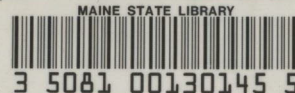


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MAINE SAWMILLS

A HISTORY



SAW-MILLS ON THE PENOBSCOT RIVER, AT OLDTOWN, MAINE.

MAINE STATE MUSEUM

NOV 8 1990



Fig. 1. A Work Pause near Sanford, Maine

An unidentified mill crew is shown here posing at a portable sawmill near Sanford. Photography by Fred Libby, Sanford, c. 1910. (Maine State Museum).

MAINE SAWMILLS

A HISTORY

by Paul E. Rivard

MAINE STATE MUSEUM

DEDICATED TO THE SAWYERS

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FOREWORD

On Saturday, August 25, 1984, I had the good fortune to make a remarkable discovery for the Maine State Museum — the sort of discovery that curators dream of making. It came as a surprise during an otherwise routine field visit to a nineteenth century gristmill. I was visiting this site in response to a donation offer of some pulleys and wheels located in the basement of the mill building. Since we did not ordinarily collect building fragments of this sort, I was simply fulfilling our responsibility to "follow up" on a collection offer and, candidly, I was not especially excited about the prospects.

As anticipated, the mill wheels proved to be incomplete and inappropriate to the museum's collection. Officially, my business ended here. But as I turned to leave, another wooden building caught my eye: high above the streambed, just beyond the gristmill, perched a marvelously intact building easily identified as a sawmill. Upon closer examination, it proved to be a remarkable discovery which ended a twenty year search by the Museum's staff for artifacts relating to Maine's logging and sawmilling industries.

The effort to collect such artifacts had begun with the planning of the new Maine State Museum in the late 1960's. The staff had recognized from the beginning that the story of lumbering was a cornerstone of the state's historical development, and that the museum exhibits would need to reflect this important part of Maine's heritage. The growth of the state's lumber commerce was well-documented through centuries of public and private records, but for a museum exhibition this data would not be enough. Artifacts were needed.

The staff knew exactly what they were looking for. Written records told that virtually all the thousands of sawmills built in Maine during the two and one-quarter centuries from 1630 to 1850 utilized straight saws that moved up and down as the logs were inched forward toward the blade. These "up-down" sawmills had been placed along almost every moving stream in Maine prior to the middle of the nineteenth century. But the search for artifacts reflecting this long era of up-down sawmilling seemed to be an exercise in frustration and futility. Despite the extensive and rich heritage shown in surviving deeds, diaries and business records, the tangible evidence of tools, machinery and sawmills themselves seemed to have been eradicated. Sawmills were, after all, ephemeral structures that had often been inexpensively built and easily destroyed in their precarious perches about Maine's streams. Many others were abandoned when the timber of the immediate region grew thin.

Months, years, and finally decades, passed and the museum's staff could not find the artifacts needed for exhibition. Then, unexpectedly, on that late summer day in 1984, a long-awaited treasure was uncovered when I stepped into the small sawmill. There, near the center of the building, I found the "fender posts," which were used to guide the saw frame up and down. Above these posts, a number of other mill components remained in place, including the "rocker arm" or "sweep" which transferred the motion of the saw into a drive for the carriage that moved the log toward the sawblade. These fragments were certain evidence of the mill's long-abandoned up-down saw



Fig. 2. Museum Exhibition (detail)

The end blocks and saw frame found in Dutton's sawmill have been placed on public exhibition in the Maine State Museum. Photo by Gregg Hart, 1990.

machinery. I eagerly continued my investigation by crawling under the building. Here I could trace the original location of the carriage track and the waterwheel and crank which moved the saw and other machinery from below.

