University of Minnesota Press, 1949). Two studies of Wisconsin lumber companies are also valuable: A.R. Reynolds, The Daniel Shaw Lumber Company: A Case Study of the Wisconsin Lumbering Frontier (Washington Square, New York: New York University Press, 1957); and Charles E. Twining, Downriver: Orrin H. Ingram and the Empire Lumber Company (Madison: The State Historical Society of Wisconsin, 1975).

55. Thomas D. Clark, "The Impact of the Timber Industry on the South," Mississippi Quarterly, 25 (1972), 141-164; Stanley Horn, This Fascinating Lumber Business (2d ed.; Indianapolis: Bobbs-Merrill, 1951); James E. Fickle, The New South and the "New Competition," Trade Association Development in the Southern Pine Industry (Urbana: University of Illinois Press, 1980).

56. The best treatment of West Coast lumbering is Thomas R. Cox, Mills and Markets: A History of the Pacific Coast Lumber Industry to 1900 (Seattle: University of Washington Press, 1974).

57. John Denis Haeger, The Investment Frontier: New York Businessmen and the Economic Development of the Old Northwest (Albany: State University of New York Press, 1981).

58. Richard L. Pfister, "External Trade and Regional Growth: A Case Study of the Pacific Northwest," Economic Development and Cultural Change, 11 (1963), Part I, 134-151.

59. James M. Gilmour, Spatial Evolution of Manufacturing: Southern Ontario 1851-1891, University of Toronto Department of Geography Research Publication No. 10 (Toronto: University of Toronto Press, 1972).

60. Harvey S. Perloff and others, Regions, Resources, and Economic Growth (Baltimore: The Johns Hopkins Press, 1960); Perloff and Wingo, "Natural Resource Endowment," pp. 215-239.

Recent research has suggested that interregional trade was not an important factor in the development of eastern industrialism before the Civil War, see Lindstrom, Economic Development.

61. This discussion relies largely upon the useful survey

provided by Richard Brown, Modernization: The Transformation of American Life, 1600-1865 (New York: Hill and Wang, 1976), and upon E.A. Wrigley, "The Process of Modernization and the Industrial Revolution in England," Journal of Interdisciplinary History, 3 (Autumn 1972), 226 ff.

62. Melvyn Dubofsky has noted that the specialization of labor and the monotonization of work were not synonymous with power-driven machinery and factories, "Adam's Curse: or the Drudgery of Work," Reviews in American History, 6 (1978), 432.

63. E.P. Thompson, "Time, Work-Discipline, and Industrial Capitalism," Past and Present, No. 38 (December 1967), pp. 56-97.

64. Anthony N.B. Garvan, "Effects of Technology on Domestic Life, 1830-1880," Technology in Western Civilization, Vol. I, The Emergence of Modern Industrial Society, Earliest Times to 1900, ed. Melvin Kranzberg and Carroll W. Pursell, Jr. (New York: Oxford University Press, 1967), pp. 546-559; Peter Laslett, The World We Have Lost (2d ed.; [n.p.]: Charles Scribner's Sons, 1973).

65. H.J. Habakkuk, American and British Technology in the Nineteenth Century: The Search for Labor-Saving Inventions (Cambridge: Cambridge University Press, 1962); Nathan Rosenberg, "America's Rise to Woodworking Leadership," America's Wooden Age: Aspects of its Early Technology, ed. Brooke Hindle (Tarrytown, New York: Sleepy Hollow Restorations, 1975), pp. 37-62.

66. Herbert G. Gutman, "Work, Culture, and Society in Industrializing America, 1815-1919," American Historical Review, 78 (1973), 528-588; Daniel T. Rodgers, The Work Ethic in Industrial America, 1850-1920 (Chicago: The University of Chicago Press, 1978).

67. Richard E. Lingenfelter, The Hardrock Miners: A History of the Mining Labor Movement in the American West, 1863-1893 (Berkeley: University of California Press, 1974).

68. Sidney Pollard, The Genesis of Modern Management: A Study of the Industrial Revolution in Great Britain (Cambridge, Massachusetts: Harvard University Press, 1965).

69. Historical geographers and urban historians have, however, investigated the impact of industrialization on urban structure and activities, e.g. David Ward, Cities and Immigrants: A Geography of Change in Nineteenth-Century America (New York: Oxford University Press, 1971); James E. Vance, Jr., "Housing the Worker: The Employment Linkage as a Force in Urban Structure," Economic Geography, 42 (1966),

294-325; Caroline Golab, "The Impact of the Industrial Experience on the Immigrant Family: The Huddled Masses Reconsidered," Immigrants in Industrial America, 1850-1920, ed. R.L. Ehrlich (Charlottesville: University Press of Virginia, 1977), pp. 1-32; Peter G. Goheen, "Industrialization and the Growth of Cities in Nineteenth Century America," American Studies, 14 (1973), 49-65.

70. Richard White, Land Use, Environment, and Social Change: The Shaping of Island County, Washington (Seattle: University of Washington Press, 1980).

71. Walsh, "Pork Packing," pp. 702-717; Cox, "Transition in the Woods," pp. 345-364.

72. William N. Sparhawk and Warren D. Brush, Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929); Russell Watson, "Forest Devastation in Michigan: A Study of Some of Its Deleterious Economic Effects," Journal of Forestry, 21 (1923), 425-451.

## CHAPTER 2 NOTES

1. "Wild Cat Banks" refers to western state banks that were chartered in great numbers under lax and unenforced banking regulations during the 1830's. Most of these banks had little paid-in stock, and they failed in the Panic of 1837. Yet liberal banking laws in Illinois, an important source of capital for western Michigan lumbering, allowed the appearance there of new wildcat banks in the 1840's and 1850's.

Herbert Brinks, "The Effect of the Civil War in 1861 on Michigan Lumbering and Mining Industries," Michigan History, 44 (1960), 105-107; Barbara Ellen Benson, "Logs and Lumber: The Development of the Lumber Industry in Michigan's Lower Peninsula, 1837-1870" (unpublished PhD dissertation, Indiana University, 1976), p. 219.

2. The move to mechanized production in 19th century America has been interpreted as largely a response to scarce, and thus expensive, labor. The most compelling presentation of this thesis is still H.J. Habakkuk's American and British Technology in the Nineteenth Century: The Search for Labor-Saving Inventions (Cambridge: Cambridge University Press, 1962). Recently Hoffman and Earle have challenged an important premise of the Habakkuk thesis, arguing that labor was in fact quite cheap in the ante-bellum North, and that it was precisely this cheap labor that allowed the investment in machinery. It is not clear how applicable the Hoffman/Earle thesis is to the Civil War North, when clearly there was a labor shortage, or to the post-bellum years when competition had raised

wages substantially, Carville Earle and Ronald Hoffman, "The Foundation of the Modern Economy: Agriculture and the Costs of Labor in the United States and England, 1800-60," American Historical Review, 85 (1980), 1055-1094.

3. Richard H. Sewell, "Michigan Farmers and the Civil War," Michigan History, 44 (1960), 354-356; Fred A. Shannon, The Farmer's Last Frontier, Agriculture 1860-1897 (New York: Holt, Rinehart, & Winston, 1945), p. 127.

4. Kenneth N. Metcalf and Lewis Beeson, Effects of the Civil War on Manufacturing in Michigan (Lansing: Michigan Civil War Centennial Observance Commission, 1966), pp. 16-17, 28-29.

5. In the end, any person, or the heir of such a person, who had served in any war or Indian campaign for a minimum of 14 days was entitled to warrants for free entry of 160 acres.

6. Ruben J.E. Greffenius, "Development of Michigan Public Land Policy" (unpublished PhD dissertation, The University of Michigan, 1968), pp. 180, 220.

7. As a railroad opened a new section, it received its grant along that part of its route.

8. Greffenius, "Michigan Public Land Policy," pp. 149, 174.

9. Irene D. Neu, "The Mineral Lands of the St. Mary's Falls Ship Canal Company," The Frontier in American Development; Essays in Honor of Paul Wallace Gates, ed. David M. Ellis (Ithaca: Cornell University Press, 1969), p. 170.

10. Greffenius, "Michigan Public Land Policy," p. 216.

11. Between 1854 and 1862 over one million acres were purchased at graduated prices in Michigan, nearly three-fourths of this at 50 cents or less (Dallas Lee Jones, "The Survey and Sale of the Public Land in Michigan, 1815-1862" [unpublished M.A. thesis, Cornell University, 1952], p. 97).

12. David Ward, The Autobiography of David Ward (New York: Privately printed, 1912), p. 117.

13. By 1867 1 million acres had been purchased in Michigan by scrip, the maximum allowed by law. Yet when the final tally was made the total was 1,397,000. The overrun was eventually declared legal by Congress (Paul Wallace Gates, The Wisconsin Pine Lands of Cornell University: A Study in Land Policy and Absentee Ownership [1943; rpt. Madison: The State Historical Society of Wisconsin, 1965], pp. 30-31).

14. Greffenius, "Michigan Public Land Policy," p. 180.

15. The failure of these policies and their exploitation by speculators is the dominant theme of Jones, "Public Land in Michigan" (see, e.g., p. 199), and Lucile Kane, "Federal Protection of Public Timber in the Upper Great Lakes States," The Public Lands; Studies in the History of the Public Domain, ed. Vernon Carstensen (Madison: The University of Wisconsin Press, 1963), pp. 439-447; see also Paul W. Gates, Wisconsin Pine Lands, passim; Benson, "Logs and Lumber," pp.25 ff.

Of Wisconsin, Michigan, and Minnesota, Gates writes:

In them all, speculation and large-scale purchasing were widespread; "rings" were formed to control land sales; combinations were established which came to dominate the lumber industry; land values were forced upward . . . , and absentee ownership drained the pineries of their wealth (Wisconsin Pine Lands, p. viii).

As Gates points out, the land policies of the 1850's and 60's were contradictory. Some were based on a democratic, agrarian view of land and designed to provide cheap land for yeoman farmers. These policies ran counter to the idea that the government should take a leadership role in economic development and counter to the programs that supported internal improvements (Paul W. Gates, Wisconsin Pine Lands, p. 13, passim).

16. Greffenius, "Michigan Public Land Policy," p. 169.

Under the Graduation Act whole townships of northern Michigan were available at reduced prices (Jones, "Public Land in Michigan," pp. 96-97).

17. Anita Shafer Goodstein, Biography of a Businessman: Henry W. Sage, 1814-1897 (Ithaca: Cornell University Press, 1962), pp. 121-122.

In a letter to George Hotchkiss, Alfred A. Dwight reminisced about his trip up the Au Sable River c. 1860; he remembered that the land was "practically unexplored, but the projected extension of the Michigan Central railroad led me to believe in its future development" (quoted in George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest [Chicago: George W. Hotchkiss & Co., 1898], p. 62).

18. The federal government did, however, double the minimum price of federal land within the bounds of the railroad land grants to \$2.50 per acre. Furthermore, when the federal land within the grant area was restored to the public market (it had been removed while the railroads located their grants) this land was put up at auction, as was all federal land when first proclaimed for sale. Occasionally this land sold at auction for much more than the \$2.50 per acre minimum selling price (Benson, "Logs and Lumber," p. 30).

19. Clam Weekly News, 22 June 1872, quoted in William

R. Peterson, The View From the Courthouse Hill (Philadelphia: Dorrance, 1972), pp. 29-30.

20. Catalogue of 525,000 Acres of Pine Timber Lands Belonging to the Saint Mary's Falls Ship Canal Company (Detroit: Advertiser and Tribune Print, [1863]), pp. viii-ix.

21. Catalogue of 525,000 Acres, p. xiii.

22. Hannah, Lay & Co.'s 1854 purchase of 7,039 acres from the St. Mary's Falls Ship Canal Company totaled \$56,217 with only \$9,855 (or 18%) as a down payment (Charles J. Wolfe, "Hannah, Lay and Company, A Study in Michigan's Lumber Industry" [unpublished M.A. thesis, Wayne University, 1938], pp. 48-49).

The land grant railroad and canal companies were not able to sell all of their land at first. See, e.g., Grand Rapids and Indiana Railroad Company, Guide to the Lands in the State of Michigan, Now For Sale, Comprised in the Grant of Over One Million Acres to the Grand Rapids and Indiana Railroad Company (Grand Rapids: M.H. Clark, 1874; St. Mary's Falls Ship Canal Company, "List of Unsold Land Groups," 1 January 1864, Box 24, Michigan-California Lumber Company Collection, Michigan Historical Collections, Bentley Historical Library, The University of Michigan.

23. A few states, notably New York, ignored or avoided this provision. A trustee acquired land with the scrip and managed the holdings. When the land was eventually sold the profits went to support the colleges. In New York the wisdom and hard work of Ezra Cornell turned one of the largest land speculations in the history of the United States into an enormously profitable investment for the university that bears his name, see Paul W. Gates, The Wisconsin Pine Lands.

The proceeds from the compulsory sale of this scrip went to the state's agricultural colleges. Yet the act specified that only the interest earned on the principal could be spent by the colleges. This was a further inducement to sell the scrip as soon as possible (Paul W. Gates, Wisconsin Pine Lands, p. 28).

24. The early scrip sales by states drew prices of 50 to 55 cents an acre. Once the bulk of the scrip had been sold the speculators who owned most of it conspired to inflate the market price. By 1867 the price of scrip had risen to \$.90 to 1.00 per acre (Paul W. Gates, Wisconsin Pine Lands, pp. 27-29, 58).

25. Goodstein, Biography of a Businessman, p. 138.

26. Gleason F. Lewis of Cleveland reportedly controlled roughly 5 million acres worth of agricultural scrip (Paul W. Gates, Wisconsin Pine Lands, p. 30).

27. Warrant prices were roughly \$1.10 to \$1.15 during

the mid-1850's, but after the Panic of 1857 prices were depressed. During 1859-1860, quotes in the Detroit Daily Advertiser for 160 acre warrants were as low as \$.712 per acre. Warrant prices rose again in the mid-1860's as the demand for Lake States pine land increased (Benson, "Logs and Lumber," p. 35; Wolfe, "Hannah, Lay and Company," p. 47; Paul W. Gates, Wisconsin Pine Lands, p. 8).

28. Benson, "Logs and Lumber," p. 30, fn. 9.

29. Benson, "Logs and Lumber," pp. 30-37.

30. Wolfe, "Hannah, Lay and Company," pp. 46-51.

31. See chapter 4 for an extended treatment of the representativeness of Blodgett as a lumberman.

32. Blodgett land ownership data were collected from Blodgett's land books, Vol. I (1870 -1879) and Vol. II (1880 - 1889), Michigan-California Lumber Company Collection; the U.S. Land Office Tract Books, miscellaneous volumes; and 19th century county atlases.

33. Blodgett paid 64 cents an acre for 440 acres of warrants in 1862 in Chicago; \$1.00 an acre for 880 acres in Detroit, 1864; and \$1.13 an acre for 408 acres, Detroit, 1867. A receipt in Blodgett's papers records the sale of 3200 acres of warrants to a John McNab in New York City in 1864 for \$1.01 per acre (Delos A. Blodgett, Receipts, Box 24, Michigan-California Lumber Company Collection).

34. The odd-numbered sections of these townships were part of the Grand Rapids and Indiana Railroad's land grant. The pattern of large tracts and concentrated holdings can be seen in any 19th century county atlas of northern Michigan, see, e.g., Atlas of Wexford County (Chicago: E.L. Hayes, 1889).

35. In 1854 David Ward located land near Otsego Lake for a Detroit firm (David Ward, Autobiography, p. 76).

36. "Cork" pine was the best grade of pine, so called because it floated high in the water. "Sap" pine was inferior; it had more branches and heavier pitch. Michigan Forestry Commission, Report of the Directors 1 (1887/8), 30; L.G. Sorden, Lumberjack Lingo (Spring Green: Wisconsin House, 1969) p.27; William G. Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 (Glendale, California: Arthur H. Clark, 1953), pp. 46-47.

37. David Ward, Autobiography, p. 66.

38. Benson, "Logs and Lumber," pp. 52-3; Goodstein, Biography of a Businessman, p. 136.



39. Lumberman's Gazette, November 1872, p. 13.

40. Letter from Hackley and McGordon to Erastus Corning, Albany, N.Y., 16 August 1871, Letterbook #1, p. 179, Hackley & Hume Collection, Archives and Historical Collections, Michigan State University.

According to the Canal Company auction catalogue this parcel of 1,706 acres ran 12 M per acre (Catalogue of 525,000 Acres, p. 134).

41. In July 1866 Blodgett gave a John McNab of New York State notes for \$8675 secured by an unspecified mortgage, see footnote #27 above. Two weeks later Blodgett purchased roughly 10,000 acres of pine land from the government with agricultural scrip and land warrants. While the notes were due in 1867-69 Blodgett paid only the interest on them until August 1875, when he paid them off. In 1872 Blodgett was also behind in his payments to the Jackson, Lansing, and Saginaw Railroad Company on his 1869 debt for land of over \$8600. Letter from O.L Barnes to Delos A. Blodgett, 5 February 1872, Blodgett Correspondence, Michigan-California Lumber Company Collection.

42. David Ward, Autobiography, p. 90, passim.

43. See, for example, John Denis Haeger, The Investment Frontier: New York Businessmen and the Economic Development of the Old Northwest (Albany: State University of New York Press, 1981); William B. Gates, Jr., Michigan Copper and Boston Dollars: An Economic History of the Michigan Copper Mining Industry (1951; rpt. New York: Russell & Russell, 1969).

44. Frederick Merk, Foreward to The Frontier in American Development; Essays in Honor of Paul Wallace Gates, ed. David M. Ellis. (Ithaca: Cornell University Press, 1969), p. xi.

45. Neu, "Mineral Lands," pp. 167-169.

46. C.B. Headley, "The Pine Forest in Michigan," Lumberman's Gazette, July 1872, p. 2.

47. Lewis Mumford, Technics and Civilization (1934; rpt. New York: Harcourt, Brace and World, 1963), p. 110.

48. Joseph F. Proctor, Diary, Unnumbered memo page, 1871; 22 November 1871; 10 January 1871; Joseph F. Proctor Collection, Michigan Historical Collections, Bentley Historical Library, the University of Michigan.

49. Joseph F. Proctor, Speech to the Osceola County Old Settlers Society, 1892, pp. 1-2, Proctor Collection; Rector, Log Transportation, p. 77.

Removable handles were a relatively new innovation in the

early 1870's. Joseph Proctor remembered years later that they were just being introduced during the 1871/72 season on the Flat River (Joseph F. Proctor, "Family History," p. 157, Proctor Collection). Saw handles had previously been riveted onto the saw itself.

50. The use of cross-cut saws in felling was said to improve logging productivity as little as 10 percent, and as much as 100 percent; see Ralph Clement Bryant, Logging: The Principles and General Methods of Operation in the United States (New York: John Wiley & Sons, 1913), p. 93; Robert F. Fries, Empire In Pine, The Story of Lumbering in Wisconsin, 1830-1900 (Madison: State Historical Society of Wisconsin, 1951), p. 33. Cross-cut saws cost about \$6.00 each (Proctor Diary, Memo page, 1871; Delos A. Blodgett, Receipts, Evert Hardware Store Company, Box 24, Michigan-California Lumber Company Collection).

51. For example, Proctor Diary, 14 November 1870, 12 February 1872a; Rector, Log Transportation, p. 206; George Baker Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949), p. 113; Benson suggested that saws were used in felling by 1870, but cites no evidence, "Logs and Lumber," p. 119.

52. Based on a reconstruction of the day-to-day labor and production of Proctor's 1870/71 and 1971/72 camps by the author from Proctor Diaries.

53. John Nelligan described a logging crew with five men in John Emmett Nelligan, as told to Charles M. Sheridan, The Life of a Lumberman ([n.p.]: [n.n.], 1929), pp. 70-71.

54. Rector, Log Transportation, pp. 74-75. Early versions of these sleds were called travois, or go-devils and were made out of the fork of a tree trunk.

55. Richard G. Wood, A History of Lumbering in Maine, 1820-1861 (Orono, Maine: University of Maine Press, 1935), p. 88.

56. Proctor Diary, 10 December 1871.

57. Proctor Diary, 4 December 1871.

58. According to David Ward, an Elk Rapids company hauled logs by sleigh up to 14 miles in 1873 (Autobiography, p. 74).

59. The transition between skidding entire trees to the riverside and the use of skidways and sleighs is not altogether clear. Certainly by 1870 the latter procedure was widely accepted. There is only scattered evidence of trees being bucked

into logs at the rollway (W.J. B[eal], "Cutting and Removing Logs for Lumber," Report of the Directors, State Forest Commission of Michigan, 1 [1887-1888], 30-33). Rector concludes that sawing at the rollway was common before the Civil War and that afterwards it was replaced by bucking at the stump and the use of sleighs (Log Transportation, pp. 72-5). The practice of hauling whole, limbed trees to the rollway came to the Lake States as part of the Maine-New Brunswick logging tradition and there seems to be little reason to doubt that it was widely adopted at first. There were three factors that made this practice short-lived: the large size of Michigan white pine, the increasing distance between stump and stream, and the small demand for ton-timber in the Michigan forest product (Hotchkiss, History of the Lumber Industry, p. 57). Benson's study does not speak to this issue.

60. Willis C. Ward, "Reminiscences of Michigan's Logging Days," Michigan History, 20 (1936), 307.

61. Lumberman's Gazette, 2 (1873), 91.

62. Benson, "Logs and Lumber," p. 122; Rector, Log Transportation, p. 192.

63. Any common farm horse might be put to work in a logging camp, Willis C. Ward, "Reminiscences," p. 307; John W. Fitzmaurice, "The Shanty Boy", or Life in a Lumber Camp (1889; rpt. Berrien Springs, Michigan: Hardscrabble Books, 1979), p. 71. In 1866 Delos A. Blodgett purchased a number of horses at roughly \$210 each (Letters, 23 November 1866, and 30 November 1866, Box 24).

64. Bryant, Logging, pp. 162-163.

65. Hudson Keenan, "America's First Successful Logging Railroad," Michigan History, 44 (1960), pp. 293-5; Rector, Log Transportation, p. 195.

66. Proctor Diary, 13 January 1871.

67. Proctor Diary, 3 March 1871.

68. For example, when the logs per M statistic is high (e.g., 10 logs per M) and few feet have been cut per acre (e.g., 5 M per acre), we can speculate that the forest is of poor quality and that logging had a limited impact upon the forest.

69. Letterbook #1, p. 181, 17 August 1871; Letterbook #2, pp. 16, 168, Hackley & Hume Collection.

In 1871 Hackley and McGordon purchased 9.5 million feet of logs that averaged 3.91 logs per M. They purchased these logs from 8 different concerns; the average log size ranged from 3.37 per M to 4.31 per M (Letterbook #1, p. 140, Hackley & Hume Collection).

For reminiscences of tree sizes see Edson H. Mudge, "Pioneer Sketches: Personal Recollections of Some Things That Happened in the Far-Away Seventies," Michigan History, 30 (1946), 61; Josiah Littlefield, Josiah Littlefield: Lumberman--Conservationist, An Autobiography ([n.p.]: [n.n.], [n.d.]), p. 63. The Port Huron Observer reported a log that scaled 2700 feet, 9 September 1848 (quoted in Benson, "Logs and Lumber", p. 122). The Muskegon Journal reported a tree that yielded nine logs, each 16 feet in length, 17 February 1880.

70. During the 1870/71 season Proctor cut 9711 logs, but the total scale went unrecorded. Proctor was hired that season to cut 2.5 million feet, and if we assume that the 9711 logs fulfilled his contract, these logs would measure 3.88 logs per M. Two weeks before the end of the season Proctor estimated that he had cut 8312 logs that measured about 2.25 million feet. These figures give an average of 3.69 logs per M. Given the similarity of the logs per M figures and the requirement of Proctor's contract (which he had nearly met two weeks before the end of the season), it seems fair to assume that the seasonal cut must have been quite close to 2.5 million feet.

The acreage for this season is unknown. He noted explicitly a southeast forty, a northeast forty, and a northwest forty; he also noted "cutting on the west 40 at the sw corner" (Proctor Diary, 10 February 1871). On January 4th Proctor had finished with the northwest forty and the southeast forty, and he was cutting on the northeast forty. The camp logged until early March, and it was in February that Proctor mentioned the "west 40." Proctor spent about six weeks cutting the northwest forty and southeast forty (21 November to 31 December), and the latter forty contained poor timber. In the eight weeks of logging in the New Year Proctor cut the northeast forty as well as mentioning the "west 40". It seems very likely that Proctor was logging a quarter section, that is 160 acres, or four forties (and the "west 40" was the southwest forty). If this was the case, 2.5 million feet over 160 acres would average 15.6 M per acre. If we subtract the southeast forty, the quarter-quarter section with the poor timber, the yield of the other 120 acres rises to 19.2 M per acre.

71. Proctor Diary, 2, 10, 15, and 21 November 1871.

72. Wolfe, "Hannah, Lay and Company," p. 38; Bryant, Logging, p. 9; Catalogue of 525,000 Acres, p. xi.

73. Hackley & Hume Letterbook #1, p. 140.

During the 1881/82 season C. H. Hackley and Co., a Muskegon mill firm, let 30 or 40 contracts with individuals loggers along the Little Muskegon. These contracts were for 30 to 300 M (Logging Contract Book, Vol. 195, Hackley & Hume Collection).

74. Lumberman's Gazette, September 1872, p. 20.

75. In the mid-1860's Hannah, Lay and Company, a successful lumber firm in Traverse City, Michigan, was said to have had 150 to 200 men at work in 8 camps on the Boardman River. In her study of early Michigan lumbering, Barbara Benson concluded that the typical camp size of the mid-1860's was 25 men, with a seasonal output of 50 M per man, for a camp total of 1,125 M ("Logs and Lumber," p. 195). The production of Delos A. Blodgett's camps along the upper Muskegon River illustrates the growing annual output of logging camps. The following table gives the annual output of some of Blodgett's camps at this time.

OUTPUT IN D. BLODGETT CAMPS 1870-1877

1870/71	Average of 3 camps	1,164 M
1871/72	Average of 3 camps	1,754 M
1872/73	Hersey camp	1,780 M
1873/74	Smith's camp	3,206 M
	Max's camp	2,401 M
	Hersey camp	2,308 M
1875/76	Quillan's camp	3,898 M
	Max's camp	4,134 M
1876/77	Quillin's camp	5,656 M
	Max's camp	4,458 M

Source: Hackley & Hume Letterbooks #1, p. 181, 17 August 1871; #1, p. 16; #3, p. 59, 13 July 1876; Proctor Diary, 27 January 1874, 1 March 1874.

For accounts of camp size and output see also: Lumberman's Gazette, December 1872, p. 21; An account of E. L. Pratt's operations, 1888, reprinted in Forest B. Meek, Michigan's Timber Battleground, A History of Clare County, 1674-1900 ([n.p.]: Clare County Bicentennial Historical Committee, 1976), pp. 96-100; John Vogel, "Memoir of John Vogel, Immigrant and Pioneer," Michigan History, 30 (1946), 558; The Lumberman's Gazette, November 1872, p. 8; Fitzmaurice, "The Shanty Boy", p. 122; Benson, "Logs and Lumber," p. 195.

Benson concluded that the biggest change in logging from 1855 to 1870 was the increased scale of production ("Logs and Lumber," p. 189). The scale of logging was growing, but it was limited by the small size of timber parcels, short logging season, simple techniques, problems in supplying isolated camps, and lumbering's long "financial season" (Rector, Log Transportation, pp. 34-5). Though lumber concerns were amassing large holdings, they were cutting the isolated 80 or 160 acre parcels of choice "cork" pine they had purchased during the 1850's. Typically the large, concentrated parcels accumulated in the 1860's were not cut until the 1880's. See, e.g., Goodstein, Biography of a Businessman, p. 79.

76. The following paragraphs are based largely on a

detailed reconstruction of the 1870/71 and 1871/72 logging camps of J. Proctor from his diaries and letters (Proctor Collection).

77. Proctor Diary, Unnumbered memo page, 1871.

78. During the 1871/72 season Proctor recorded the daily cut ten times, for an average of 17.8 logs cut per man/day. Three French Canadians worked ten days as a cutting crew that season and averaged 22.4 logs per man/day. They consistently exceeded the cut of the other crews. They were "Good Hands" (Proctor Diary, 18 February 1871; see also 16 January 1871 to 31 January 1871).

79. Proctor Diary, 5 January 1871.

80. Based on the modal camps, 12 men and .8 million feet (1860) and 25 men and 2 million feet in 1870.

81. Skidding productivity does not seem to have been limited by the rate of cutting. It is possible, however, that the teamster serviced a single cutting crew and that this affected his daily totals.

82. Proctor Diary, 5 January 1872.

83. Hackley & Hume Letterbook #1, 17 August 1871, p. 181.

Barbara Benson examined the manuscript censuses of 1860 and 1870 and found a wide range of average log prices (by county), as given by sawmill companies. In 1870 the range was \$4.47 to \$7.97, in 1860 \$2.29 to \$7.03. In general, log prices were higher in the southern counties, such as Wayne and St. Clair, and lower in the northern interior counties, such as Emmet and Osceola. The figures for Saginaw County are \$4.29 per M (1860) and \$6.83 per M (1870); they are emphasized here because of the dominant position of Saginaw in the lumber industry at this time (Benson, "Logs and Lumber," p. 210).

Rector provides the following estimation of logging costs (as carried by the Congressional Globe) in the Saginaw Valley c. 1870:

Stumpage	\$ .75
Logging	\$4.00
Driving/Booming	\$2.00
Milling	\$4.00
Shrinkage, & Misc.	\$1.00
	-----
Total	\$11.75

Source: The Congressional Globe, 24 May 1870, appendix, p. 311, quoted in Rector, Log Transportation, p. 20.

Average price for lumber in Chicago in 1869 was \$12 per M (Muskegon Chronicle, 1 December 1869).

84. David Ward claimed to have earned a profit of \$9.00 per M "for stumpage" (that is, after logging and milling costs were deducted) in 1863-4 (Autobiography, p. 117); see also Goodstein, Biography of a Businessman, pp. 77-78, 135, 180.

85. Goodstein, Biography of a Businessman, p. 138; Catalogue of 525,000 Acres, pp. viii-ix; American Lumberman, 6 January 1906, p. 21. See chapter 3 for an extended discussion of costs and profits c. 1870.

86. Proctor Diary, 2 March 1872, Proctor Collection; Stanley Lebergott, Manpower in Economic Growth: the American Record Since 1900 (New York: McGraw-Hill, 1964), p. 528.

Proctor was paid \$1.25 per M for cutting and skidding (Proctor Account Book, p. 13, Proctor Collection).

87. Martin Deming Lewis, Lumberman From Flint, The Michigan Career of Henry H. Crapo, 1855-1869 (Detroit: Wayne State University, 1958), p. 86; Benson, "Logs and Lumber," 190-194; Rector, Log Transportation, pp. 34-35, 88.

88. Hackley and Hume Letterbook #1, p. 212, 20 September 1871; Engberg, "Labor in the Lake States," pp. 312-313; see also "Statement of Logs Belonging to Hackley and McGordon Put Into Tamarack Creek Winter 1870 & 1871," Hackley & Hume Letterbook #1, 15 May 1871; Logging Contract Book, Vol. 195, Hackley and Hume Collection.

89. F. Clever Bald, Michigan in Four Centuries (New York: Harper and Row, 1954), p. 290.

90. William N. Sparhawk and Warren D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S. Department of Agriculture Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), p. 90.

At work in Montcalm County in October 1871, Joseph Proctor frequently noted that the forest was "very smoky" (Proctor Diary, 24 October 1871, Proctor Collection).

Fire was such a problem that David Ward later remembered offering another lumberman \$5000 in 1869 to postpone logging a parcel adjacent to Ward's because of the potential fire hazard, Ward, Autobiography, p. 125.

91. According to Forrest Meek, author of the county's only history (Timber Battleground, p. 73).

92. Willis C. Ward, "Reminiscences," p. 304. Often a single shanty served a number of purposes, for example smithing and carpentry.

93. See, e.g., Proctor Diary, 24 October and 31 October 1871.

94. According to Richard G. Wood, stoves had replaced

the caboose in Maine during the 1850's (Wood, Lumbering in Maine, p. 92). The caboose was still occasionally used in Michigan (Fitzmaurice, "The Shanty Boy," p. 54; Willis C. Ward, "Reminiscences," p. 304).

95. During the previous autumn (1870) Proctor built and furnished two shanties, and he was able to begin cutting within three weeks. These two shanties required an estimated 26 man/days of work. Construction man/days were calculated by the author from diary entries. Totals represent labor spent in actual building of shanties and labor spent in other ways to prepare the camp for logging, such as trips to town for tools or a trip to last year's camp to salvage lumber. Child labor counted as 1/2 man/day.

Fitzmaurice estimated that it took 10 to 12 days to build a camp in the 1880's ("The Shanty Boy", p. 23).

96. In the case of the Grand Rapids and Indiana Railroad, even the northern terminus was subject to interpretation, at least according to the railroad. Congress had stated that the line should run to "Traverse Bay," but the railroad company, which was interested in both acquiring a larger grant and building through the upper Manistee pinery, interpreted this to be Little Traverse Bay, rather than Grand Traverse Bay, which was Congress's intent (A.N. Bliss, "Federal Land Grants for Internal Improvements in the State of Michigan," Pioneer Collections, Report of the Pioneer Society of the State of Michigan, 7 [1886; rpt. 1904], p. 66).

There is frequent reference to the influence that lumbermen brought to bear on the location of railroad routes: Mancelona Herald, 21 July 1892, exchange from the Detroit Daily News; Hotchkiss, History of the Lumber Industry, p.

75. David Ward claimed to have influenced the location of the Jackson, Lansing, and Saginaw Railroad (Autobiography, p. 136).

97. See chapter 1 for a discussion of the sources of Michigan settlers.

98. Engberg, "Labor in the Lake States," pp. 30, 43, 56, 74-5, 224.

99. Proctor Diary, Memo page, 1871.

100. Ward, "Reminiscences," p. 308.

101. Fitzmaurice, "The Shanty Boy", p. 174.

102. Calculated by author from Proctor accounts and diary entries (Proctor Collection).

103. Lebergott, Manpower, pp. 529, 539.

104. Fitzmaurice suggested that a season's wages were



\$200 to \$400, but this seems quite high ("The Shanty Boy", p. 174). Assuming the high monthly wage figure of \$45, and a long season of 6 months, a shanty boy would still earn only \$270.

105. Proctor Diary, 20 October 1873.

106. Proctor Diary, 12 November 1873.

107. For an important study of the views (or ideas) of work, see Daniel T. Rodgers, The Work Ethic in Industrial America, 1850-1920 (Chicago: The University of Chicago Press, 1978).

108. The following sketch is taken from Vogel, "Memoir," pp. 546-560.

109. Vogel, "Memoir," p. 557.

110. See also Mudge, "Pioneer Sketches," 527-533.

111. Vogel, "Memoir", p. 559.

112. Background history of Proctor and his family from Proctor, "Family History," and Speech to the Osceola County Old Settlers Society, Proctor Collection.

113. Proctor, "Family History," p. 43.

114. Proctor, "Family History," p. 57.

115. Proctor, "Family History," p. 57.

116. Proctor Diary, 30 July 1870.

117. Proctor Diary, 24 September 1869.

118. Proctor Diary, 14 June 1870.

119. Proctor Diary, 17 November 1870.

120. Proctor Diary, 22 April 1877.

121. Joseph Proctor Account Book, pp. 20, 25. Occasionally the boys and Joseph worked at odd jobs with different wages. The totals include all wages, and the common wage rate is noted.

122. Lebergott, Manpower, pp. 528, 529. Annual farm income is less well known, but would have been much less.

123. In the fall of 1876 Clyde (11 years) and Dan (15) were at work in a logging camp; Fred (19), Frank (18), and Charlie (16) were at work in local sawmills (Proctor Diary, 18 October 1876, 29 October and 23 December 1876).

125. Proctor Diary, 22 April 1877.

126. Proctor Diary, 3 December 1878.

### CHAPTER THREE

1. Franklin B. Hough, Report Upon Forestry (Washington: Government Printing Office, 1878), p. 524; Barbara Ellen Benson, "Logs and Lumber: The Development of the Lumber Industry in Michigan's Lower Peninsula, 1837-1870" (unpublished Ph.D dissertation, Indiana University, 1976), pp. 196-197; Hazen L. Miller, The Old Au Sable (2d. ed.; Grand Rapids: William B. Eerdmans, 1964), p. 37; Muskegon Reporter, 10 February 1860, p. 1; Saginaw Board of Trade, Annual Review, 2 (1882), 6.

2. For a good review of early Michigan railroad construction, see Willis F. Dunbar, All Aboard! A History of Railroads in Michigan (Grand Rapids, Michigan: William B. Eerdmans, 1969).

3. John Emmett Nelligan, The Life of a Lumberman (Privately printed, 1929), p. 57.

4. Muskegon Chronicle, 1 December 1869, p. 3. For similar sentiments see Muskegon News & Report, 15 March 1870, p. 4.

5. On the importance of rail links for central place viability in the 19th century see Edward K. Muller, "Selective Urban Growth in the Middle Ohio Valley, 1800-1860," Geographical Review, 66 (1976), 178-199.

6. Lumberman's Gazette, October 1872, p. 13.

7. Many of the counties exhibited extraordinary growth. This was due to the "boom town" character of the counties' mill towns. Alpena County, for example, grew from 291 people in 1860 to 4807 people in 1874 (with 1/2 the area of 1860); Cheboygan County 599 (1860) to 3070 (1874); Manisee County 874 (1860) to 8471 (1874). Cheboygan County increased its number of improved acres from 600 in 1860 to 2900 in 1874, a rate of increase of 483 percent (Census of the State of Michigan, 1874, [Lansing, W.S. George, 1875], p. lxxiii; and Statistics of the State of Michigan, Collected for the Ninth Census of the United States, 1870 [Lansing: W.S. George, 1873], p. 310.

8. Census of Michigan, 1874, pp. 281-282; Statistics of Michigan, 1870, pp. 416-421.

9. James Bruce Smith, "Lumbertowns in the Cutover: A Comparative Study of the Stage Hypothesis of Urban Growth" (unpublished PhD dissertation, University of Wisconsin, 1973), pp. 43-66.

10. Mill owners from Muskegon and Newaygo argued the relative costs of rivermouth vs. upriver saw milling in the Muskegon Papers in 1859, see, e.g., Muskegon Reporter, 29 July 1859, p. 2.

11. Lumber from Saginaw and East Saginaw was lighted down the Saginaw River past the Carrolton Bar until the mid-1870's when this bar was dredged, Saginaw River Improvement Association, Saginaw River Improvement (East Saginaw: Daily Enterprise Steam Printing House), p. 6.

12. Hough, Report Upon Forestry, 1878, p. 516; Hackley & Hume Letterbook #2, p. 168; "Statement of Logs Belonging to Hackley & McGordon. . . ," 15 May 1871, Letterbook #1, p. 140, Hackley & Hume Collection, Archives and Historical Collections, Michigan State University; Muskegon Journal, 30 December 1879, Supplement, p. 1; William Gerald Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 (Glendale, California: The Arthur H. Clark Company, 1953), pp. 17-21.

Of course driving charges reflected the distance and difficulty of the drive; logs driven out of small tributaries and then down a major river typically incurred higher charges. In 1871 Allen Macomber sold Hackley and McGordon over 2 million feet that had to be first driven out of the Little Muskegon River and into the Muskegon River. Drive charges for these logs were \$1.25 (Hackley & Hume Letterbook #1, p. 212).

13. Saginaw Board of Trade, Annual Review, 12 (1892), 56; Rector, Log Transportation, p. 80.

A common theme in the literature concerns the movement of sawmills closer and closer to the stump as steam engines freed mills from riverside locations and as the spread of railroads allowed the transport of logs and lumber by rail. In general, this was not the case in Michigan and certainly not before 1875. In Pennsylvania and the Upper Mississippi Valley lumber was delivered to market by raft and later by rail; ships were not used. In this case mills were freer to move upstream because there was no point of transshipment to a vessel (Robert F. Fries, Empire in The Pine: The Story of Lumbering in Wisconsin, 1830-1900 [Madison, Wisconsin: The State Historical Society of Wisconsin, 1951], p. 64).

For treatment of location theory and the lumber industry, see Smith, "Lumbertowns in the Cutover," pp. 32-7. For a basic review of Alfred Weber and resource location models, see Peter Haggett, Andrew d. Cliff, and Allan Frey, Locational Analysis in Human Geography (2d ed.; New York: John Wiley & Sons, 1977), pp. 177-189; see also Ian F.E. Hamilton, "Models of Industrial Location," Models in Geography, ed. R.J. Chorley

and P. Haggett (London: Methuen, 1967), pp. 361-424.

14. Rector, Log Transportation, pp. 126-130; Benson, "Logs and Lumber," pp. 202-206; David Ward, The Autobiography of David Ward (New York: Privately printed, 1912), pp. 125-126.

Michigan was the last of the Lake States to develop successful boom companies, due largely to court challenges (Rector, Log Transportation, pp. 125-7).

For a general introduction to river driving, see Clifford Allen, ed., Michigan Log Marks, Their Function and Use During the Great Michigan Pine Harvest (East Lansing: Michigan Agricultural Experiment Station, 1941). Steward Edward White, The Riverman (New York: McClure, Phillips, 1908), though a novel, is useful.

15. Muskegon Journal, 30 December 1879, Supplement, p. 1.

16. Rector, Log Transportation, p. 128.

17. Anita S. Goodstein, Biography of a Businessman: Henry W. Sage, 1814-1897 (Ithaca: Cornell University Press, 1962), p. 99-100.