A small roadway ran parallel to the south side of the mill. Here, wagons had been brought to be loaded with freshly cut lumber. On the stream side, a series of wooden posts and stone piers supported the mill. One of these piers was much larger than the others and extended under the mill floor. The northwest corner of the mill rested on this larger pier, and the top surface provided a large flat shelf tucked closely under the mill floor. On this flat area some timbers and other "refuse" had accumulated through the years and, by extending a plank across the waterway under the mill, it was possible to crawl out to this pier for a closer inspection. The materials discovered here were a curator's dream come true: all of the wooden parts of the frame saw itself, the straight sawblade, a piece of up-down sawn lumber, the "head" and "tail" blocks used to hold the logs on the moving carriage, even the iron "dogs" that connected these blocks to the log! Here were all the most important components of any up-down sawmill, tidily stacked up generations ago as if intended to serve as a time capsule, as if they had been laid out just for me to find.

From the late 1960's to 1984, curators from the Maine State Museum had traveled throughout the State of Maine in search of artifacts like these. The effort had been concentrated on remote and sparsely settled regions of the state where it was imagined that an important mill site might have survived unrecognized. Now, at last, the evidence needed for the museum's exhibition had been found — in a building on Bond Brook in Augusta, only 3.2 miles from the Maine State Museum!



Fig. 3. Samuel Dutton's Mill

With its dam now missing, Dutton's sawmill stands perched high above the streambed. Original parts of the mill's up-down saw and log carriage were found piled on the large stone pier supporting the northwest corner of the mill building. Photo by Gregg Hart, 1990. (Maine State Museum.)

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NOTES ON SOURCES

This booklet on Maine sawmills is part of a larger research project concerning Maine industries and manufactures; a broader inquiry which extends from household crafts to urban-industrial growth. As with all aspects of this study, the sources of information have ranged from personal notes to statistical compilations, from formal government reports to incidental diary entries.

In this account, a certain inconsistency emerges from the changing scale of the industry itself. When, for example, few sawmills can be identified during the early 17th century, the "facts" gathered about them tend to be site-specific and rich in minor details. As a direct result, the chapter on 17th century beginnings is largely a story of specific mills and the sawyers and workmen who built and ran them. By contrast, analysis of the Penobscot developments, two centuries later, requires a more statistical survey. As the historical terrain to be viewed grows larger, the historian must stand at a more distant vantage point to encompass it. Thus, the story, and the raw data supporting it, is found to change from chapter to chapter.

The principal primary source documents supporting research in the period from the 1630s through 1800 are deeds. These records of land transfers and mortgages provide key information on mill construction and ownership, as well as the roles of merchants and investors. The earliest deeds cited in this booklet can be found published in *York County Deeds*. In addition, published documentary materials can be located in the *Province and Court Records of Maine* and the collections of the *Massachusetts Archives*. Information concerning individuals working about the mills can be

gleaned from geneological records. The *Geneological Directory of Maine and New Hampshire* has been of greatest use here.

Among the secondary sources contributing to the seventeenth century data, the most useful were Benno Forman's "Mill Sawing in Seventeenth Century Massachusetts," said Richard M. Candee's "Merchant and Millwright — the Water Powered Sawmills of the Piscataqua," both published in *Old Time New England*, a quarterly of the Society for the Preservation of New England Antiquities. The Candee article is recommended, in particular, because it succinctly summarizes the documentary evidence that survives on Maine's first mills.

Deeds located in the York County Registry of Deeds, in Alfred, were of particular value in tracing sawmill ownership in the Saco River area. Here, the researcher will find enumerable transactions between mill builders, owners, and sawyers which reflect the prevailing strategy of fractional ownership. Contributing to an understanding of Saco area history were a couple of published titles that should be mentioned; G. T. Rildon's basic work, *Saco Valley Settlements & Families*, and Roy P. Fairfield's *Sand, Spindles, and Steeples*. George Folsom's early work, the *History of Saco and Biddeford* published in 1830, was also useful.

County histories were useful throughout. In particular, the *History of Kennebec County*, by Henry D. Kingsbury, provided a good succinct history of the City of Gardiner. Of particular value in tracing the role of Sylvester Gardiner and his contemporaries, *The Kennebec Proprietors*, by Gordon E. Kershaw was invaluable, while Charles E. Clark's

The Eastern Frontier provided good general background.