18. George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest (Chicago: George W. Hotchkiss, 1898), pp. 262-3; W. Neil Thorton, Iosco County and Lake Huron Shore Log Marks (Tawas City, Michigan: Printer's Devil Press, 1981), p. 19; Allen, ed., Michigan Log Marks, pp. 48, 52-3; Lumberman's Gazette, October 1872, p. 23.

Muskegon Boom Company capitalization had grown to \$200,000 by 1872 (Lumberman's Gazette, December 1872, p. 19).

19. Joseph F. Proctor, "Family History," pp. 104-105, Joseph F. Proctor Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan. See also Joseph F. Proctor Diary, 28 April 1872, Proctor Collection; Rector, Log Transportation, p. 96-97.

Proctor mentions peaveys in this account, written in 1909, but it is likely his memory was poor. Little data is available, but it seems that peaveys did not come into wide use in Michigan until the 1880's (Rector, Log Transportation, pp. 206-7).

20. Lumberman's Gazette, July 1872, p. 6; Rector, Log Transportation, pp. 78-80; John W. Fitzmaurice, "The Shanty Boy" or Life in a Lumber Camp (1889; rpt. Berrien Springs, Michigan: Hardscrabble Books, 1979), pp. 40-45.

There are early reports of logs being formed into rafts at rollways and floated downstream, but this procedure had largely died out after the Civil War. Neither Rector nor Benson mention log rafting in Michigan. Lumberman's Gazette, 2 (1872), p. 47; Michigan Agricultural Society, Transactions, 7

(1855), 828.

21. Fitzmaurice's terms ("The Shanty Boy", pp. 44-45.

22. Proctor's Diary, 14 April 1872. This was not a large jam. For example, a jam described in the Muskegon Journal of 2 June 1880 (p. 8.) as the largest ever witnessed at Big Rapids was 6 - 20 feet high and stretched nine miles from Big Rapids to Paris.

23. Rector, Log Transportation, pp. 93-98; George Baker Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949), pp. 168-172; Fitzmaurice, "The Shanty Boy", pp. 45-8; Allen, ed., Michigan Log Marks, pp. 54-5; Proctor Diary, April 1869.

Joseph Proctor worked the river drive on the Flat River for a number of years around 1870. In February 1869 he noted in his diary that he had been "hired out . . . to run logs as section Boss from Smiths bridge to the Bunk mill pond" (Proctor Diary, 25 February 1869). See also Proctor Diaries, 8 March 1871; April 1869, for a river driving account; and 24 April 1869, in which he mentions "the rear sackers."

24. Lumberman's Gazette, July 1872, p. 6; A. S. Draper, "Reminiscences of the Lumber Camp," Michigan History, 14 (1930), 438-441; Fitzmaurice, "The Shanty Boy", pp. 42, 46, 133-134. Rector, Log Transportation, pp. 95-97; Engberg, "Labor in the Lake States Lumber Industry," pp. 169-171; Letter from Mason and Pingree to Delos Blodgett, 9 July 1869, Box 24, Michigan-California Lumber Company Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan.

Hackley & McGordon ordered two wall tents "for log drivers" in 1873 that were 14 x 20 feet (Letter from Hackley & McGordon to Finney Bros., Chicago, 28 March 1873, Hackley & Hume Letterbook #2, p. 151.

25. Muskegon Chronicle, 4 August 1869, p. 3, (exchange from Newaygo Republican); Muskegon News & Report, 28 June 1870, p. 1; 5 July 1870, p. 1; 9 August 1870, p. 1, 2 August 1870, p. 1; Letter from Hackley & McGordon to Delos A. Blodgett, 29 July 1877, Hackley & Hume Letterbook #3, p. 189; Letter from Hackley & McGordon to Thomas Byrne, 21 September 1877, Hackley & Hume Letterbook #3, p. 235; Rector, Log Transportation, pp. 183-186. Fewer logs were boomed in 1870 than in 1869.

Proctor recorded that the 1869 drive on the Flat River began on 29 March and finished the last days of April (Proctor Diaries, March and April 1869, passim).

26. Rector, Log Transportation, pp. 185-6.

27. Lumberman's Gazette, July 1872, pp. 6, 8, and August 1872, p. 1.

28. Rector quotes the Saginaw Daily Courier, 9 October 1868 (Log Transportation, pp. 115-6).

29. Lumberman's Gazette, July 1872, p. 6, November 1872, p. 21; Fitzmaurice, "The Shanty Boy", p. 51; Rector, Log Transportation, p. 115-116, 128, 136, 178-179; Lumberman's Gazette, December 1872, p. 19. Log marks were registered in all counties that the logs passed through (Allen, ed., Michigan Log Marks, p. 13).

Because the boom companies had to leave the river open for general navigation, retractable booms were used. A "sheer" boom, with fins, was one type used (see Rector, Log Transportation, p. 123, fn. 55; see also description in White, The Riverman, p. 225).

30. Ralph W. Stroebel, Tittabawassee River Log Marks (Saginaw, Michigan: Saginaw Public Libraries, Eddy Historical Collection), pp. 11-12.

31. Fitzmaurice, "The Shanty Boy", p. 51; Lumberman's Gazette, November 1872, p. 21; Allen, ed., Michigan Log Marks, p. 54; Muskegon Chronicle, 6 February 1869, p. 1.

32. Though the boom companies earned grand profits for their stockholders, by the late 1870's the size of these profits was limited by law, and rebates were often paid to the client mills. Goodstein, Biography of a Businessman, pp. 99-100.

33. Thomas R. Cox, "Transition in the Woods: Log Drivers, Raftsmen, and the Emergence of Modern Lumbering in Pennsylvania," Pennsylvania Magazine of History and Biography, 104 (1980), 363.

34. For an overview of sawmilling 1855 to 1870, see Benson, "Logs and Lumber," pp. 211-240.

35. Truman B. Fox, History of the Saginaw Valley, Its Resources, Achievements, and Possibilities (East Saginaw: Daily Courier Steam Job Print, 1868), p. 34.

36. Lumberman's Gazette, July 1872, p. 12.

37. During a normal workday the saws averaged less than these rates due to breakdowns, maintenance, and the loading and unloading of logs. Northwestern Lumberman, 20 October 1886, p. 6; Hotchkiss, History of the Lumber Industry, p. 96; C.H. Hackley to H. Disston & Sons, 27 September 1884, Hackley & Hume Letterbook #5, p. 799.

38. Lumberman's Gazette, July 1872, pp. 12, 18, and

11 May 1881, p. 2. See also Benson, "Logs and Lumber," pp. 227-228; Fries, Empire in the Pine, p. 61.

39. Letter from Hackley & McGordon to Branch, Crooks, & Co., St. Louis, 21 February 1873, Hackley & Hume Letterbook #2, p. 137; Lumberman's Gazette, 15 October 1879, p. 5; Muskegon News & Report, 12 July 1870, p. 1, 19 July 1870, p. 4.

40. T. Fox, History of the Saginaw Valley, p. 34.

41. Hotchkiss, History of the Lumber industry, pp. 96-97; Lumberman's Gazette, October 1872, p. 17, 15 October 1879, p. 5; Fries, Empire in Pine, pp. 63-64; Benson, "Logs and Lumber," p. 228.

42. See, e.g. Lumberman's Gazette (from the Flint Globe), October 1872, p. 23, and November 1872, p. 12. Live rollers and transfers were not available until the late 1870's. Lumberman's Gazette, 28 October 1879, p. 5, and 5 March 1879, pp. 24-5.

43. History of Mason County, Michigan (Chicago: H.R. Page, 1882), pp. 50-52; Muskegon Chronicle, 12 May 1869, p. 3; Muskegon News & Report, 28 June 1870, p. 1; Benson, "Logs and Lumber," p. 231; Cadillac Evening News, 12-13 June 1872, Special Centennial Edition, p. A-8 (quoting Clam Lake News of June 1872).

44. Benson, "Logs and Lumber," pp. 210, 239-240; Charles J. Wolfe, "Hannah, Lay, and Company, A Study of Michigan's Lumber Industry" (Unpublished M.A. Thesis, Wayne State University, 1938), pp. 66-67; Hackley & Hume Letterbook #2, p. 16, #1, p. 181.

45. Muskegon News and Report, 4 October 1870, p. 1; Letter from Hackley and Hume to Fisher, Perley, & Co., 23 July 1872, Hackley & Hume Letterbook #2, p. 31; see also Hackley & Hume Letterbook #2, pp. 23, 25, 28, 31, 69, 103.

46. Lumberman's Gazette, September 1872, p. 1., August 1872, p. 4; Wolfe, "Hannay, Lay and Company," pp. 66-67; Muskegon News & Report, 6 Dec. 1870, p. 1; Muskegon Chronicle, 1 Dec. 1869; Goodstein, Biography of a Businessman, pp. 77-78; Muskegon Report, 6 June 1862, p. 1; Muskegon News & Report (from the Chicago Post), 4 October 1870, p. 1; Letter Hackley & McGordon to John Schroeder, Milwaukee, 18 November 1872, Hackley & Hume Letterbook #2, p. 103; Letter from Hackley and McGordon to Fisher, Perley, & Co., 23 July 1872, Hackley & Hume Letterbook #2, p. 31.

"Uppers" comprised 1st, 2nd, and 3rd clear. For grades and inspection guidelines, see "Rules for Inspecting Lumber in the Saginaw District," Lumberman's Gazette, August 1872, p. 12.

47. An 1870 survey of Muskegon mill capitalization showed an average of \$46,000, \$35,000 mode, and \$45,000 median (Muskegon News and Reporter, 6 December 1870, p. 1; also Benson, "Logs and Lumber," p. 235).

The average mill investment in Saginaw and along the eastern shore of Michigan in 1872 was over \$49,000 (N = 122), according to the Lumberman's Gazette, July 1872, p. 12.

48. Goodstein, Biography of a Businessman, p. 129.

49. Benson, "Logs and Lumber," pp. 234-235.

50. See, e.g., Muskegon Chronicle, 13 October 1869, p. 3.

51. Hotchkiss, History of the Lumber Industry, pp. 176-177; Benson, "Logs and Lumber," pp. 236-238. See also Gregory S. Kealey, Toronto Workers Respond to Industrial Capitalism, 1867-1892 (Toronto: University of Toronto Press, 1980), p. 33; James M. Gilmour, Spatial Evolution of Manufacturing: Southern Ontario, 1851-1891 (Toronto: University of Toronto Press, 1972), pp. 189-194.

While industrial leaders in the 1870's were generally of middle-class or upper-class background (Frances W. Gregory and Irene D. Neu, "The American Industrial Elite in the 1870's: Their Social Origins," Men in Business: Essays on the Historical Role of the Entrepreneur, ed. William Miller [New York: Harper & Row, 1962], pp. 193-211), this does not seem to have been the case in the lumber industry. According to Frederick W. Kohlmeyer a large proportion of successful 19th century lumbermen were from working backgrounds ("Northern Pine Lumbermen: A Study in Origins and Migrations," Journal of Economic History, 16 (1956), 529-538.

52. Goodstein, Biography of a Businessman, pp. 78,

99. Eastern Michigan mills often used excess waste to power pumps and boilers that converted subterranean brine into salt.

53. Benson, "Logs and Lumber," p. 240.

54. Goodstein, Biography of a Businessman, pp. 78-79.

55. Muskegon News & Report, 30 August 1870, p. 1; Goodstein, Biography of a Businessman, pp. 79, 135.

According to the 1870 census, 20 percent of the total value of the finished product of the saw mill industry was paid in wages, while 45% went to raw materials, leaving a gross profit margin of 35%. U.S., Ninth Census, 1870, Vol. 3, p. 534).

56. See, e.g., Lumberman's Gazette, October 1872, pp. 11, 13.

57. Muskegon Chronicle, 1 December 1869.



58. Hough, Report Upon Forestry, 1878, p. 449. The Albany figures used here include the trade of nearby W. Troy.

59. Fries, Empire in Pine, Pp. 82-83; see also Charles E. Twining, Downriver: Orrin H. Ingram and the Empire Lumber Company (Madison: State Historical Society of Wisconsin, 1975).

60. Frederick Merk, Economic History of Wisconsin During the Civil War Decade (1916; 2d ed., Madison: State Historical Society of Wisconsin, 1971), p. 60.

61. Hough, Report on Forestry, 1878, p. 449; The Albany Lumber Trade, Its History and Extent (Albany, N.Y.: Albany Argus, 1872), p. 11.

62. Albany Lumber Trade, p. 12.

63. For general review of Michigan lumber marketing see Benson, "Logs and Lumber," pp. 241-258.

64. Hough, Report on Forestry, 1878, pp. 541-542, 517.

65. Saginaw River Improvement, p. 6.

66. Hough, Report on Forestry, 1880, pp. 50-51.

67. Benson, "Logs and Lumber," pp. 246-7.

68. Albany Lumber Trade, p. 32; Goodstein, Biography of a Businessman, p. 71.

69. William N. Sparhawk and Warren D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929) p. 22.

70. Hotchkiss, History of the Lumber Industry, pp. 155-6.

For a stimulating discussion of 19th century marketing and the evolution from a merchant/wholesaler middleman system to the direct marketing of goods by the manufacturer, see Glenn Porter and Harold C. Livesay, Merchants and Manufacturers: Studies of the Changing Structure of Nineteenth-Century Marketing (Baltimore: The Johns Hopkins Press, 1971), pp. 1-12.

71. Lumberman's Gazette, August 1872, p. 11; September 1872, p. 15; Hotchkiss, History of the Lumber Industry, pp. 97-98; Fries, Empire in Pine, pp. 70-71.

In 1871 Hannah, Lay & Company built the City of Traverse, which would carry 640 MBF. It plied the Traverse City--Chicago route. Cost was \$85,000; length, 225 feet (Wolfe,

"Hannay, Lay and Company," pp. 57-58).

The barges seem to have been used more by the Saginaw and Bay City mills for the longer trips to eastern points. Schooners were used by the western Michigan mills for the shorter trips to Milwaukee and Chicago. It is only 110 miles from Muskegon to Chicago. The Muskegon Chronicle of 16 June 1869 (p.3) expressed surprise at the size of Saginaw barges. Geo. Lewis laments the passing of the sailcraft and the new age of steamers and barges in his article "Transportation of Lumber," Lumberman's Gazette, September 1872, p. 15.

72.. Hackley & McGordon, and C.H. Hackley & Co., Shipping Registers, Vol. 193, pp. 8-12; Vol. 194, pp. 6-8, Hackley & Hume Collection.

73. Muskegon News & Report, 19 July 1870, p. 1.

74. This schedule was unusual and drew comment (Muskegon News & Report, 20 September 1870, p. 1).

75. Muskegon News & Report, 4 October 1870, p. 1, and 20 September 1870, p. 1.

76. Saginaw Board of Trade, Annual Review, 12 (1892), p. 56.

77. In the spirit of true boosterism, Geo. Lewis wrote "Transportation of Lumber" for the 1872 Lumberman's Gazette. Lewis describes the wide-ranging impact of the railroad on the sawmill industry and lumber transportation, including the finer sorting of lumber and more re-finishing of lumber. No doubt these changes were evident, but they were not widespread until the 1880's (Lumberman's Gazette, September 1872, p. 15). See also, W.R. Bates, History, Commercial Advantages and Future Prospects of the Saginaws (East Saginaw, Michigan: E.W. Lyon, 1874), pp. 19-21, quoting A.H. Mershon, for a more realistic assessment.

78. Lumberman's Gazette, July 1872, p. 6.

79. Lumberman's Gazette, July 1872, p. 14; Muskegon News and Report, 9 August 1870, p. 1. J.B. Atwood sent 33 cars to Boston from Flint in one week (Lumberman's Gazette, July 1872, p. 14). At 6 MBF per car, this was less than 200 MBF; freight was \$9.00 per M.

80. Letter from C.H. Hackley & Co. (by Hume) to Schmitt & Schmittdeib, Detroit, 30 August 1878, Hackley & Hume Letterbook #3, pp. 493-494.

81. Muskegon Chronicle, 27 March 1869, p. 3; 21 April 1869, p. 3, 6 February 1869, p. 1; Muskegon News & Report, 12 April 1870, p. 1, 11 October 1870, and 29 October 1870. The 1870 season was shorter than usual.

82. Letter from C.H. Hackley & Co. (by Hume) to Wickes Brothers, E. Saginaw, 18 February 1879, Hackley & Hume Letterbook #3, p. 615. The Muskegon Chronicle of 1 December 1869 (p. 3) uses a 6 month season to calculate average mill capacity. Other sources suggest a 7 month season, e.g., Statistics of Michigan, 1870, pp. 616-620.

83. The April 18th shipment was on the schooner Monsoon. It scaled 75,501 feet, 5193 feet of which was from Hackley and Sons. The last shipment was also on the schooner Monsoon, and it scaled 116,953 feet (Shipping register, Vol. 193, p. 8; Vol. 194, pp. 6, 8, Hackley & Hume Collection).

84. Letter from C.H. Hackley & Co. (by Hume) to Wickes Brothers, E. Saginaw, 18 February 1879, p. 615, Hackley & Hume Letterbook #3; Goodstein, Biography of a Businessman, pp. 69-70, 82.

85. Saginaw Board of Trade, Annual Review, 2 (1882), 9; Michigan Agricultural Society, Transactions, 7 (1855), 829-831; T. Fox, History of the Saginaw Valley, p. 34.

86. Hotchkiss, History of the Lumber Industry, p. 144.

87. T. Fox, History of the Saginaw Valley, p. 34; Muskegon Chronicle, 6 February 1869, p. 1, and 1 December 1869, p. 3; Muskegon News & Report, 6 December 1870, p. 1; Lumberman's Gazette, July 1872, p.12; Hough, Report Upon Forestry, 1878, p. 513; Saginaw Board of Trade, Annual Review, p. 9. Both mode and median capacity were closer to 8 million feet. Production continued to lag far behind capacity through the 1870's (Hough, Report Upon Forestry, 1878, p. 521.

In a discussion of mill production, discrepancies arise due to the frequent appearance in contemporary newspapers of lists of mill "capacity." Of course, actual mill production is an altogether different statistic. No doubt there is a certain amount of imagination and boosterism contained in estimations of capacity.

88. Letter from C.H. Hackley & Co.(by Hume) to Wickes Brothers, E. Saginaw, 18 February 1879, p. 615, Hackley & Hume Letterbook #3.

89. Lumberman's Gazette, II (1873), p. 143, October 1872, p. 13.

90. Muskegon Journal, 30 December 1879, Supplement, p. 1; Goodstein, Biography of a Businessman, pp. 69-70; Benson, "Logs and Lumber," pp. 224-5; Lumberman's Gazette, July 1872, p. 12.

91. Census of Michigan, 1874, p. xiv.
92. "Manufacturing" included some 125 different industries including agricultural implement works, meat packing, paper mills, plaster mills, copper smelting, and distilleries (Census of Michigan, 1874, pp. lxxxiv-vii).
93. Lumberman's Gazette, July 1872, p. 6.
94. Muskegon Chronicle, 6 February 1869, p. 1.
95. Statistics of Michigan, 1870, pp. 501-503. A survey of advertising in The Lumberman's Gazette (Bay City) 1872-74 by the author revealed few (less than 10) manufacturers of sawmill equipment in Michigan and very few (4) manufacturers of circular, gang, and mulay sawing machines.
96. Engberg, "Labor in the Lake States Lumber Industry," pp. 46-47, 55, 65; Goodstein, Biography of a Businessman, p. 119; Benson, "Logs and Lumber," 260. See also Charles Frank Kovacik "A Geographic Analysis of the Foreign-born in Huron, Sanilac, and St. Clair Counties of Michigan with particular reference to Canadians: 1850-1880" (unpublished PhD dissertation, Michigan State University, 1970); George B. Engberg, "Who Were the Lumberjacks?" Michigan History, 32 (1948), 238-246.
- Of the 12,005 men who identified themselves as lumber workers in an 1869 survey for the decennial census, 52% were American-born, 24% British-American, 11% German, 5% Irish, 4% British (U.S., Ninth Census, 1870, Vol. I, Population, pp. 740-741, 764). It seems likely that these data are a better representation of millhands than shanty boys. Of the latter group, many were farmers or farmer's sons who saw logging as an off-season job and would have identified themselves as farmers.
97. Letter from A. Gudmundsen to Parents, Iceland, 31 July 1872, Michigan History, 66 (1982), 14-15.
98. George Blackburn and Sherman L. Ricards, Jr. "A Demographic History of the West: Manistee County, Michigan, 1860," Journal of American History, 57 (December 1970), 614.
99. Lumberman's Gazette, September 1872, p. 5.
100. Muskegon News & Report, 31 May 1870, p. 4.
101. History of Mason County, pp. 50-1.
102. Goodstein, Biography of a Businessman, pp. 114-5.
103. William R. Peterson, The View From Courthouse

Hill (Philadelphia: Dorrance, 1972), pp. 105-106. According to Petersen, Jonathon W. Cobbs platted "Cobbtown" in Clam Lake (later Cadillac), Michigan, with lots large enough for grazing animals and a large garden and sold them to his mill employees.

104. Goodstein, Biography of a Businessman, p. 116.

105. Lumberman's Gazette, monthly abstracts of mills, 1872-73; Goodstein, Biography of a Businessman, pp. 81-82.

106. Proctor Diary, 20 March 1872; Letter from Proctor to his mother, 13 November 1869, Proctor Collection.

107. Letter from Hackley & McGordon to William Wallace, Eau Claire, Wisconsin, 28 February 1871, Hackley & Hume Letterbook #1; Lumberman's Gazette, Mill Abstracts, 1872-73. These income figures presume full-time employment; average figures would be lower.

These wages were roughly comparable to wages elsewhere in the Great Lakes industries. For example, in the Neenah-Menasha area of Wisconsin, wages in 1870 were \$1.25 per day for laborers, \$47-\$52 per month for millers in flour mills, \$30-\$40 for skilled labor in wooden-ware factories, and \$30 per month for labor in the one paper mill (Charles N. Glaab and Lawrence H. Larsen, Factories in the Valley: Neenah--Menasha, 1870-1915 [Madison: State Historical Society of Wisconsin, 1969], pp. 224). For regional wage patterns see Sari Bennett and Carville Earle, Geography of American Labor: an Atlas (Catonsville, Maryland: Department of Geography, University of Maryland Baltimore County, pp. 24-30.

108. Muskegon Chronicle, 28 April 1869, p. 3.

109. Lumberman's Gazette, July 1872, p. 14; also see Lumberman's Gazette, July 1872, p. 1.

110. A thesis of Vernon H. Jensen's book Lumber and Labor is that lumber workers were traditionally unsympathetic to labor movements due to the unstable character of their employment: a seasonal industry with high turnover of workers (New York: Farrar & Rinehard, 1945).

111. Fitzmaurice, "The Shanty Boy", p. 175. Fitzmaurice estimated that there were forty saloons within 300 feet of the "Catacombs" and 1400 hookers in Bay City and Saginaw. For more reminiscences of revelry in mill towns, see Nelligan, Life of a Lumberman.

In July 1870 an attempted murder in a Muskegon brothel prompted police raids on a number of whorehouses. The incident prompted a discussion in the local newspapers of the problem of prostitution in Muskegon and possible solutions. Muskegon News & Report, 3 July 1870, p. 1; 5 July 1870, p. 1.

112. See for example, Bates, The History of the Saginaws, pp. 69-84.
113. Peterson, View From the Courthouse Hill, p. 85.
114. Peterson, View From the Courthouse Hill, p. 365.
115. Michigan Census, 1874, pp. 367, 381; see also U.S., Ninth Census, 1870, Vol. 3, pp. 533-534.
116. Benson, "Logs and Lumber," pp. 215.
117. See Dinsdale for a description of the New York industry as small, seasonal mills producing for local markets (Evelyn M. Dinsdale, "Spatial Patterns of Technological Change: The Lumber Industry of Northern New York," Economic Geography, 41 (1965), 252-275.

#### Chapter 4

1. William N. Sparhawk and Warren D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), p. 29; Michigan Bureau of Labor, Annual Report, 10 (1893), 908; R.V. Reynolds and A.H. Pierson, Forest Products Statistics of the Lake States, U.S.D.A. Statistical Bulletin No. 68 (Washington: Government Printing Office, 1939), p. 5.  
Value of sales represents mill output. Employment levels include both camps and mills.
2. Saginaw Board of Trade, Annual Review, 12 (1892), 25.
3. Michigan Bureau of Labor, Annual Report, 10 (1893), 908.
4. Mancelona Herald, 10 November 1887. For example, see Antrim County Atlas (Chicago: Ogle & Co., 1910), Mancelona Township, (T22N R5W).
5. George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest (Chicago: George W. Hotchkiss & Co., 1898), p. 144; Josiah Littlefield, Josiah Littlefield: Lumberman--Conservationist, An Autobiography, ed. Hazel B. Littlefield ([n.p.]: [n.n.], [n.d.]), p. 31; John Vogel, "Memoir of John Vogel, Immigrant and Pioneer," Michigan History, 30 (1946), 559-560.
6. Fitzmaurice noted that the improved saws were "one-half superior" to the old models (John Fitzmaurice, The Shanty Boy or Life in a Lumber Camp, [1889; rpt.

Berrien Springs, Michigan: Hardscrabble Books, 1979], p. 73). See also Alcide Jolivet, "A Day in the Lumber Woods," Cadillac, its Past, Present and Future (Cadillac: Cadillac News and Express, [1891?]), pp. 14-16.

7. For the importance of grading in a modernizing market see Wendell R. Smith, "Product Differentiation and Market Segmentation as Alternative Marketing Strategies," Classics in Marketing, ed. C. Glenn Walters and Donald P. Robin (Santa Monica: Goodyear Publishing Company, 1978), pp. 433-439.

8. Letter from Delos A. Blodgett to Mr. P. Judge, 24 October 1883, Box 1, Michigan-California Lumber Company Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan.

9. Log Mark Register Certificate, 28 November 1871, Box 24, Michigan-California Lumber Company Collection; Proctor Diaries, 1873, unnumbered memo page, and 1876 & 1877, passim, Joseph F. Proctor Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan; Delos A. Blodgett account with Hackley and Sons, 13 July 1876, Hackley & Hume Letterbook #3, p. 59, Hackley & Hume Collection, Archives and Historical Collections, Michigan State University.

10. Letter from Delos A. Blodgett to P. Judge, 1 November 1883; see also Letter from Delos A. Blodgett to P. Judge, 31 October 1883, Box 1, Michigan-California Lumber Company Collection.

11. Daniel Abrey, Reminiscences (Corunna, Michigan: Louis N. Sheardy, 1903), p. 22; Ralph Clement Bryant, Logging: The Principles and General Methods of Operation in the United States (New York: John Wiley & Sons, 1913), p. 129.

Clydesdales and Percherons were introduced; Blodgett imported and raised the latter breed on his own farm.

Blodgett's camps used oxen as late as 1879, and horses (for skidding) as early as 1877 (Proctor Diaries, 21 February 1879, 25 October 1877). Blodgett reportedly resisted the change to horses (Joseph F. Proctor, Speech to the Osceola County Old Settlers Society, Joseph F. Proctor Collection).

A team of oxen cost about \$150-160 in the 1880's. Horses about \$225 each. See Delos A. Blodgett, Journal "A," 16 February 1885, p. 92; Journal "B," 29 August 1888, p. 235, Michigan-California Lumber Company Collection; Letter from Hackley and Hume to James W. Turner [?], Evart, 8 September 1884, Hackley & Hume Letterbook #5, p. 769; Fitzmaurice, "The Shanty Boy", p. 71.

12. Fitzmaurice, "The Shanty Boy", p. 73; Jolivet, "A Day in the Lumber Woods," pp. 12-3; A.S. Draper, "Reminiscences of the Lumber Camp," Michigan History, 14 (1930), 446. Proctor implies that tongs were adopted after 1880 (J. Proctor, "Family History," p. 169, Joseph F. Proctor

Collection).

13. Earl Frothingham, "Review of a Hardwood Lumbering Operation in Michigan, Typescript, (1905), pp. 27, 30-31. Rector says that typical Big Wheel loads were 1000 to 2000 feet (William Gerald Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 [Glendale: Arthur H. Clark Company, 1953], p. 200), but other sources suggest that they were smaller. For example, John H. Heilala, "With the Big Wheels," Michigan History, 38 (1954), 295.

14. Heilala, "With the Big Wheels," p. 295.

15. Letter from J.W. Clarke, Cadillac, to Chas. Isaacs, 26 November 1883, Box 1, Michigan-California Lumber Company Collection.

16. For background on the Big Wheels see Curran N. Russell interview with Roy Overpack [son of the inventor], Curran Northrum Russell Collection, Bentley Historical Library, Michigan Historical Collections, University of Michigan.

17. Fitzmaurice, "The Shanty Boy", p. 73; John Emmett Nelligan, The Life of a Lumberman ([n.p.]: Privately printed, 1929), p. 71.

See J. Proctor, Speech to the Osceola County Old Settlers Society, for a description of Delos A. Blodgett's grudging acceptance of the block and chain in the late 1870's.

18. Fitzmaurice, "The Shanty Boy", pp. 25, 71; Stewart H. Holbrook, Holy Old Mackinaw: A Natural History Of the American Lumberjack (New York: Macmillan, 1956), pp. 104-105; Rector, Log Transportation, pp. 211-2. A newspaper account of E.L. Pratt's logging operations, is reprinted in Forrest B. Meek, Michigan's Timber Battleground: A History of Clare County, 1674-1900 ([n.p.]: Clare County Bicentennial Historical Committee, 1976), pp. 97-98. Proctor noted "big" loads of 6.7 M and 7 M in 1877 (Proctor Diary, 25 February 1877, 27 February 1877).

The largest load of the Lake States was the famous "World's Fair Load" (destined for the Chicago 1893 World's Fair) that scaled 36,055 feet near Ewen, Michigan (Holbrook, Holy Old Mackinaw, pp. 104-105).

19. Fitzmaurice, "The Shanty Boy", p. 25.

20. Fitzmaurice, "The Shanty Boy", pp. 71-2; Rector, Log Transportation, pp. 209-210, 213; Meek, Michigan's Timber Battleground, p. 98.

21. Proctor Diaries, 1876-77.

22. Proctor Diaries, 1877-78.



23. Letter from J. Proctor to his family, 20 February 1878, J. Proctor Correspondence, Proctor Collection.

24. A "logging railroad" is used to refer to the general class of short rail lines that were privately-owned lines, used light rails and small locomotives, and were often narrow gauge. Their primary purpose was to haul logs to a mill or river. On the other hand, the public carriers were corporations that offered general freight and passenger service and were standard gauge.

25. Rector, Log Transportation, pp. 194-203; Richard G. Wood, A History of Lumbering in Maine, 1820-1861 (Orono, Maine: University of Maine Press, 1935), p. 145; Detroit Daily Advertiser, 7 May 1859, quoted by Barbara Ellen Benson, "Logs and Lumber: The Development of the Lumber Industry in Michigan's Lower Peninsula, 1837-1870" (unpublished PhD dissertation, Indiana University, 1976), p. 199; Lumberman's Gazette, December 1872, p. 27; March 1873, p. 79; July 1873, p. 23; William Fox, A History of the Lumber Industry in the State of New York, U.S.D.A. Bureau of Forestry Bulletin No. 34 (Washington: Government Printing Office, 1902), p. 28.

26. Letter from Hackley & McGordon (by Hume) to Ross & Co., Quebec, 21 March 1878, Hackley & Hume Letterbook #3, pp. 376-377.

27. The legendary status of Gerrish's railroad grew out of the overwhelming attention it received in both the local and trade press. The road was the subject of great speculation. For background on this road see Hudson Keenan, "America's First Successful Logging Railroad," Michigan History, 44 (1960), 292-302; George C. Despres, "Railroad Logging", Michigan History, 38 (1954), pp. 182-184; Rector, Log Transportation, pp. 195-198.

Scott Gerrish, Delos A. Blodgett, and Joseph Proctor were all neighbors in the Hersey area of Osceola County. For an interesting account of Blodgett's prediction of Gerrish's failure, see J. Proctor, Speech to the Osceola County Old Settlers Society, Proctor Collection.

The drive along the Doc and Tom Creek the previous year had cost \$.50 per M, which was reportedly prohibitively high. Yet the LGMRRR charged \$1.25 per M, suggesting that the inaccessibility of stands was a primary factor in the railroad's success (Rector, Log Transportation, pp. 196-197 ).

28. William G. Rector, "Railroad Logging in the Lake States," Michigan History, 36 (1952), 355.

29. Cadillac News, 23 May 1878, quoted by William R. Peterson, The View From Courthouse Hill (Philadelphia: Dorrance, 1972), p. 334. See also Michael Koch, The Shay Locomotive, Titan of the Timber (Denver: World Press, 1971).

In 1882 an early Shay locomotive pulled 60,937 feet, 45 cars, 393 logs near Cadillac, Michigan. A photo of this train was widely distributed. A copy of it is in the C.T. Stoner Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan.

30. Rector, Log Transportation, p. 201, quoting the Northwestern Lumberman, 14 February 1885, p. 17.

31. Gladwin Record, 27 March 1885, quoted in Meek, Michigan's Timber Battleground, p. 112.

Hackley & Hume bought the Muskrat Lake and Clam River Railroad in 1888 for \$50,000 and "other valuable considerations" (Warranty Deed, H. Hovey, N. Hovie, J. McCracken, & M. McCracken to Hackley & Hume, 5 November 1888, Folder 14, Box 6, Hackley and Hume Collection).

In 1894 Hackley & Hume advertised the sale of their Clare County logging railroad for \$37,000. This included 3 locomotives, 96 cars, and 2270 tons of rails (Letter from Hackley & Hume to M. Mitchkem & Co., Detroit, 2 October 1894, Hackley & Hume Letter book #11, p. 342; Letter from Hackley & Hume to The Timberman, Chicago, 26 September 1894, Hackley & Hume Letterbook #11, p. 329).

The book value of the Clam River Railroad was \$12,000 to \$17,000 in the 1880's (Blodgett Ledger "A," p. 158, Michigan-California Lumber Company Collection).

32. Fieldwork by the author. The Clam River Railroad's work may have been ended prematurely by a river rights dispute with John Koopman of Falmouth. See chapter 5.

33. Blodgett sold 200 tons of rails, 3000 ties, a locomotive at \$1800, and a number of Russell logging cars at \$125 each (Blodgett Journal "C," 22 August 1889, p. 169; Journal "C," 17 April 1889, p. 121, Michigan-California Lumber Company Collection).

An average Michigan logging train had 10 cars with a total of 35,000 board feet (Keenan, "Successful Logging Railroad," p. 302; Rector, Log Transportation, p. 212).

34. During the 1891/92 season Hackley and Hume hauled 26 million feet for Blodgett (Letter from Hackley and Hume to John Twin [?], 30 July 1891, Hackley & Hume Letterbook #7, p. 621; Blodgett Journal "C," 6 May 1889, p. 130, Michigan-California Lumber Company Collection).

35. Rector, Log Transportation, pp. 202-3. The Flint and Pere Marquette Railroad carried nearly 13 million feet in 1872 during a drought (Lumberman's Gazette, November 1872, p. 11; December 1872, p. 11).

36. Blodgett Journals "C", 11 May 1889, p. 132; "D", 31 March 1890, p. 12.

In an answer to an inquiry, Hackley and Hume explained

that they knew of only two railroads hauling large amounts of sawlogs. The Chicago and Western Michigan Railroad hauled 30-50 miles to Muskegon for \$2/M (Doyle Scale). The Flint and Pere Marquette Railroad 50-75 miles for \$1.75-\$2.00 (Letter from Hackley & Hume to H. M. Cross, Arkansas City, Arkansas, 3 December 1888, Hackley and Hume Collection).

That same year, 1888, the Flint and Pere Marquette was reported to have hauled 161 million feet, about 100 of which were dumped into the Tittabawassee River (Rector, Log Transportation, p. 202).

37. Blodgett Journals "C," 4 May 1889, p. 130; 11 May 1889, p. 132; "D", 12 May 1891, p. 146.

38. These figures are estimates based on average wages and the modal sleigh and railroad camps presented below. See Figures 21, 22, and 23.

39. Rector, Log Transportation, p. 188-189.

40. The average log handled by the Tittabawassee Boom Company, for example, ran 4.4 logs/M in 1870 and 8.7 per M in 1885. Franklin Hough, Report Upon Forestry, U.S. Forest Service (Washington: Government Printing Office, 1878), p. 516. The Timberman, 17 September 1898.

41. Delos A. Blodgett's camps ranged from 4 logs to the M in the early 1870's to 8-10 logs/M in the 1880's. Between 1884 and 1892 Blodgett's yield per acre ranged from 19 to 40 M per acre. His highest yields were achieved late in this period (Calculated from Blodgett's ledgers and journals by the author).

Hotchkiss noted that Cummer and Son cut four survey sections during the 1880's that ran 40-50 M per acre (Hotchkiss, History of the Lumber Industry, p. 340).

42. Michigan Forest Commission, Report, 1887/88, p. 31.

43. William O. Bailey, Report on Forest Fires of Michigan, U.S. Army, Signal Office, Signal Service Notes, No. 1, (1881); see also David Ward, The Autobiography of David Ward (New York: Privately printed, 1912), p. 152; Gerald Schultz, Walls of Flames ([n.p.]: [n.n.], [n.d.]) is a popular account of the 1881 fire.

44. Fitzmaurice, "The Shanty Boy", p. 121.

45. Meek, Michigan's Timber Battleground, pp. 97-8; Fitzmaurice, "The Shanty Boy", pp. 21-22; Letter from Hackley and Hume to John Twin [?], 30 July 1891, Hackley & Hume Letterbook #7, p. 621; Letter from Hackley and Hume to A. Rodgers, 10 August 1887, Hackley & Hume Letterbook #6, pp. 569-70. Delos A. Blodgett's dozens of camps averaged roughly 8 million feet during the 1880's (Blodgett Journals, passim).

J.E. Potts Salt and Lumber Company was said to have cut 100 million feet along the Au Sable River in 1888/89, and Alger Smith & Co. cut 80 million (Fitzmaurice, "The Shanty Boy", pp. 70, 103). Fitzmaurice described a typical late 1880's camp: 10 million feet, 100 men, 12 horse teams, 1 September to 1 April season (p. 21).

46. Jacob Dye and Rex J. Dye, Lumber Camp Life in Michigan: An Autobiographical Account by Jacob Dye--1880-1893, and by His Son, Rex J. Dye--1904-1909 (Hicksville, New York: Exposition Press, 1975), pp. 13, 15.

47. Proctor Diaries, 6 October 1877, 20 November 1877, 22 November 1877, 8 December 1877, 3 December 1878, 21 February 1879.

Blodgett kept his horse teams at his farms until needed: "Had a heavy snow to day & it is snowing yet this eve. Blodgett is going to telegraph for teams to night." (Proctor Diaries, 3 December 1878).

Task specialization had not advanced to the point where men were unable to move from job to job, largely because of the significant proportion of semi- or un-skilled labor required in every stage of logging.

48. The contract stated: ". . . it is expressly stipulated that the time of the delivery of said logs is of the essence of this agreement" (Logging Contract, Charles H. Hackley & Co. with W.S. Gerrish, 7 October 1873, Folder 27, Box 3, Hackley & Hume Collection), p. 3.

49. American Lumberman, 31 March 1906, p. 49; Letter from Hackley and Hume to C. Eyke, 4 April 1893, Hackley & Hume Letterbook #10, p. 50.

As noted above, Blodgett's Deer Lake logs were hauled by the Grand Rapids and Indiana Railroad to the Paris rollway from mid-December to 1 April. Annual output for each of Blodgett's camps was available by March 31, and his Clam River Railroad and the Hackley & Hume Railroad delivered logs to the river bank by April each year.

The continued seasonality of logging is recognized by many scholars and contemporary accounts (e.g., Rector, Log Transportation, p. 26; Vernon H. Jensen, Lumber and Labor (New York: Farrar & Rinehard, 1945), p. 49; The Timberman, 19 March 1898, p. 33), yet at times the big wheels and logging railroads are depicted as ushering in an era of "full-scale year-round logging" (Benson, "Logs and Lumber," p. 199).

50. J.A. Whittier, President of the Saginaw Board of Trade, estimated in 1882 that the cost of stumpage was \$4.50 per M (Report of Tarrif Commission, House Misc. Document #6, Part I, 47 Congress, 2 Session, p. 956, quoted in Rector, Log Transportation, p. 22).

According to the American Lumberman the cost of stumpage in the mid-1880's was \$4.00 to \$6.00 per M. The cost

of stumpage in Wisconsin and Minnesota was estimated at 50% less (6 January 1906, p. 21).

Delos A. Blodgett sold four land groups in 1885-1886: 120 acres for \$29.17 per acre, 80 acres at \$62.50/acre, 800 acres at \$125.00/acre, and 167.5 acres at \$47.76/acre (Journal "A", 4 November 1885, p. 143; p. 147, 30 November 1885; 15 June 1886, p. 191; 29 December 1886, p. 10).

The cost of stumpage included more than the initial purchase price. Taxes were levied by various local administrative units, often as an attempt to exploit the absentee lumbermen and speculators. Delos A. Blodgett paid annual taxes of roughly 1-2% of the assessed value of his pine land. For example, on one quarter-section (in Richland Township, Missaukee county) he paid a total of \$1382 in taxes between 1881 and 1890. This was an average of \$.86 per acre per year (SE 1/4, Sec 6, T21N R8W, Blodgett Land Book Vol. II, Michigan-California Lumber Company Collection).

Miscellaneous expenses of pine land ownership included surveying, fire fighting, and "clearing and protecting pine" (see, for example, Blodgett Journal "B", 31 March 1887, p. 35, and 10 July 1888, p. 216, Michigan-California Lumber Company Collection).