Statistical data was important to this study. A good summary of many early statistical tables was compiled by Moses Greenleaf in *A Statistical View of the District of Maine*, in 1816. Greenleaf's 1829 book, *A Survey of the State of Maine* is an invaluable reference which contains data gleaned from a number of government surveys, studies, commercial returns and census takings.

A quantum-jump in the value of census records can be found beginning in 1850 when an enumeration of manufacturing activities was formally compiled on a community by community basis. The *Industrial Census* provides not only a partial statistical count on sawmills, but also lists details of many operations. Each mill which is identified in the census is listed by its company name, and includes data on the quantity and value of raw materials used, the products produced, the labor employed, and the principal machinery and power sources used. Detailed inspection of this listing confirmed, for example, that the operators of mills were not always the owners. This source also provided an excellent insight into sawmill technology and productivity.

The records of Maine's *Industrial Census* are available on microfilm in the Maine State Archives. These listings provided a cornerstone of research on Maine mills in the period from the late 1840s through the 1870s. Beginning in the census of 1880, however, changes in format tended to make the data less satisfactory for the purposes of this research.

Among the most useful state documents for this study was *The Water Power of Maine*, published by the State in 1867, and reprinted for a couple of years thereafter. This book contains a town-by-town enumeration of water power sites and the employment of those sites for manufacturing purposes. The State's interest in this grew from a desire to show that the available water power of the State far exceeded its use by manufacturing interests. Since many power sites were not used, or only partly employed, this compilation sought to remind the reader of this unused abundance to lure capital investment to Maine's rivers and streams. Incidental to this purpose, however, the book provides a great cross-section of water power use in the state, and it enumerates the sawmills of the state quite



Fig. 4. "The Village Mill," Skowhegan

This Skowhegan mill was about the same size as Dutton's mill in Augusta. The timber and earth dam shown here is typical of those built to provide power for small mills throughout Maine. Photograph from "Stereoscopic Gems," by S. S. Vose, Skowhegan, Maine, c. 1875. (Courtesy Maine Historic Preservation Commission.)

thoroughly. Marginal information provided by the local compilers of this data sometimes provides valuable glimpses of productivity and mill activity.

Extensive use has been made of local histories. The quality of these is variable, and caution is required in their use. But, the list of local historical works contributing to this study is too numerous to itemize fully in these notes. Reference to local histories is a good beginning point for many studies. Many of these works are strictly "fact-oriented" and they make good basic reference works in this regard. Early classics such as Edward E. Bourne's *History of Kennebunk* should be mentioned, as well as Louise Helen Coburns' *History of Skowhegan* which was published in 1941 and is still one of the best all-around local histories written on any Maine community. Clarence A. Day's small volume, *Historical Sketch of Orono*, was valuable for its succinct history of mill development in that area. Many others contributed. All those used can be found in the local history collection of the Maine State Library.

No study of sawmills would be complete without reference to a number of cornerstone works on Maine's logging and lumbering heritage. These include David C. Smith's

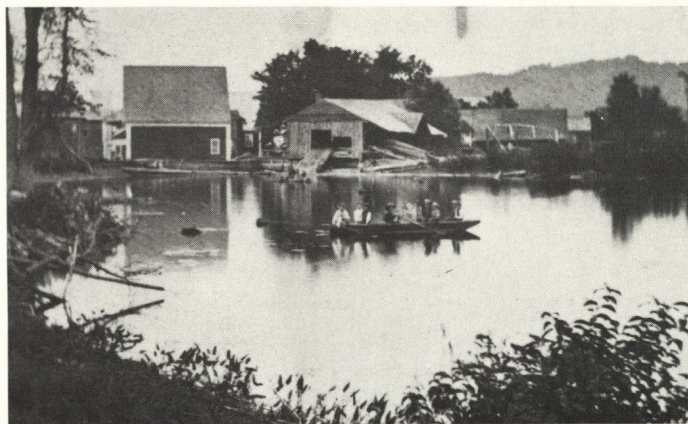


Fig. 5. "Mills and Mill Pond," Canton

This up-stream view of a small mill in Canton, Maine, shows the rampway used to draw logs into the mill from the pond formed above the mill dam. Photograph from an anonymous stereoscopic card, c. 1870. (Courtesy Maine Historic Preservation Commission.)