51. A Minnesota lumber company invested an estimated \$27,000 in equipment, shanties, roads, and stream improvements (but not stumpage) in a 5 year operation that produced 8 million feet annually (St. Paul Globe, 30 December 1884, quoted in Rector, Log Transportation, p. 109).

52. J.A. Whittier estimated the cost of cutting, skidding, and banking in 1882 at \$3.75 per M (Report of Tariff Commission, p. 956, in Rector, Log Transportation, p. 22).

Blodgett's cutting, skidding, and hauling costs ranged from \$2.25 to \$4.66 per M. Logging equipment was treated as a separate account in Blodgett's books; equipment costs were passed on to the camps as an annual percentage charge. For example, 15% to 25% of the book value of the equipment might be charged to a logging camp at the end of the season (See for example, Blodgett Journal "B," 26 March 1887).

53. Data for this and the following paragraphs were collected by the author from Blodgett's ledgers and journals, Michigan-California Lumber Company Collection.

54. Due to the nature of Blodgett's books the profits of his logging operations and the sale price of his logs are not known.

55. Anita S. Goodstein, Biography of a Businessman: Henry W. Sage, 1814-1897 (Ithaca: Cornell University Press, 1962), p.

Though large profits were gained by dozens of lumbermen and speculators, pineland speculation was a "hazardous area in which to undertake a large-scale speculation," according to Paul

Wallace Gates, The Wisconsin Pine Lands of Cornell University: A Study in Land Policy and Absetee Ownership (1943; rpt. Madison: State Historical Society of Wisconsin, 1965), p. 88.

56. A sleighing season of roughly 75 ys would generally be adequate to haul 8 million logs due to the shift of some of the cutting crews to sleighing in the last month or two.

57. Littlefield, Josiah Littlefield, p. 37; Fitzmaurice, "The Shanty Boy", pp. 21-22.

58. Frank P. Bohn, "This was the Forest Primeval," Michigan History, 21 (1937), 33-38, 185; Dye and Dye, Lumber Camp Life, p. 15; Fitzmaurice, "The Shanty Boy", p. 22; George Baker Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949), p. 131-132.

59. Bohn, "Forest Primeval," p. 185; Jolivet, "A Day in the Woods," p. 10; Fitzmaurice, "The Shanty Boy", p. 25. Joseph Proctor evidently ran quite a comfortable camp along the Flat River in the early 1870's; sheets, straw beds, and table cloths were used. Proctor was a jobber who lived in camp with his family (Proctor, Speech to the Osceola County Old Settler's Society, Joseph F. Proctor Collection).

60. Lewis Reiman, Incredible Seney (Ann Arbor: Northwoods Publishers, 1953), p. 61; Fitzmaurice, "The Shanty Boy", pp. 112-113, 167-168, 171; George Engberg, "Labor in the Lake States Lumber Industry," pp. 153-156; Proctor Diaries, 16 October 1880.

61. Jensen, Lumber and Labor, p. 51; Engberg, "Labor in the Lake States Lumber Industry," pp. 39-41, 55, 76, 78; Willis C. Ward, "Reminiscences of Michigan's Logging Days," Michigan History, 20 (1936), 308.

62. Engberg, "Labor in the Lake States Lumber Industry," pp. 46-48, 51; Proctor Diaries, 14 January 1881; 9 October 1877; Fitzmaurice, "The Shanty Boy", p. 234.

63. For Blodgett profits see, for example, D. Blodgett Journal "B," 31 March 1888, p. 173. For Background on D. Blodgett see Portrait and Biography Album of Osceola County (Chicago: Chapman Bros., 1884), pp. 331-333; Ernest B. Fisher, ed., Grand Rapids and Kent County Michigan, Vol. II (Chicago: Robert O. Law, 1918), pp. 49-50.

64. Michigan, Bureau of Labor and Industrial Statistics, Annual Report, 3 (1886), 157. The person in question is not named, and of course this account could be fabricated or a manifestation of a false consciousness. Yet there is widespread evidence of many owners' paternal benevolence.

65. Michigan, Bureau of Labor and Industrial Statistics, Annual Report, 3 (1886), 158.

66. Reiman, Seney, p. 63; Engberg, "Labor in the Lake States Lumber Industry," pp. 33-34; William R. Peterson, The View From Courthouse Hill, p. 327.

The seasonal migration between Lake States camps and mills, Lake Superior mines, and the plains harvest frontier is less likely to have included shanty boys from the Lower Peninsula of Michigan because the northern plains and mines were less accessible to them compared to their Wisconsin counterparts. See John C. Hudson, "Migration to an American Frontier," Annals of the Association of American Geographers, 66 (1977), 242-265, especially pp. 260-264.

67. Stanley Lebergott, Manpower in Economic Growth: The American Record Since 1800 (New York: McGraw-Hill Book Company, 1964), p. 541. Michigan farm wages dropped only 2% over the same period (p. 539).

68. Michigan, Bureau of Labor and Industrial Statistics, Annual Report, 1 (1884), 161.

69. Engberg, "Labor in the Lake States Lumber Industry," pp. 305-6; Fitzmaurice, "The Shanty Boy", p. 174; Letter from Hackley and Hume to C. Eyke, 15 August 1893, Hackley & Hume Letterbook #10, pp. 291-293; Letter from Hackley and Hume to A. Rodgers, 10 August 1887, Hackley & Hume Letterbook #6, pp. 569-570; Hackley & Hume Papers, Vol. 199, p. 42; Blodgett Journal "B," 14 April 1887, p. 46; Blodgett Journal "B," 31 March 1887, p. 39; Letter from J. W. Clarke to Chas. Isaac, 6 October 1883, Box 1, Michigan-California Lumber Company Collection.

Median wage in a Wisconsin Land and Lumber Company camp, in Michigan's Upper Peninsula, was \$24.00 per month in 1883 and \$26.00 in 1888 (Engberg, "Labor in the Lake States Lumber Industry", p. 298-303).

A shanty boy was hired at a monthly wage rate, but he was paid by the day. \$26.00 a month was a common rate due, in part, to the ease of calculation.

70. Jensen, Lumber and Labor, pp. 56-58; Michigan, Bureau of Labor and Industrial Statistics, Annual Report, 10 (1893), 907-8; Engberg, "Labor in the Lake States Lumber Industry," p. 354.

Engberg calculated annual income of \$288 for 1879 and \$286 for 1889. He arrived at these totals by dividing the total amount of wages paid in the lumber industry, by the average number of employees, as reported to the census of manufactures (p. 355).

An unskilled or semi-skilled shanty boy might have made \$182 in seven months. The average wage in the sawmills (for laborers) at this time was \$1.50 to \$1.75 per day. If he worked

four of the remaining five months at the lower rate, he would earn a total of \$338 for the year.

71. Lebergott, Manpower in Economic Growth, p. 528.

72. Reynolds and Pierson, Forest Products Statistics, pp. 5-16; Saginaw Board of Trade, Annual Review, 12 (1892), p. 25; The Statistical History of the United States From Colonial Times to the Present (1965; rpt. Stanford, Connecticut: Fairfield Publishers, [n.d.]), p. 312.

73. ". . . The good, old-fashioned methods, in vogue thirty years ago, are to-day fighting the "battle of the saw-log" just as assiduously and successfully as they ever did," wrote John Fitzmaurice in the late 1880's ("The Shanty Boy", p. 70).

## Chapter 5

1. Saginaw Board of Trade, Annual Review, 12 (1892), 25-26; Lumberman's Gazette, 25 February 1885, p. 2; Henry B. Steer, Lumber Production in the United States, 1799-1946, U.S.D.A. Misc. Publication No. 669 (Washington: Government Printing Office, 1948), p. 11.

2. William N. Sparhawk, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), p. 17.

3. U.S., Bureau of the Census, 1950, Population, Vol. I, Number of Inhabitants (Washington: Government Printing Office, 1952), p. 17.

4. Abstract of the Eleventh Census, 1890 (Washington: Government Printing Office, 1894), p. 3.

5. Michael Williams, "Ohio: Microcosm of Agricultural Clearing in the Midwest," Global Deforestation and the Nineteenth-century World Economy, ed. Richard P. Tucker and J.F. Richards (Durham, N.C.: Duke Press Policy Studies, 1983), pp. 1-13.

6. George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest (Chicago: George W. Hotchkiss, 1898), p. 144; Saginaw Board of Trade, Annual Review, 12 (1892), 26.

7. Saginaw Board of Trade, Annual Review, 12th (1892), p. 33; Muskegon Journal, 13 January 1880, p. 31.



8. John Emmett Nelligan, The Life of a Lumberman (Privately printed, 1929), pp. 78-80; John W. Fitzmaurice, "The Shanty Boy" or Life in a Lumber Camp (1889; rpt. Berrien Springs, Michigan: Hardscrabble Books, 1979), pp. 74-75. William Gerald Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 (Glendale, California: Arthur H. Clarke Company, 1953), pp. 98-100, 109, 196; John Vogel, "Memoir of John Vogel, Immigrant and Pioneer" Michigan History, 30 (1946), 559. Fitzmaurice implied that it might take 20 men an entire summer to clear 6 to 8 miles of a small tributary (p. 75).

9. Fitzmaurice, "The Shanty Boy", p. 79; Nelligan, Life of a Lumberman, pp. 77-80, 149.

10. Nelligan, Life of a Lumberman, p. 78; William G. Rector, "From Woods to Sawmill: Transportation Problems in Logging," Agricultural History, 23 (1949), 239-240; Rector, Log Transportation, pp. 100-110. Rector's treatment of logging dams is extensive but it is limited to Wisconsin and Minnesota. See also John N. Vogel "Folk Technology: A History of the Round Lake Logging Dam," Typescript [Park Falls, Wisc.: Chequamegon National Forest] October, 1980.

Larger dams were built along the lower courses of the driving rivers. These were usually built by a boom company to accumulate water and to store logs. The large dams might cost more than \$50,000, and were 300 or 400 feet long with 10 to 15 feet of head.

11. Fitzmaurice, "The Shanty Boy", p. 48.

12. Rector, Log Transportation, pp. 103 and 249.

13. Muskegon Journal, Supplement to 30 December 1879, p. 1; Saginaw Board of Trade, Annual Review 4 (1884), 14.

14. Muskegon Journal reported logs piled 6 to 20 feet high for the nine miles from Big Rapids to Paris (2 June 1880, p. 8, from the Cadillac News; also Nelligan, Life of a Lumberman p. 73).

15. Letter from Hackley and Hume to C. Eyke, 9 May 1893, Hackley & Hume Letterbook #10, p. 118; Letter from Hackley & McGordon to T. Byrne, 21 September 1877, Hackley & Hume Letterbook #3, p. 235; Letter from Hackley & Hume to C. Eyke 15 November 1888, Hackley & Hume Letterbook #7, p. 143; Letter from Hackley & Hume to Eyke, 4 April 1893, Hackley & Hume Letterbook #10, p. 50, Hackley & Hume Collection, Archives and Historical Collections, Michigan State University; Clifford Allen, ed., Michigan Log Marks, Their Function and Use During the Great Michigan Pine Harvest (East Lansing: Michigan Agricultural Experiment Station, 1941), pp. 70-71.

16. For a general account of the drive in the 1880's see Fitzmaurice, "The Shanty Boy", pp. 40-52; Nelligan, Life of a Lumberman, pp. 141; Steward Edward White's The Riverman (New York: McClure, Phillips, 1908), is also useful.

17. Muskegon Journal, Supplement to 30 December 1879, p. 1; Letter from Hackley & Hume to C. Eyke, 15 March 1893, Hackley & Hume Letterbook #10, pp. 7-9; Rector, Log Transportation, p. 22; Charles E. Twining, Downriver: Orrin H. Ingram and the Empire Lumber Company (Madison: State Historical Society of Wisconsin, 1975), pp. 247-8; Blodgett Journal "A," 25 June 1886, p. 194, Michigan-California Lumber Company Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan.

18. Rector, Log Transportation, pp. 183-7.

19. Miscellaneous Clam River Drive Papers, Box 24, Michigan-California Lumber Company Collection. For sample Clam River Drive charges see Blodgett Journal "A," 8 June 1885, p. 114; Journal "A," 10 June 1886, p. 188, Michigan-California Lumber Company Collection. A copy of an Oscoda Boom Company contract is reprinted in Neil E. Thorton, Iosco County and Lake Huron Shore Log Marks (Tawas City, Michigan: Printer's Devil Press, 1981), p. 11.

20. Rector, Log Transportation, pp. 174-181.

21. Letter from J.W. Blodgett to Mr. Koopman, 16 May 1886, Box 1, Correspondence, Michigan-California Lumber Company Collection; Koopman materials, Box 24, Michigan-California Lumber Company Collection; Rector, Log Transportation, p. 181.

White describes a similar conflict in his novel The Riverman, pp. 9-20.

22. John Koopman, Plaintiff vs. Delos A. Blodgett, Defendant, Superior Court of Grand Rapids, County of Kent, State of Michigan, [n.d.], copy in Box 24, Michigan-California Lumber Company Collection.

23. Koopman Bond, 15 May 1886, Box 24, Michigan-California Lumber Company Collection.

24. Letter from Hackley & Hume to M. Monette, Colorado, Hackley & Hume Letterbook #6, p. 989.

25. Clam River Litigation Papers, Box 24, Michigan-California Lumber Company Collection.

26. See James Willard Hurst, Law and Economic Growth: the Legal History of The Lumber Industry

In Wisconsin (Cambridge: Belknap Press, 1964) for a general discussion of legal problems regarding the use of streams for log transportation (pp. 147-157). There is some evidence that Koopman was paid to abandon his mills for a few years, (Rector, Log Transportation, p. 181, quoting the Northwestern Lumberman, 9 November 1889, p. 8).

27. Michigan mill owners and speculators had purchased land in these areas a decade or so earlier (e.g. Josiah Littlefield, Josiah Littlefield: Lumberman--Consevationist, An Autobiography ([n.p.]: [n.n.], [n.d.]), p. 31).

28. Letter from Hackley & Hume to H.M. Cross, 3 December 1888, Hackley & Hume Correspondence, Hackley & Hume Collection; Rector, Log Transportation, pp. 204, 281; Blodgett Journal "D," 31 March 1890, p. 12, Michigan-California Lumber Company Collection.

29. If logs were carried by rail to a mill, the railroad might carry the resultant mill products (especially shingles, lath, etc.) to market. In Wisconsin rail rates on logs were reduced if a mill contracted to ship a certain percent of the lumber via the same carrier.

30. U.S., Tenth Census, 1880, Vol. IX, Report on Forests, p. 552; Saginaw Board of Trade, Annual Review, 2 (1882), 23; 4 (1884), 15; 12 (1892), 32.

The number of logs per car ranged from 8 to 27, with an average of 16, or 3600 feet (Ballou Log Scale Account, Cadillac, 13 August 1888, Box 24, Michigan-California Lumber Company Collection).

31. Robert C. Johnson, "Logs for Saginaw: The Development of Raft-Towing on Lake Huron," Inland Seas, 5 (1949), 39-40.

32. Saginaw Board of Trade, Annual Review, 12 (1892), p. 31; Rector, Log Transportation, p. 167; Johnson, "Logs for Saginaw: The Development of Raft-Towing on Lake Huron," pp. 39-40, 84-85.

33. Saginaw Board of Trade, Annual Review, 12 (1892), pp. 11, 31; Johnson, "Logs for Saginaw: The Development of Raft-Towing on Lake Huron," p. 83.

34. The Timberman, 22 October, 1898, p. 23; Johnson, "Logs for Saginaw: The Development of Raft-Towing on Lake Huron," pp. 41, 86.

35. Other agglomeration factors included the availability of banks and other financial intermediaries.

36. Fries, Empire in Pine, pp. 89-90, 95.

37. Frederick Merk, Economic History of Wisconsin During the Civil War Decade (2d ed.; Madison: State Historical Society of Wisconsin, 1971), p. 389.

38. Edward E. Sturgeon, "Trends in Land Use and Ownership in Cheboygan County, Michigan" (unpublished PhD dissertation, University of Michigan, 1954), p. 124.

40. Lumberman's Gazette, 2 February 1878, p. 98. The quote is taken from an article on the woodworking industry. It is an equally appropriate comment on the lumber industry.

41. Lumberman's Gazette, 11 May 1881, p. 2. This article argued for the rejection of the circular saw for the cutting of lumber and the use of resaw machines at or near the point of lumber consumption, similar to the British model.

42. Lumberman's Gazette, 15 October 1879, p. 5; An exchange from the Northwestern lumberman; the Lumberman [later the Timberman], 31 July 1886, pp. 4-5.

The Muskegon mill of Hackley and Hume ran a circular and gang mill throughout the 1880's and cut 25 to 30 million feet each year (Letter from Hackley & Hume to the Timberman, 26 October 1894, Hackley & Hume Letterbook #11, p. 329; Statement, 8 January 1892, Vol. 199, p. 43, Hackley & Hume Collection).

The circular saw was well adapted to the slabbing of logs in that it was fast and powerful. However the size of log that the saw could cut was limited by the radius of the saw blade. The largest circular blades had a radius of 30 to 36 inches, and the larger the saw the bigger the kerf (for example a 72" saw was 6 guage [Statement, 24 January 1887, Vol. 199, p. 25, Hackley & Hume Collection]). Double circular saw machines were designed to solve this problem, but they left a "step" between the upper and lower kerfs.

A few mills used re-saws to recut planks, as an economy measure.

43. Lumberman's Gazette, 4 January 1877, p. 7; The Disston Lumberman's Handbook, A Practical Book of Information on the Construction and Use of Saws (Philadelphia: Henry Disston & Sons, 1921), p. 4; Rodney C. Loehr, "Saving The Kerf: The Introduction of the Band Saw Mill," Agricultural History, 23 (1949), 169.

44. For the use of the band saw in woodworking see: "Band Saw Machinery," Lumberman's Gazette, 3 (1873), p. 183; "New Improved Band Saw," Lumberman's Gazette, 2 February 1878, p. 98; "An Improvement in Band Saws for Fret Cutting," Lumberman's Gazette, 23 August 1882, p. 4. See also advertisements in the Lumberman's Gazette, 2 February 1878, p. 93; Lumberman's Gazette, 5 March 1879, p. 5.

45. J.L. Perin, a Parisian, discovered a method that

produced band saw blades of great strength and flexibility. For many years North America was dependent upon France for quality band saw blades (Lumberman's Gazette: 4 January 1877, p.7; 22 March 1877, p. 197; 26 January 1878, p. 74; 11 April 1883, p. 3).

46. Lumberman's Gazette, 11 February 1885, p. 1; 19 June 1886, p. 1; 11 April 1883, p. 3 (An exchange from the Wood Worker).

A number of early band saw mills were built in New York City by Richards, London, and Kelley, of Philadelphia & London (Lumberman's Gazette, July 1873, p.21; 11 January 1877, p. 19).

Hardwood manufacturers were attracted to the band saw because of its smaller kerf. J.R. Hoffman, a hardwood dealer in Fort Wayne, Indiana, was the first person to use a band saw successfully in the milling of lumber. The scarcity and high cost of some hardwoods induced Hoffman to sacrifice the circular's quantity for the band's quality. By running the band saw at slow speeds, Hoffman found that it produced high quality lumber with little waste, see Loehr, "Saving the Kerf."

Evidently there were unsuccessful experiments with the band saw in Michigan as early as 1860. About that time James McCormick purchased a band saw in England and installed it in his Saginaw River mill (Lumberman's Gazette, 25 February 1885, p. 2).

47. These included Torrent & Arms Lumber Company of Muskegon (Lumberman's Gazette, 17 June 1885, [p. 4]); Backus & Binder of Saginaw, which installed two bands (Lumberman's Gazette, 25 February 1885, p. 2); and Cummer Lumber Company of Cadillac, which installed the first band saw machine made by the Stearns Manufacturing Company of Erie, Pennsylvania, a firm that would emerge as a major manufacturer of band saws (Lumberman's Gazette, 24 June 1885, [p. 2]).

48. Lumberman's Gazette, 25 February 1885, p. 2

49. Lumberman's Gazette, 17 June 1885, [p. 4], quoting the Saginaw Courier.

50. "Sawing Machinery, New & Old," The Timberman, 31 July 1886, p. 4.

51. The Northwestern Lumberman, 19 June 1886, p. 1. The Northwestern Lumberman published a "Statistical Supplement" to its 26 June 1886 issue. This was an attempt to list all of the region's saw mills and classify them as to level of output, type of saw, and product type. No doubt there were omissions and errors. Of the 764 mills that cut pine lumber and that were not portable mills, 46 had band saws.

52. Lumberman's Gazette, 24 June 1885, [p. 3]. The Timberman, 25 September 1886, p. 11.

53. Letter from J. Cummer & Son to Stearns Manufacturing Company, dated 15 June 1885, rpt. in Lumberman's Gazette, 24 June 1885, [p. 3]. J. Cummer reported "unqualified success." Lumberman's Gazette reported that the new mills were giving "excellent satisfaction, and promise satisfactory results."

There were band saws installed in Wisconsin and Minnesota in the mid-1880's, but it appears that band saws were refined in Michigan, and that they were more widely adopted there, at least at first. This was no doubt due to the dwindling pine resources in Michigan, compared to Wisconsin and Minnesota (David C. Smith, A History of Lumbering in Maine, 1861-1960 [Orono, Maine: University of Maine Press, 1972], p. 123; Agnes M. Larson, History of the White Pine Industry in Minnesota [Minneapolis: University of Minnesota Press, 1949], p. 159; Lumberman's Gazette, 25 Feb 1885, p. 2).

54. Assuming a 1/6 inch difference in kerfs, a mill sawing inch boards with a band would cut seven boards where a circular would cut six. The savings increased with the size of the logs.

The Northwestern Lumberman, in an analysis of the band saw, used figures of circular kerf = 5/16 inch, and band kerf = 2/16 inch. In this case the difference between kerfs is slightly more ("The Band Mill in Pine Lumber," Northwestern Lumberman, 31 July 1886, p. 2).

55. Calculated by the author from data in Northwestern Lumberman, 20 October 1888, p. 6.

56. There were continued problems with band saw blades. See, e.g., "What's the Matter With The Band Saw Blade," Northwestern Lumberman, 14 July 1888, p. 20.

57. Northwestern Lumberman, 6 March 1886, pp. 1, 7.

58. Fries says that the bull chain was patented in 1873 by a La Crosse, Wisconsin, lumberman (Empire in Pine, p. 63); Holbrook attributes the invention to a Muskegon man (Stewart H. Holbrook, Holy Old Mackinaw: A Natural History of the American Lumberjack [2d ed.; New York: Macmillan Company, 1956], pp. 100-101).

Log turners were first used in the early 1870's. Alexander Rodger's foundry was producing the "Tarrant's patent rigger [sic] and log cant" in 1872 (Lumberman's Gazette, July 1872, p. 6). This was later called the Rodger's nigger (Lumberman's Gazette, December 1872, p. 19). W.E. Hill of Kalamazoo, Michigan, appears to have added direct steam to the log turner. His advertisements noted patents dated 26 October 1880, and 9 August 1881 (Lumberman's Gazette, 21 January 1885, [p. 13]; Holbrook, Holy Mackinaw, pp. 100-101).

59. These feeds were often called "shot gun feeds"

because of the way the carriages shot back into position after each cut. The feed designed by Clint Prescott and manufactured by the Marinette Iron Works was one of the best steam feeds. Fries notes that the Prescott feed was developed about 1873 (Empire in Pine, p. 63). C.H. Hackley & Co. considered adopting a Prescott feed during 1877 and 1878 and then purchased two feeds, the first for \$390 (Letter from C.H. Hackley & Co. to Marinette Iron Works, Marinette, Wisconsin, 8 November 1877, Hackley & Hume Letterbook #3, p. 272; Letter from C.H. Hackley & Co. to D. Clint Prescott, Marinette, Wisconsin, 10 January 1879, Hackley & Hume Letterbook #3, p.589).

60. The firm of Garland & Emery of Bay City installed some of the first live rollers and conveyor systems in Michigan. This company revamped the production line of the Keystone Company Mill in West Bay City in 1879 and expanded the mill's work floor by 26 feet by 90 feet for the extra equipment. The Lumberman's Gazette commented: "The system of transfer is so admirably arranged that the lumber glides along from the saws to the edgers and from the edgers to the trimmers as though propelled by unseen hands" (Lumberman's Gazette, 28 October 1879, p. 5). See Lumberman's Gazette, 5 March 1879 (pp. 24-25) for a detailed etching of the Garland & Emery system in "A Model Lumber Mill."

61. By 1880 the gang or parallel edger had largely replaced the single and double edgers (Lumberman's Gazette, 15 October 1879, p. 5, an exchange from the Northwestern Lumberman).

62. The first kilns in the Saginaw Valley were installed by John McGraw & Company in 1873 (Lumberman's Gazette, 2 [1873], 143).

Many of these developments were facilitated by the rapid innovation that occurred in the woodworking industry at this time, see F.H. Hutton, "Wood-working Machinery," U.S., Tenth Census, 1880, Vol. 22, Report on Power and Machinery Employed in Manufactures, pp. 178-294.

63. Classified by author from data in Michigan Bureau of Labor, Annual Report, 3 (1886), 112-119.

64. William R. Peterson, The View From Courthouse Hill (Philadelphia: Dorrance, 1972), pp. 322-323.

65. Rector, Log Transportation, p. 27, fn. 17. For an elaborate hot pond diagram, see Malcolm Rosholt, The Wisconsin Logging Book (Rosholt, Wisconsin: Rosholt House, 1980), p. 234.

66. Saginaw mills cut logs on contract for \$1.75 to \$2.75 during the early 1880's (Lumberman [later Timberman] 31 July 1886, p. 4; Michigan Bureau of Labor, Annual Report, 3 (1886), 103; Ballou Statement, 8 March

1889, Box 22, Michigan-California Lumber Company Collection; Rector, Log Transportation, p. 22.

67. Michigan Bureau of Labor, Annual Report, 10 (1893), 907.

68. Anita Shafer Goodstein, Biography of a Businessman: Henry W. Sage, 1814-1879 (Ithaca, New York: Cornell University Press, 1962), pp. 77-78, 86; Saginaw Board of Trade, Annual Review, 4 (1884), 11; Michigan Bureau of Labor, Annual Report, 3 (1886), 110; Ballou Statement, 8 March 1889, Box 22, Michigan-California Lumber Company Collection.

69. U.S., Tenth Census, 1880, Vol. 2, Manufacturing, pp. 295-273; Statistics of Michigan, 1870, pp. 410-421; Census of Michigan, 1884, pp. 337-338.

In 1890 Saginaw County had one of the largest capital/labor ratios in the country, Sari Bennett and Carville Earle, The Geography of American Labor and Industrialization, 1865-1908: An Atlas (Catonsville, Maryland: Department of Geography, University of Maryland Baltimore County, 1980), p. 78.

70. Goodstein, Biography of a Businessman, pp. 77-80, 135; Michigan Bureau of Labor, Annual Report, 3 (1886), 103; 10 (1893), 907; Blodgett Ledger "A," p. 144; Blodgett Journal "B," 31 March 1888, p. 173, and 30 March 1889, p. 111, Michigan-California Lumber Company Collection.

71. Saginaw Board of Trade, Annual Review, 12 (1892), 28.

72. Saginaw Board of Trade, Annual Review, 12 (1892), 54-56.

73. Saginaw Board of Trade, Annual Review, 4 (1884), 15-16; 12 (1892), 26, 28, 54-55; Hackley and Hume Shipping Book, Vol. 198, Hackley & Hume Collection.

74. Saginaw Board of Trade, Annual Review, 4 (1884), 16; 12 (1892), 27; Franklin B. Hough, Report Upon Forestry (Washington: Government Printing Office, 1878), p. 517.

75. Saginaw Board of Trade, Annual Review, 12 (1892), 22.

76. Saginaw Board of Trade, Annual Review, 12 (1892), 55; Letter from Hackley & Sons to Leonard Lawrence & Co., 13 May 1878, Hackley & Hume Letterbook #3, pp. 412-413.

Lumber shipped via lake vessel might have been stained or warped by the elements. As Fries has pointed out, there were certain advantages for wholesalers in the major wholesale



centers to order by rail as well (Empire in Pine, p. 90).

77. Hackley and Hume Shipping Book, Vol. 198; Letter from Hackley & Hume to Falconer & Emery, 22 January 1886, Hackley & Hume Letterbook #6, p. 115.

78. Dried, planed lumber was also lighter per M and had a higher \$/lb ratio.

79. Hotchkiss, History of the Lumber Industry, pp. 155-156; David Ward, The Autobiography of David Ward (New York: Privately Printed, 1912), pp. 152-153; Glenn Porter and Harold C. Livesay, Merchants and Manufacturers: Studies in the Changing Structure of Nineteenth-Century Marketing (Baltimore: The Johns Hopkins Press, 1971), pp. 1-12. See also Wroe Alderson, "Factors Governing the Development of Marketing Channels," Classics in Marketing, ed. C. Glenn Walters & Donald P. Robin (Santa Monica: Goodyear Publishing Company, 1978), pp. 15-29.

80. Michigan Bureau of Labor, Annual Report, 1 (1884), 159-161.

81. Letter from C.H. Hackley & Co. to Wickes Bros., East Saginaw, 18 February 1879, Hackley & Hume Letterbook #3, p. 615; Letter from Hackley & Hume to T. Ewing, Milwaukee, 29 March 1880, Hackley & Hume Letterbook #4, p. 259; Letter from Hackley & Hume to C. Eyke, Harrison, 31 March 1893, Hackley & Hume Letterbook #10, pp. 42-43; Letter from Hackley & Hume to H. C. Akeley, Minneapolis, 30 November 1893, Hackley & Hume Letterbook #10, p. 470; Letter from Hackley and Hume to Blodgett, Cummer, & Diggins, Cadillac, 27 April 1894, Hackley & Hume Letterbook #11, p. 42.

82. Saginaw Board of Trade, Annual Review, 12 (1892), 23, 48; 2 (1882), 9-11; Muskegon Journal, 30 December 1879, Supplement, p. 1; Michigan Bureau of Labor, Annual Report, 3 (1886), 111-112; Goodstein, Biography of a Businessman, pp. 69-70; Letter from Hackley and Hume, 10 December 1887, Vol. 199, p. 31, Hackley & Hume Collection; Miscellaneous loose notes and pp. 10, 26, 34, 36, 38, 41, and 44 in Vol. 199, Hackley & Hume Collection; Letter from C.H. Hackley & Co. to Wickes Brothers, East Saginaw, 18 February 1879, Hackley & Hume Collection Letterbook #3, p. 615; U.S., Eleventh Census, 1890, Vol. 6, Part II, Statistics of Cities, pp. 54-61, 354-357, 502-505.

83. Though a few authors have suggested that 2 M per man/day was common in the 1870's, and 3 M per man/day by the late 1880's, I find no evidence to support this (Barbara Ellen Benson, "Logs and Lumber: The Development of the Lumber Industry in Michigan's Lower Peninsula, 1837-1870" [unpublished PhD

dissertation, Indiana University, 1976], p. 229; James Glasgow, Muskegon, Michigan: Evolution of a Lake Port [Chicago, Illinois: Private Edition, Distributed by the University of Chicago Libraris, 1939], p. 33).

84. Saginaw Board of Trade, Annual Review, 2 (1882), 10-11; 4 (1884), 10; 12 (1892), 48; Michigan Bureau of Labor, Annual Review, 3 (1886), 111-112, 124.

85. Saginaw Board of Trade, Annual Review, 12 (1892), 48.

86. U.S., Eleventh Census, 1890, Vol. 6, Part II, pp. 54-61, 354-357, 502-505.

87. The U.S. Census used a broad definition of "manufacturing"; it included craftsmen, artisans, and the construction trades.

For more on the growth of secondary industry in Michigan mill towns, see Saginaw Board of Trade, Annual Review, 12 (1892), 19-23, 47-49.

88. James Bruce Smith, "Lumbertowns in the Cutover: Comparative Study of the Stage Hypothesis of Urban Growth," (unpublished PhD dissertation, University of Wisconsin, 1973), pp. 43-54; Hotchkiss, History of the Lumber Industry, p. 144.

Despite the drop in Saginaw Valley and Saginaw County output, production in Saginaw City proper was still high in 1889 (Saginaw Board of Trade, Annual Review, 12 [1892], 48).

89. Michigan Bureau of Labor, Annual Report, 2 (1885), 135-137, 139-140; 3 (1886), 219-267, 396; 4 (1887), 240-1.

Women were very rarely employed in Michigan sawmills (Michigan Bureau of Labor, Annual Report 3 [1886], 125).

In 1885 50% of the estimated school age population in East Saginaw did not attend school, up from 36% in 1874 (Michigan Bureau of Labor, Annual Report, 2 [1885], 65).

90. This trend is shown clearly in Mark D. Cook's map "Percent of Foreign Born Population By County: 1890," The Geography of Labor, ed. Sari Bennett and Carville Earle, p. 54.

In Glaab and Larsen's study of the Neenah-Menasha region of Wisconsin, an area known for woodworking industries and paper mills, the authors concluded that the region never reached the level of foreign born in the eastern industrial mill towns, which was often 43 percent foreign born. Yet it appears that errors in arithmetic mislead Glaab and Larsen. Their own data show that 39% of Mennah-Menasha were immigrants in 1885, not less than 30% as claimed by the authors (Charles N. Glaab and Lawrence H. Larsen, Factories in the Valley: Neenah-Menasha, 1870-1915 [Madison: State Historical Society of Wisconsin,

1969], pp. 201-203).

91. This and the following paragraphs are based primarily on two sources. First, the nativity of lumber workers at the state level may be found in the U.S., Ninth Census, 1870, Vol. I, Population, pp. 740-741, 746; U.S., Tenth Census, 1880, Vol. I, Population, pp. 748-751, 829-830, 853; U.S., Eleventh Census, 1890, Population, Part II, pp. 318-323, 336-341, 570-573, 624-625. These data represent the nativity of workers who identified themselves as employed in the lumber industry. Each census year the definition was quite broad, covering all aspects of lumbering, that is logging, driving, and milling. Because of the isolation of the logging camps, logging's relatively short season, and springtime enumeration it is assumed that these data best describe the sawmill work force, see George B. Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949), pp. 54-60, especially table 4 on p. 55, for an extensive discussion and presentation of these data.

Second, the Michigan Bureau of Labor and Industrial Statistics, founded in 1883, made an attempt to survey the "wage earners" in selected Michigan towns. East Saginaw and the twin villages of Oscoda and Au Sable were included in this survey as examples of sawmill towns and because of a recent strike in the latter villages. In each canvass the bureau attempted to reach as many workers as possible. The total survey in East Saginaw included 2752 men, and in Oscoda/Au Sable 778 men. This was roughly 50% of the whole work force in each case. The present author excluded all workers who were not employed in the lumber industry to produce a new data set for each town: Oscoda/Au Sable N = 646, East Saginaw N = 1153 (Michigan Bureau of Labor, Annual Report, 2 [1885], 151-3, 154-5).

Vernon H. Jensen provides a very general introduction in his Lumber and Labor (New York: Farrar & Rinehard, 1945), pp. 50-51.

92. This was the case in the 1884 survey of Oscoda/Au Sable where 333 of a total of 385 mill laborers were foreign born. That year all 45 of the lumber pilers surveyed were foreign born. Michigan Bureau of Labor, Annual Report, 3 (1886), 125.

93. In 1879 30% of Michigan lumber workers were Canadian, while 9% in Wisconsin, and 21% in Minnesota were Canadian. In 1884 30% of the lumber work force in East Saginaw was Canadian. In the Wisconsin manufacturing towns of Neenah and Menasha the largest ethnic group was consistently German, while Canada was poorly represented. In 1885 Germany, Scandinavia, England, and Ireland all contributed more people than Canada to this Wisconsin manufacturing center (Glaab and Larsen, Factories, pp. 199-200; Michigan Bureau of Labor, Annual Report, 3 (1886), 125.

94. Engberg, "Labor in the Lake States Lumber Industry," p. 55.

95. Michigan Bureau of Labor, Annual Report, 2 (1885), 151-155.

96. Letter from Hackley & Hume to Blodgett, Cummer, & Diggins, 13 November 1893, Hackley & Hume Letterbook #10, p. 441; Michigan Bureau of Labor, Annual Report, 1 (1884), 160 and 2 (1885), 207-209. Wages fell 10-25% in 1884 according to the Michigan Bureau of Labor (p. 116).

These wages seem to be higher than those paid elsewhere in the Great Lakes, see Glaab and Larsen, Factories, pp. 224-228.

97. Michigan Bureau of Labor, Annual Report, 1 (1884), 160.

In 1885 54% of the 4232 men from 77 saw mills earned \$1.62 or less (Goodstein, Biography of a Businessman, p. 82, quoting Michigan Bureau of Labor, Annual Report, 3 [1886], p. 16).

98. Engberg, "Labor in the Lake States Lumber Industry," pp. 61-68; Michigan Bureau of Labor, Annual Report, 2 (1885), 135-137.

99. Michigan Bureau of Labor, Annual Report, 2 (1885), 180-182, 168-169, 184, 171.

100. Michigan Bureau of Labor, Annual Report, 10 (1893), 1075-1076.

101. Michigan Bureau of Labor, Annual Report, 1 (1884), 160 and 2 (1885), pp. 207-9; Letter from Hackley & Hume to Blodgett, Cummer, & Diggins, 13 November 1893, Hackley & Hume Letterbook #10, p. 441.

102. Michigan Bureau of Labor, Annual Report, 10 (1893), 1084-1085.

103. Quoted in Goodstein, Biography of a Businessman, p. 132.

104. Muskegon Journal, 30 December 1879, Supplement, p. 4.

105. See Fitzmaurice, "The Shanty Boy", pp. 168-170; Goodstein, Biography of a Businessman, pp. 119, 123 ff; Glaab and Larsen, Factories, pp. 160-162.

106. Michigan Bureau of Labor, Annual Report, 2 (1885), 118.

107. Jensen argues that lack of unionism by lumber

workers was due to seasonality, individualism, isolation of camps, and the control of mill towns by mill owners (Lumber and Labor, pp. 58-59).

The Knights of Labor were founded in Philadelphia in 1873 and organized in Michigan in 1879. The 5th "General Assembly" was held in Detroit in September 1881 at which the Knights voted to end their pact of secrecy and openly solicit members. The Knights recruited widely in Michigan and elected city officials in Alpena, Muskegon, and Saginaw (Michigan Bureau of Labor, Annual Report, 1 [1884], p. 68).

108. Bennett and Earle, The Geography of Labor, p. 12; Michigan Bureau of Labor, Annual Report, 2 (1885), 18-20 and 5 (1888) 398-429.

For a general discussion of strikes in the lumber industry, see Jensen, Lumber and Labor, pp. 59-63.

109. Michigan Bureau of Labor, Annual Report, 2 (1885), 34-38.

110. Michigan Bureau of Labor, Annual Report, 2 (1885), 34-38.

111. Blodgett, for example, founded Cadillac's first bank and operated it as a separate arm of his lumbering operation.

112. See the Michigan-California Lumber Company, Louis Sands, and Hannah, Lay & Company Collections at the Michigan Historical Collections, Bentley Historical Library, University of Michigan.

## Chapter 6

1. Saginaw Board of Trade, Annual Review, 12 (1892), 25.

2. Mancelona Herald, 2 April 1896; Hackley & Hume Letterbook #11, 11 August 1893, p. 280, Hackley and Hume Collection, Archives and Historical Collections, Michigan State University.

3. Mancelona Herald, 12 October 1899.; David Ward, The Autobiography of David Ward (New York: Privately printed, 1912), pp. 179, 182.

4. Timberman, 17 September 1898. p. 44.

5. American Lumberman, 17 February 1906, p. 54.

6. George Baker Engberg, "Labor in the Lake States Lumber Industry, 1830-1930" (unpublished PhD dissertation, University of Minnesota, 1949), p. 11.

7. Michigan, Census of the State of Michigan, 1904, Vol. II, Agriculture, Manufactures and Mines (Lansing: Wynkoop Hallenback Crawford Co., 1905), pp. 620-622. Figures are adjusted to represent changing definitions of variables (see discussion, p. 622). Neither agriculture, mining, nor logging are considered by this census to be manufacturing industries.

8. R.V. Reynolds and A.H. Pierson, Forest Products Statistics of the Lake States, U.S.D.A. Statistical Bulletin No. 68 (Washington: Government Printing Office, 1939), pp. 29, 31; Census of Michigan, 1904, V. II, pp. 652-653.

9. For an introduction to David Ward and the David Ward Estate see Carl Addison Leech, "Deward: A Lumberman's Ghost Town," Michigan History, 28 (1944), 5-19; Rolland H. Maybee "David Ward: Pioneer Timber King," Michigan History, 32 (1948), 1-14; David Ward, The Autobiography of David Ward (New York: Privately printed, 1912); Willis C. Ward, "Reminiscences of Michigan's Logging Days," Michigan History, 20 (1936), 301-312.

For background on the H.M. Loud and Sons Lumber Company, see George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest (Chicago: George W. Hotchkiss, 1898), pp. 161-163; Earl H. Frothingham, "Review of a Hardwood Lumbering Operation in Michigan," October 1905, Typescript, Natural Science Library, University of Michigan. I am indebted to Tom Beauvais of Ann Arbor, Michigan, who first brought the latter source to my attention.

10. Crawford County Avalanche (from American Lumberman), 16 January 1902; Russell Watson, "Forest Devastation in Michigan: A Study of Some of Its Deleterious Economic Effects," Journal of Forestry, 21 (1923), 440.

11. See, e.g., A.S. Draper, "Reminiscences of the Lumber Camp," Michigan History 14 (1930), 447-448; John J. Heilala, "With the Big Wheels", Michigan History, 38 (1954), 296.

12. W.B. Mershon, Report of the Directors, Michigan Forestry Commission, 1904/05, p. 102.

13. U.S., Department of Commerce, Bureau of Corporations, The Lumber Industry, Vol. I: Standing Timber (Washington, Government Printing Office, 1913), p. 22.

14. Hotchkiss, History of the Lumber Industry, pp. 72, 75; Leech, "Deward," p. 8; David Ward, Autobiography, pp. 80, 85, 149, 163.

15. Thomas R. Cox, "The Stewardship of Private Forests: The Evolution of a Concept in the United States, 1864-1950," Journal of Forest History, 25 (1981), 192-193.

16. Blodgett Stumpland Inventory, 1 May 1901, Michigan-California Lumber Company Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan; Atlas of Wexford County (Chicago: E.L. Hayes, 1889).

17. Leo Alilunas, "Michigan's Cut-over 'Canaan,'" Michigan History, 26 (1942), 191-196; Watson, "Forest Devastation in Michigan," p. 437. See also Lucile Kane, "Settling the Wisconsin Cutovers," Wisconsin Magazine of History, 40 (Winter 1956-57), 91-98; Lucile Kane, "Selling Cut-Over Lands in Wisconsin," Business History Review, 28 (1954), 236-247.

18. Blodgett Stumpland Inventory, 1 May 1901, Michigan-California Lumber Company Collection; Land Contract, Delos A. Blodgett and others with Walter P. Rich, 19 November 1903, Box 17, Michigan-California Lumber Company Collection; Letter, J. Van Ellen, of Blodgett & Co. Ltd. to Bradley E. Hough, 15 February 1907, Book #7, Michigan-California Lumber Company Collection; Land Contract, Delos A. Blodgett and others with David Garoe, 8 March 1899, Box 22, Michigan-California Lumber Company Collection; Watson, "Forest Devastation," p. 441; Frothingham, "Review of a Hardwood Lumbering Operation," p. 7.

Garoe's contract with Blodgett was cancelled when Garoe became three months behind in his payments.

19. Alilunas, "Cut-over 'Canaan,'" pp. 197-199.

20. For a discussion of agricultural potential of northern Lower Michigan, see U.S., Department of Interior, National Resource Committee, Regional Planning: Part VIII, Northern Lake States, Report of the Northern Lake States Regional Committee to the National Resources Committee (Washington: Government Printing Office, 1939), p. 26; Lawrence M. Sommers, ed., Atlas of Michigan (Grand Rapids: William B. Eerdmans Publishing, 1977), p. 38.

21. H.C. McKinley, The Au Sable River (1933), quoted in Hazen L. Miller, The Old Au Sable (2d ed.; Grand Rapids: William B. Eerdmans, 1964), pp. 61-62.

22. Arthur W. Stace, "What Are We Going To Do With 2,208,975 Added Acres?" ([n.p.]: Michigan Department of Conservation, [1941?]), p.4; Edward E. Sturgeon, "Trends In Land Use and Ownership in Cheboygan County, Michigan" (unpublished PhD dissertation, The University of Michigan, 1954), pp. 3-6; Watson, "Forest Devastation in Michigan," p. 442; William N. Sparhawk and Warren D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), p. 73.

23. Filbert Roth, "Biennial Report of the Forest Warden," Report of the Directors, Michigan Forestry Commission, 1907/08, pp. 20-21; Paul D. Kilburn, "Effect of Settlement on the Vegetation of the University of Michigan Biological Station," Papers of the Michigan Academy of Science, Arts, and Letters, 45 (1960), 79-80.

For a general treatment of logging and forest fires in the Lake States see Stephen J. Pyne, Fire in America: A Cultural History of Wildland and Rural Fire (Princeton: Princeton University Press, 1982), pp. 199-218.

24. Sparhawk and Brush, Economic Aspects of Forest Destruction, p. 90; Miller, Au Sable, pp. 166-167. For other accounts of fire fighting and fire damage see Mancelona Herald, 30 April 1903; 3 September 1908; 13 July 1911; 20 July 1911; also Secord Diary, August 1908, p. 61, Mabel Secord Collection, Bentley Historical Library, Michigan Historical Collections, The University of Michigan; Gerald Micketti, "The Day Metz Burned," Michigan History, 65 (1981), 12-16.

25. F. Roth, "Biennial Report," Report of the Directors, Michigan Forestry Commission, 1907/08, pp. 19-21; Paul Kilburn, "Effects of Logging and Fire on Xerophytic Forests in Northern Michigan," Bulletin of the Torrey Botanical Club 87 (1960), 403; C.E. Ahlgren, "Effects of Fire on Temperate Forests: North Central United States," Fire and Ecosystems, ed. T.T. Kozlowski and C.E. Ahlgren (New York: Academic Press, 1974), pp. 196, 202; Silas Little, "Effects of Fire on Forests: Northeast United States," Fire and Ecosystems, ed. T.T. Kozlowski and C.E. Ahlgren (New York: Academic Press, 1974), pp. 231, 233; Frothingham, "Review of Hardwood Lumbering," p. 55.

Kilburn argues that these post-logging forest fires did not do permanent damage to the sandier soils of northern Michigan (where most of the fires occurred) due to their resistance to erosion (Paul Dayton Kilburn, "Historical Development and Structure of the Aspen, Jack Pine and Oak Vegetation Types on Sandy Soils in Northern Lower Michigan," [Unpublished Ph.D. Dissertation, The University of Michigan, 1957], pp. 228-229).

For an introduction to the ecology of fire see Henry A. Wright and Arthur W. Bailey, Fire Ecology, United States and Southern Canada (New York: Wiley-Interscience, 1982).

26. See, for example, George Perkins Marsh, Man and Nature, or Physical Geography as Modified by Human Action (1864; rpt. ed. David Lowenthal, Cambridge: Belknap Press, 1965); Eugen Coan, "James Graham Cooper, Pioneer Naturalist and Forest Conservationist," Journal of Forest History 27 (1983), 126-129.

For a background on the Conservation movement in Michigan see Norman J. Schmaltz, "Cutover Land Crusade: The



Michigan Forest Conservation Movement, 1899-1931," (unpublished PhD dissertation, University of Michigan, 1972); also Samuel P. Hays, Conservation and the Gospel of Efficiency: The Progressive Conservation Movement, 1890-1920 (1959; rpt. New York: Atheneum, 1975).

27. F. Clever Bald, Michigan in Four Centuries (New York: Harper and Row, Publishers, 1954), pp. 353-4; Michigan Forestry Commission, Report of the Directors, 1905/06, p. 109; Ruben J.E. Greffenius, "Development of Michigan Public Land Policy" (unpublished PhD dissertation, University of Michigan, 1968), pp. 26-27.

28. Watson, "Forest Devastation in Michigan," p. 446.

29. Kilburn, "Logging and Fire," pp. 403, 405.

30. In the Loud & Sons camps the axes were the "regulation Michigan double-bitted" and weighed 3 to 5 pounds (Frothingham, "Review of Hardwood Lumbering," pp. 20, 40).

31. For a contemporary review of cross-cut saws, see Ralph Clement Bryant, Logging: The Principles and General Methods of Operation in the United States (New York: John Wiley & Sons, 1913), pp. 74-80.

Early versions of steam-powered sawing machines were available by 1900, but they were rarely used in the Lake States, see, e.g., George Despres, "Railroad Logging," Michigan History, 38 (1954), 184; Bryant, Logging, pp. 78-80.

32. See, e.g., Joseph F. Proctor Diary, 20 November 1870, Proctor Collection, Bentley Historical Library, Michigan Historical Collections, University of Michigan.

33. Frothingham, "Review of Hardwood Lumbering," pp. 25-26; Alcide Jolivet, "A Day In The Lumbering Woods," in Cadillac, its Past, Present and Future (Cadillac: The Cadillac News and Express, [1891?], p. 16; John W. Fitzmaurice "The Shanty Boy" or Life in a Lumber Camp (1889; rpt. Berrien Springs, Michigan: Hardscrabble Books, 1979), p. 73.

34. Draper, "Reminiscences," p. 446; Jolivet, "Day in the Woods," p. 14; Bryant, Logging, pp. 90, 428; Engberg, "Labor in the Lake States Lumber Industry," p. 111; Nelson C. Brown, Logging--Principles and Practices in the United States and Canada (New York: John Wiley & Sons, 1934), p. 249.

35. Frothingham, "Review of a Hardwood Lumbering," p. 23. Frothingham estimated that skilled felling could reduce skidding costs by 1/3rd (p. 23).

36. Bryant, Logging, pp. 90, 246; Brown, Logging, p. 249; Frothingham, "Review of Hardwood

Lumbering," p. 23.

J. Proctor's 1870/71 camp averaged 4500 feet of pine per man/day or 13,500 per saw (see chapter 2).

37. Frothingham, "Review of Hardwood Lumbering," p. 27; Heilala, "Big Wheels," p. 295. For a general account of skidding in the early 20th century, see Bryant, Logging, pp. 152-159, 426-427; Brown, Logging, p. 251.

38. Frothingham, "Review of Hardwood Lumbering," pp. 28-29. Frothingham gives an excellent detailed review of the use of log drays, and includes a number of useful photographs.

39. Mancelona Herald, 17 December 1908; Letter from Hackley & Hume to S.C. Overpack, 19 September 1887, Hackley & Hume Letterbook #6, p. 614; Letter from Hackley & Hume to Saginaw Lumber & Salt Company, 19 July 1894, Hackley & Hume Letterbook #11, p. 199; Frothingham, "Review of Hardwood Lumbering," pp. 30-31.

40. Frothingham, "Review of Hardwood Lumbering," pp. 27, 30-31; Heilala, "Big Wheels," p. 295. Big wheels cost \$135 new. Loud & Sons purchased hubs from Overpack and built their own 10-foot versions of the wheels. This must have been an economy measure for 10-foot Overpack wheels were available; they were built for the west coast market (Frothingham, "Review of Hardwood Lumbering," p. 30; Ray Overpack, interviewed by Curran N. Russell, Curran Northrm Russell Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan).

41. Fitzmaurice, "The Shanty Boy", p. 69.

42. For a general treatment of steam skidding and loading, see Bryant, Logging, pp. 196-221; Asa S. Williams, "Logging by Steam," Forestry Quarterly, 6 (1908), 1-33.

43. William Gerald Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 (Glendale, California: Arthur H. Clark, 1953), p. 200.

44. See, for example, Joseph Illick, "The Story of the American Lumbering Industry," A Popular History of American Invention, Vol. II, ed. Waldemar Kaempffert (New York: Charles Scribner's Sons, 1924), p. 179; Williams, "Steam," pp. 2-3.

45. For an account of early use of steam skidders and loaders in Michigan, see Fitzmaurice "The Shanty Boy", p. 69. Fitzmaurice's account may be one of the earliest extant, written in 1888 of a loader he reportedly viewed in 1883. See also Heilala, "Big Wheels," pp. 297-8.

46. Williams, "Logging by Steam," p. 8.

47. See, for example, Ervin Mancil, "Pullboat Logging," Journal of Forest History, 24 (1980), 135-141; also Donald Mackay, The Lumberjacks (Toronto: McGraw-Hill, Ryerson, 1978).

48. See photograph (c. 1880) of logs being pulled out of Lake George and loaded onto cars of the Lake George and Muskegon River Railroad in Forrest B. Meek, Michigan's Timber Battleground: A History of Clare County, 1679-1900 ([n.p.]: Clare County Bicentennial Historical Committee, 1976), p. 113.

49. Fitzmaurice, "The Shanty Boy", p. 69.

50. "Log Loader Test," Timberman, 10 December 1898, p. 30; Williams, "Logging by Steam," pp. 27-28; Bryant, Logging, pp. 323-328.

51. Williams, "Logging by Steam," pp. 22-27; Bryant, Logging, p. 323.

52. Mancelona Herald, from the Alba Sentinel, 15 June 1905; Mancelona Herald, 14 June 1904.

These were no doubt extraordinary days, but their enormity underlines the capacity of the loaders. Even higher records (up to 350 M per day) are noted in the typescripts of Mabel Secord's diaries (e.g. p. 62, 1905, Secord Collection). Bryant suggests that log loader capacity was as high as 300 M, depending upon the skill of the crew and operator, and the availability of logs and empty cars (Logging, p. 328).

53. Timberman, 20 August 1898, p. 125.

54. Frothingham, "Review of Hardwood Lumbering," pp. 32-38.

55. Despres, "Railroad Logging," pp. 182-183.

56. American Lumberman, "White Pine's Journey from Forest to Mill. A Logging Camp Sojourn--Woods Work of the Lumber Companies of Cloquet, Minn.," 31 March 1906 (#1610), p. 47.

57. Steam-driven tractors with caterpillar treads were also used, though rarely, to remove logs from the woods, see Illick, "Story of American Lumbering," pp. 170-1; Bryant, Logging, pp. 172-3; William C. Fitt, "Locomotives without Tracks: Michigan's Phoenix Log Haulers," Michigan History, 66 (1982), 45-8.

58. Mancelona Herald, 1 June 1911, 28 December 1911, see also Timberman, 18 June 1898, p. 1.

59. Timberman, 14 May 1898, p. 59.

The Cobbs and Mitchell Lumber Company built a branch line of the Grand Rapids and Indiana Railroad in Charlevoix County to feed their mill in Cadillac (Mancelona Herald, from the Boyne Falls Arena, 19 October 1899).

60. Mancelona Herald, 19 May 1892; 11 February 1897.

61. Detroit Free Press, 2 February 1901. For more on chartered railroads owned and operated by lumber concerns, see chapter 7.

62. Bryant, Logging, p. 426; Mershon, Michigan Forest Commission, Report of the Directors, 1904/05, p. 102.

63. American Lumberman, "White Pine Journey," 31 March 1906, p. 51.

64. Draper, "Reminiscences," p. 441.

65. American Lumberman, "White Pine Journey," 31 March 1906, p. 51.

66. Frothingham, "Review of Hardwood Lumbering," p. 35.

67. Frothingham, "Review of Hardwood Lumbering," p. 10.

68. This and the following discussion of yields in the Loud & Sons camps represent calculations by the author based on data provided by Frothingham, "Review of Hardwood Lumbering," p. 9.

69. Hemlock averaged 9 M per acre in northern Michigan (Bryant, Logging, p. 10).

70. American Lumberman, "White Pine Journey," 31 March 1906, p. 48; Josiah Littlefield, Josiah Littlefield: Lumberman--Conservationist, An Autobiography, ed. Hazel G. Littlefield ([n.p.]: [n.n.], [n.d.]), pp. 40-41.

71. David Ward, Autobiography, pp. 76, 80, 163.

72. Mancelona Herald, 14 July 1904, (repeated in Charlevoix Sentinel), 21 July 1904; Mancelona Herald, 15 June 1905. This report is also noted in the typescript of Mabel Secord's Diary, 1905, p. 62, Secord Collection; Timberman, 14 May 1898, p. 59.

Bryant describes a "large white pine logging company" similar to the Ward Estate (Bryant, Logging, p. 320).

Wisconsin Land and Lumber's Camp #19 in the Upper Peninsula ranged from 130 to 150 men at this time (George Baker Engberg "Labor in the Lake States Lumber Industry, 1830-1930" [unpublished PhD dissertation, University of Minnesota, 1949],

pp. 298-303. For further reports of large operations see Mancelona Herald, 13 May 1897.

73. Saginaw Board of Trade, Annual Review, 12 (1892), 33.

74. Mancelona Herald, 24 May 1894 and 25 July 1907; Hotchkiss, History of Lumbering, p. 75.

75. The following paragraph is based largely on Frothingham's "Review Of Hardwood Lumbering."

76. Frothingham, "Review of Hardwood Lumbering," pp. 8, 17, 19, 35-36, 43.

77. Census of Michigan, 1904, Vol. II, pp. 625-627.

Statistics published by the state and federal census bureaus, as well as by the Michigan Bureau of Labor Statistics, do not differentiate between logging and milling. Instead "Lumber & Timber Products," or a similar category, is used. This category includes milling and the logging camps run by the mills, but not planing mills nor sash, door, and blind companies. Independent logging is omitted.

These same issues of growing integration, dominance by large companies, and rising capitalization are dealt with in greater detail in chapter 7.

78. Crawford County Avalanche (from American Lumberman), 16 January 1902.

79. Mancelona Herald, 10 July 1902 (repeated in Charlevoix Sentinel, 17 July 1902); 11 April 1912 (from Detroit Free Press), see also Mancelona Herald, 18 May 1911, 14 March 1912.

80. Frothingham, "Review of Hardwood Lumbering," p. 54; Despres, "Railroad Logging," p. 183; Rector, Log Transportation, p. 19.

81. Frothingham, "Review of Hardwood Lumbering," p. 42.

82. Detroit Free Press, 5 September 1900. p. 7; American Lumberman, 6 January 1906, p. 60; Engberg, "Labor in the Lake States Lumber Industry," pp. 298-303; Bryant, Logging, p. 532.

The Blue Lake Lumber Company had trouble attracting workers to peel hemlock at \$26-\$30 per month, and it re-advertised for men at \$30-\$40 (Mancelona Herald, 29 May 1902).

83. Frothingham, "Review of Hardwood Lumbering," pp. 22, 36.

84. Frothingham, "Review of Hardwood Lumbering," p. 42.  
It is difficult to compare rail charges from 1905 to the those of the 1880's. By 1900 railroads typically delivered logs from skidway to millpond, while during the 1880's the railways hauled logs a few miles to a nearby river to await the annual spring drive.

85. Calculated by author from Michigan Railroad Commission, Annual Report, 32 (1904), 140-1, assuming 6000 lbs = 1000 feet of green pine logs (Rector, pp. 29, 192).

86. Bryant, Logging, pp. 32, 427. Despres, "Railroad Logging," p. 183; Frothingham, "Review of Hardwood Lumbering," p. 41.

87. Frothingham, "Review of Hardwood Lumbering," p. 40.

88. Census of Michigan, 1884, p. 337; Census of Michigan, 1904, Vol. II, p. 644, 650.

89. See also Mancelona Herald, 25 July 1907.

90. Bryant, Logging, p. 427.

91. Williams, "Logging by Steam," p. 29.

92. Williams, "Logging by Steam," p. 28.

93. Throughout the latter decades of the white pine era there was a serious problem of rollways burned by forest fires. See, for example, W.B. Mershon, Michigan Forestry Commission, Report of the Directors, 1905/06, p. 101-102.

94. Frothingham, "Review of Hardwood Lumbering," pp. 35-36, 38.

95. American Lumberman, "White Pine Journey," 31 March 1906, p. 49.

96. Illick, "Story of American Lumbering Industry," p. 159; Bryant, Logging, pp. 87, 426; Timberman, 19 March 1898, p. 33; American Lumberman, "White Pine Journey," 31 March 1906, p. 46; Mancelona Herald, 1 July 1897.

97. Frothingham, "Review of Hardwood Lumbering," p. 34; Bryant, Logging, pp. 87, 459-460.

98. Frothingham, "Review of Hardwood Lumbering," pp. 13-19; Jacob Dye and Rex J. Dye, Lumber Camp Life in Michigan (Hicksville, New York: Exposition Press, 1975), p. 15; Fitzmaurice, "The Shanty Boy", p. 22; Frank P. Bohn, "This Was the Forest Primeval," Michigan History, 21 (1937), 33-38, 185.

99. Mancelona Herald, 1 December 1898; Photo Collection, "Lumber," Michigan Historical Collections, Bentley Library, University of Michigan; Bryant (Logging, p. 66) describes an Oregon railroad camp for 80 men: 10 cars with showers, steam heat, and electric lights.

See Frothingham, "Review of Hardwood Lumbering," pp. 13-20, for a description of a turn-of-the-century-camp.

100. Heilala, "Big Wheels," p. 293; Bohn, "Forest Primeval," Michigan History, 21 (1937), 185.

101. Frothingham, "Review of Hardwood Lumbering," pp. 16-17; American Lumberman, "White Pine's Journey," 31 March 1906, p. 46; Jolivet, "Day in the Woods," p. 10; Dye and Dye, Lumber Camp Life, p. 27; Heilala, "Big Wheels," pp. 299-300.

102. Stanley Lebergott, Manpower in Economic Growth (New York: McGraw-Hill, 1964), pp. 524, 528; Mancelona Herald, 29 May 1902; Detroit Free Press, 5 September 1900, p. 7; Bohn, "Forest Primeval," p. 183; Engberg, "Labor in the Lake States Lumber Industry," p. 354; Engberg lists the median wage for an Upper Peninsula logging camp from 1883 to 1906 (pp. 298-303).

Average annual earnings of non-farm employees in the United States rose from \$446 in 1885 to \$550 in 1905, up 23% (Lebergott, pp. 524, 528). Average annual earnings in Michigan manufacturing rose at roughly the same rate, Census of Michigan, 1884, p. xxxi; Census of Michigan, Vol. II, 1904, p. 648.

103. American Lumberman, "White Pine's Journey," 31 March 1906, p. 47. For a general treatment of the problem of labor transiency, see Engberg, "Labor in the Lake States Lumber Industry," pp. 68 ff. For a discussion of higher wages as an incentive to work less, see Peter Mathias, "Leisure and Wages in Theory and Practice," The Transformation of England: Essays in the Economic and Social History of England in the Eighteenth Century (New York: Cambridge University Press, 1979), pp. 148-167.

104. Bryant, Logging, p. 426. See chapter 7 for more detailed treatment of wages and nativity in the lumber industry.

105. Bohn, "Forest Primeval," p. 183; Engberg, "Labor in the Lake States Lumber Industry," pp. 80-85.

## Chapter 7

1. Henry B. Steer, Lumber Production in the United States, 1799 - 1946, U.S.D.A Publication No. 669 (Washington: Government Printing Office, 1948), p. 11.

2. Michigan, Census of the State of Michigan, 1904, V. II, Agriculture, Manufactures, and Mines (Lansing: Wynkoop Hallenbeck Crawford, 1906), pp. 618, 620-622.

3. Steer, Lumber Production, p. 11.

4. R. V. Reynolds and A. H. Pierson, Forest Product Statistics of the Lakes States, U.S.D.A Statistical Bulletin No. 68 (Washington: Government Printing Office, 1939), pp. 5, 9, 13.

5. Census of Michigan, 1904, V. II, pp. 618, 620-622.

Logging is not included as part of the lumber industry, nor is agriculture--which paid roughly the same amount of wages and accounted for twenty times the amount of capital invested--included as manufacturing (p. xiii).

6. James Bruce Smith, "Lumbertowns in the Cutover: A Comparative Study of the Stage Hypothesis of Urban Growth" (unpublished PhD dissertation, University of Wisconsin, 1973), pp. 43-54.

7. Saginaw Board of Trade, Annual Review, 12 (1892), 11, 19, 31; Henry Vivian Nelles, The Politics of Development: Forests, Mines, & Hydro-Electric Power in Ontario, 1849-1941 (Hamden, Connecticut: Archon Books of Shoe String Press, 1974), pp. 86 ff; Robert C. Johnson, "Logs For Saginaw: The Development of Raft-Towing on Lake Huron," Inland Seas, 5 (1949), 87 ff; A.R.M. Lower, The North American Assault on the Canadian Forest: A History of the Lumber Trade Between Canada and the United States (Toronto: The Ryerson Press, 1938), p. 154.

After 1898 logs were occasionally rafted from Ontario to Michigan, though they were subject to a Canadian export duty (Detroit Free Press, 16 September 1900, p. 10).

8. These large rafts disrupted navigation, especially along the St. Mary's River and the North Channel, and were the subject of vociferous complaints by shipping companies (Johnson, "Logs for Saginaw: Raft-Towing," pp. 87 ff; William Gerald Rector, Log Transportation in the Lake States Lumber Industry, 1840-1918 [Glendale, California: Arthur H. Clark Company, 1953], p. 170).



9. The Timberman, 18 June 1898, p. 21; Johnson, "Logs For Saginaw: Raft-Towing," pp. 83-84; George W. Hotchkiss, History of the Lumber and Forest Industry of the Northwest (Chicago: George W. Hotchkiss, 1898), p. 144; Ralph Clement Bryant, Logging: The Principles and General Methods of Operation in the United States (New York: John Wiley & Sons, 1913), pp. 382-383.

10. Saginaw Board of Trade, Annual Reivew, 12 (1892), p. 31; Hotchkiss, History of the Lumber Industry, pp. 143-144.

11. Saginaw Board of Trade, Annual Review, 12 (1892), 33; Timberman, 1 January 1898, p. 23; Timberman, 22 October 1898, p. 23; Rector, Log Transportation, p. 169.

12. Hazen L. Miller, The Old Au Sable (2d ed.; Grand Rapids, Michigan: William B. Eerdmans Publishing Co., 1963), pp. 37-38; Letter from Hackley & Hume to Eyke, Harrison, Michigan, 11 June 1894, Hackley & Hume Letterbook #11, p. 113, Hackley & Hume Collection, Archives and Historical Collections, Michigan State University; Rector, Log Transportation, pp. 180-181, 187-188; Bryant, Logging, pp. 371-372, 392. The last years of driving on a river were characterized by salvage operations. White pine was scarce and hundreds of millions of feet of logs were at the bottoms of Michigan's rivers. These logs gave a final season's business to a sawmill or two in many mill towns, but new legal entanglements arose over their rightful ownership.

13. Hotchkiss, History of the Lumber Industry, pp. 142-143.

14. Timberman, 18 June 1898, p. 21; Mancelona Herald, 19 May 1892, 11 February 1897, 19 October 1899 (from the Boyne Falls Arena), 1 June 1911; Josiah Littlefield, Josiah Littlefield: Lumberman--Conservationist, An Autobiography, ed. Hazel G. Littlefield ([n.p.]: [n.n.], [n.d.]), p. 57.

15. Earl H. Frothingham, "Review of a Hardwood Lumbering Operation in Michigan," Typescript, 1905, Natural Science Library, University of Michigan, pp. 6, 11, 41-42, 54. In 1905 the cost of hauling logs by rail was \$1.74 per M in the Loud & Son operation.

16. Detroit Free Press, 2 February 1901. Mancelona Herald, 7 May 1891, 24 May 1894 (from Gaylord Herald), 25 July 1907; George C. Despres, "Railroad Logging," Michigan History, 38 (1954), 182. See also Donald Stroup, The Manistee & Northeastern: The Life and Death of a Railroad (Kalamazoo, Mich.: Historical Society of

Michigan, 1964).

17. See chapter 5 for a discussion of the dynamics of mill location.

18. Russell Watson, "Forest Devastation in Michigan: A Study of Some of Its Deleterious Economic Effects," Journal of Forestry, 21 (1923), 432.

19. Watson, "Forest Devastation," p. 432. William N. Sparhawk and Warren D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), 17.

20. Sparhawk and Brush, Forest Destruction, p. 13.

21. Census of Michigan, 1904. Vol. II, pp. viii-xi.

22. Edward E. Sturgeon, "Trends in Land Use and Ownership in Cheboygan County, Michigan" (unpublished PhD Dissertation, University of Michigan, 1954), p. 124.

23. Leo Alilunas, "Michigan's Cut-Over 'Canaan,'" Michigan History, 26 (1942), 199. See also Lucile Kane, "Settling the Wisconsin Cutovers," Wisconsin Magazine of History, 40 (1956-1957), 91-98; James Glasgow, Muskegon, Michigan: The Evolution of a Lake Port (Chicago, Illinois: Private edition, distributed by the University of Chicago Libraries, 1939), pp. 62-63.

23. Sparhawk and Brush, Forest Destruction, p. 18. Alpena actually lost population between 1900 and 1910.

25. Sparhawk and Brush, Forest Destruction, p. 16.

26. There were twenty-two mills with production levels over 15 million feet in 1909; 851 mills cut less than .5 million feet. U.S., Bureau of Commerce, Bureau of Corporations, The Lumber Industry, Part I: Standing Timber (Washington: Government Printing Office, 1913), p. 278.

27. Reynolds and Pierson, Forest Products Statistics, p. 5.

28. Timberman, 14 May 1898, p. 59.

An analysis of trade journal advertising hints at the preeminence of the band saw. During 1889, 82 saw machine ads appeared in the Timberman (Chicago). Of these 60% featured gang mills, 40% featured band mills, and there were no advertisements for circular saws. In 1899, 125 saw machine advertisements appeared in the American Lumberman (Chicago), successor to the Timberman and the Northwest Lumberman. Ninety per cent of these ads featured band saws and 10% circular

saws while there were no ads for gang saws. The manufacturers of mill machinery offered both the band and the gang as saws with high resource economy in the 1880's; by the end of the century the band had proven the more efficient.

29. Timberman, 19 November 1898, p. 22.

30. Letter from Jim Secord to Mabel Secord, 24 February 1901, 20 December 1901, 14 April 1904, Secord Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan; Mancelona Herald, 2 October 1902 (from East Jordan Enterprise), 16 April 1903, 18 March 1909 (from Bay City Tribune), 10 August 1911, 11 April 1912 (from Detroit Free Press).

31. Frothingham, "Review of Hardwood Lumbering," pp. 43, 46, 51.

32. Daily shipments of logs out of the woods by rail reduced the danger, of course, but it was not always feasible for a logging train to load at a half dozen or so skidways every day. The accumulation of logs at skidways was common, and the presence of railroads in the forest added to the fire danger.

33. The Deward mill often ran a second shift from April to September or October, though some years the double shift was kept on through the winter as well (Secord Diaries, passim, and 1 December 1908, p. 63, Secord Collection).

34. Timberman, 1 January 1898, p. 21 (from Bay City Tribune).

35. Frothingham, "Review of Hardwood Lumbering," p. 43.

36. American Lumberman, 6 January 1906, p. 21.

37. Reynolds and Pierson, Forest Products Statistics, p. 38; Salling Hanson Lumber Books, Passim, Salling, Hanson and Company Collection, Michigan Historical Collections, Bentley Historical Library, University of Michigan; see, e.g., December 1900, p. 60; December 1902; p. 443; December 1904, p. 212; and December 1906, p. 366.

Much of the pine cut at the turn of the century had been passed over by two or three cuttings. Those concerns that were logging high quality white pine stands, such as the Ward Estate and Salling, Hanson & Co., both of the Grayling area, received \$20 to \$45 per M for pine lumber.

38. Michigan, Bureau of Labor and Industrial Statistics, Annual Review, 10 (1893), 907.

39. Bureau of Corporations, The Lumber Industry, Part I, pp. 37-41. The bureau concluded that ". . . it does not generally pay to build a large mill unless to cut a tract of

timber already in possession (p. 35).

40. Crawford Avalanche, 16 January 1902 (From the American Lumberman).

41. See, e.g., Blodgett Journal "H," pp. 131, 157, 169, and 180, Michigan-California Lumber Company Collection,, Michigan Historical Collections, Bentley Historical Library, University of Michigan.

42. Bureau of Corporations, The Lumber Industry, Part I, p. xiv.

43. Bureau of Corporations, The Lumber Industry, Part I, p. xvii.

44. Reynolds and Pierson, Forest Products Statistics, pp. 5-6.

These state statistics include, of course, the Upper Peninsula, where timber was less scarce. Thus these figures tend to underplay the extent of decline in the Lower Peninsula.

45. Salling Hanson Lumber Book, 1900, p. 60; 1906, p. 366. Lumber sales could well be affected by market fluctuations, but these figures appear to represent a trend.

46. Frothingham, "Review of Hardwood Lumbering," pp. 44-5.

47. Michigan Bureau of Labor and Industrial Statistics, Annual Review, 20 (1902), 371.

48. Frothingham, "Review of Hardwood Lumbering," p. 53.

49. Mancelona Herald (from the Charlevoix Herald), 5 July 1906.

50. Statistics of Lake Commerce, by George Tunnell (U.S. House Documents, 55th Congress, 2nd Session, Serial #3679 No. 277), p. 97.

51. Saginaw Board of Trade, Annual Review, 12 (1892), 56.

52. Lake Commerce, p. 96.

53. Lake Commerce, pp. 95-96; Hotchkiss, History of the Lumber Industry, p. 148.

54. Lake Commerce, p. 96.

55. Saginaw Board of Trade, Annual Review, 12 (1892), 33.

19. 56. U.S., Census, 1950, Population, Vol. I, p.
57. Lake Commerce, p. 101.
58. Salling Hanson, for example, shipped largely to Michigan and Ohio points (Salling and Hanson Lumber Books).
59. Lake Commerce, p. 35.
60. Mancelona Herald, 18 March 1909.
61. Most mills sawed many species depending upon the cost and availability of timber. The Deward mill sawed largely white pine, but it sawed hemlock and hardwood as well. Salling, Hanson and Company was operated in the same general area as the Ward Estate and this firm was cutting a even balance of pine, maple, and hemlock at this time (Salling, Hanson Lumber Books).
62. Frothingham, "Review of Hardwood Lumbering," p. 43. Higher hemlock output was gained in part by the cutting of large hemlock timbers.
63. Productivity and capital/labor ratios did not increase over this period.
64. Michigan Census, 1904, V. II, Table VII, pp. 632-633.
65. Michigan Census, 1904, V. II, pp. 626-627. The lumber industry had a lower percent of proprietorships than the state average in 1904 (pp. 626-629). Corporations loomed even larger in Michigan industry as a whole, contributing 75% to 83% of of the total amount of capital, wages, value of product, and number of employees (N = 7446) (pp. 628-9).
66. Glasgow, Muskegon, p. 61.
67. Glasgow, Muskegon, p. 49.
68. Census of Michigan, 1904, V. II, pp. 656-657, 666-671, 682-685.
69. American Lumberman, 6 January 1906, p. 53. In its 17 February 1906 issue, the American Lumberman implies that this figure is more than 150 million feet of white pine.
70. Detroit Free Press, 1 October 1900, p. 3.
71. L.H. Wood, Geography of Michigan: Physical, Industrial and Sectional (Kalamazoo: Horton-Beimer Press, 1914), pp. 136-139.

72. Sparhawk and Brush, Forest Destruction, pp. 27-8.
73. Glasgow, Muskegon, pp. 56-60.
74. Glasgow, Muskegon, p. 49.
75. D.L. Gibson, Socio-Economic Evolution in a Timbered Area in Northern Michigan, Michigan Agricultural Experiment Station, Technical Bulletin No. 193 (East Lansing: Michigan State College, 1944), p. 31. Gibson notes that in terms of number of establishments, Cheboygan County did not decline relative to many southern Michigan counties; Cheboygan did, however, decline relative to these counties in terms of total employees.
76. Allan Pred, City Systems in Advanced Economies, Past Growth, Present Processes, and Future Development Options (New York: John Wiley & Sons, 1977), pp. 87 ff. Decline was measured relative to both manufacturing growth in the large regional centers and population growth in the counties.
77. Sidney Glazer, "The Beginnings of the Economic Revolution in Michigan," Michigan History, 34 (1950), 196-8.
78. This sketch is based primarily on Gibson, Timbered Area.
79. Quoted in Gibson, Timbered Area, pp. 25-26.
80. Gibson, Timbered Area, p. 41.
81. Gibson, Timbered Area, p. 42.
82. Gibson, Timbered Area, p. 52.
83. Glasgow, Muskegon, p. 50.
84. Glasgow, Muskegon, pp. 50-53.
85. L. Connor, "Camera Notes on Muskegon and Milwaukee," 1893, Burton Historical Collection, Detroit Public Library.
86. Glasgow, Muskegon, pp. 54-56. See Standard Atlas of Muskegon County, 1900, for plat of Muskegon Heights industrial park, pp. 42-43.
87. Saginaw Board of Trade, Annual Review, 12 (1892), 49.
88. So Jim Secord, mill foreman, explained to his new wife in a description of their new home (Secord Letters, 6

December 1901).

89. Second Letters, 20 October 1901, 9 December 1901; Second Diaries, 9 September 1902, p. 36.

90. See, for example, Saginaw & Vacinity ([n.p.]: S.H. Knox, 1904)

91. See, for example, C.H. Hackley, An Appreciation (Muskegon: Hackley Memorial Association, 1929).

92. U.S., Eleventh Census, 1890, Vol. VI, Manufacturing, Part I, pp. 464, 468; U.S., Thirteenth Census, 1910, Vol. IX, Manufactures, pp. 570-571.

93. Smith, "Lumbertowns," pp. 100-108, 116.

94. For a general treatment of the importance of capital investment and regional growth see Gordon L. Clark and Meric Gertler, "Migration and Capital," Annals of the Association of American Geographers, 73 (1983), 18-34.

## Chapter 8

1. Ferris Lewis recalled his youth in Frederick, a logging village in northern Michigan, during the 1910's: ". . . the twilight of lumbering was fast fading into complete darkness" (Ferris E. Lewis, "Frederick: A Typical Logging Village in the Twilight of the Lumbering Era, 1912-18," Michigan History, 32 [1948], 337.

2. William N. Sparhawk and Warrend D. Brush, The Economic Aspects of Forest Destruction in Northern Michigan, U.S.D.A. Technical Bulletin No. 92 (Washington: Government Printing Office, 1929), p. 21.

3. R.V. Reynolds and A. H. Pierson, Forest Products Statistics of the Lake States, U.S.D.A. Statistical Bulletin #68 (Washington: Government Printing Office, 1939), p. 6

4. Sparhawk and Brush, Forest Destruction, p. 20.

5. Sparhawk, Forest Destruction, pp. 17-18.

6. This paragraph is based largely on Sparhawk, Forest Destruction, pp. 13, 16-18, 20; and Russell Watson, "Forest Devastation in Michigan: A Study of Some of Its Deleterious Economic Effects," Journal of Forestry, 21 (1923), 432-433, 438.

7. Watson, "Forest Devastation," p. 438.

8. D.L. Gibson, Socio-Economic Evolution in a Timbered Area in Northern Michigan, Michigan Agricultural Experiment Station, Technical Bulletin No. 193 (East Lansing: Michigan State College, 1944), p. 73.
9. Sparhawk and Brush, Forest Destruction, p. 16; Lewis, "Frederick," p. 334.
10. Lewis, "Frederick," p. 322.
11. James Glasgow, Muskegon, Michigan: The Evolution of a Lake Port (Chicago, Illinois: Private edition, distributed by the University of Chicago Libraries, 1939), p. 73.
12. See, for example, Michigan, Railroad Commission, Annual Report, 6 (1977), pp. 41, 110, 173-174, 215, 411-412.
13. Pere Marquette Railroad Company, Annual Report, 1 (1900).
14. Quoted in Sparhawk and Brush, Forest Destruction, p. 36.
15. Sparhawk and Brush, Forest Destruction, pp. 36 ff.
16. See Leo Alilunas, "Michigan's Cut-Over 'Canaan,'" Michigan History, 26 (1942), 188-201.
17. Alilunas, "Cut-Over," p. 191; see also Lucile Kane, "Settling the Wisconsin Cutovers," Wisconsin Magazine of History, 40 (1956-1957), 91-98.
18. Filbert Roth, "Biennial Report of Forest Warden," Report of the Directors, Michigan Forestry Commission, 1905/1906, 19-21; Alilunas, "Cut-Over," p. 199; Sparhawk and Brush, Forest Destruction, p. 15; Edward E. Sturgeon, "Trends in Land Use and Ownership in Cheboygan County, Michigan" (unpublished PhD dissertation, University of Michigan, 1954), p. 293.
19. Watson, "Forest Devastation," p. 433-434.
20. Sparhawk and Brush, Forest Destruction, pp. 44-55.
21. Sparhawk and Brush, Forest Destruction, pp. 40-44.
22. Sparhawk and Brush, Forest Destruction, p. 52.
23. Gibson, Timbered Area, p. 61.



24. Arthur W. Stace, What Are We Going to do With 2,208,975 Added Acres? ([n.p.]: Michigan Dept. Of Conservation [1941?]), p. 9.

25. Watson, "Forest Devastation," p. 440.

26. See, e.g., Harold T. Pinkett, Gifford Pinchot: Private and Public Forester (Urbana: University of Illinois Press, 1970); Samuel P. Hays, Conservation and the Gospel of Efficiency (1959; rpt. New York: Atheneum, 1975); Robert H. Wiebe, The Search for Order, 1877-1920 (New York: Hill and Wang, 1967), p. 65.

27. Stace, What Are We Going to Do?, p. 15.

28. Stace, What Are We Going to Do?, pp. 9-10.

29. See, e.g., the maps "National and State Forests" and "National and State Forests -- Public Ownership" in Lawrence M. Sommers, ed. Atlas of Michigan (East Lansing: Michigan State University Press, 1977), pp. 182-183.

30. Grand Rapids and Indiana Railroad, Michigan in Summer ([n.p.]: [n.n.], [n.d.]).

31. Statistics of Lake Commerce, by George G. Tunnell (U.S. House Documents, 55th Congress, 2nd Session, Serial # 3679, No. 277, Wasington, 1898).

32. Harvey S. Perloff and others Regions, Resources, and Economic Growth (Baltimore: The Johns Hopkins Press, 1960), pp. 115, 194.

33. Perloff, and others, Regions, pp. 198, 204, 208.

34. Perloff, and others, Regions, p. 640.

35. Lumberman's Gazette, 2 (1873), 143.

36. There is a large literature on land speculation, much of it by Paul Wallace Gates and his students. An important early article is Gates's "The Role of the Land Speculator in Western Development," Pennsylvania Magazine of History and Biography, 66 (July 1942), 314- 333. See also Malcolm Rohrbough, The Land Office Business (New York, Oxford, 1968). Robert Swierenga's historiographic essay "Land Speculation" (Western Historical Quarterly, 8 (1977), 283-302) is very useful.

37. Wiebe, The Search For Order, also Hays, Conservation.

38. Adam Smith, Inquiry Into the Nature and Causes

of the Wealth of Nations (1776; rpt. New York: Modern Library, 1937).

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