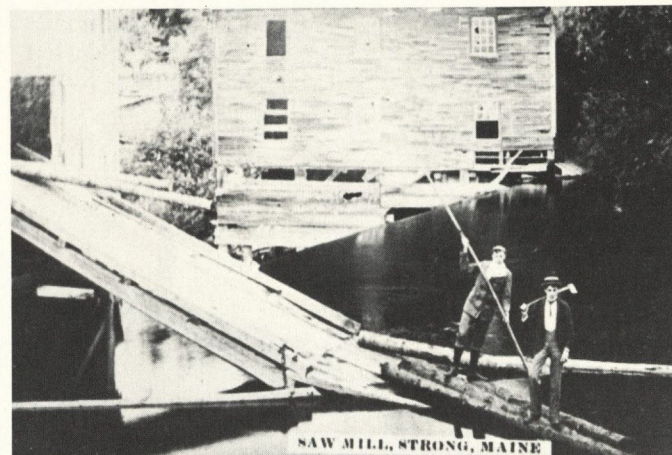


Fig. 6. "Saw Mill. Strong, Maine."

Mill dams caused water flowages to "pond up" above the mills. In addition to holding water for driving the water wheels, the ponds provided a convenient place to stockpile logs for the mill. Photography from an anonymous stereoscopic card, c. 1890. (Courtesy Maine Historic Preservation Commission.)

Lumbering and the Maine Woods, and *History of the Maine Woods*, as well as another *History of the Maine Woods* by Philip T. Coolridge. The volume which contributed most to the particular study of sawmills was, however, the 1961 work by Richard G. Wood, *A History of Lumbering in Maine*. This volume was especially useful in its review of the developments in the Ellsworth area.

Finally, it should be noted that among the principal documents contributing to this research have been surviving photographs, buildings and artifacts themselves. Of particular use have been a number of glass plate negatives in the collection of the Maine State Museum, and images from a large selection of stereo postcards in the collection of the Maine Historic Preservation Commission. The artifact collections of the Maine State Museum have themselves provided a number of specific contributions to this study. Among these were the remains of the Dutton sawmill, a *Davis Patent* clapboard saw, a mid-19th century shingle saw, a *T. H. Ricker* portable sawmill. Though they are too often overlooked as such, this tangible evidence is no less valuable than the written evidence.



Fig. 7. S. R. Bearce Mill, Lewiston

The water power of larger rivers was usually developed by corporations that invested in the construction of dams, raceways and mill buildings and then leased them to tenant manufacturers. The S. R. Bearce sawmill was established by the Franklin Company which owned several hundred acres of land on both sides of the river, water power, canals and numerous mills and machine shops. Photograph from a stereoscopic card series "Lewiston and Neighborhood," #27, c. 1875. (Courtesy Maine Historic Preservation Commission.)

INTRODUCTION

Bond Brook descends to the Kennebec River from a series of marshes and bogs located west of Augusta in the present-day communities of Manchester and Sidney. The stream is not very large and the volume of water it carries is not very great. Nevertheless, Bond Brook was attractive to eighteenth-century millwrights and merchants; smaller mill sites on this watercourse were well suited to the slow-moving waterwheel technology of the period, and they were favorably located near the trading emporiums of Fort Western (the "Fort") and Hallowell (the "Hook"). Five mill dams were ultimately built on this stream and it was here, some two miles above the Kennebec, that Hallowell merchant Samuel Dutton built a dam and sawmill in 1782.

Commerce interested Dutton far more than farming or even permanent settlement. In fact, six years passed from the time that he bought the mill site from Jonas Clark to the time that he accepted a house lot grant from the "Proprietors of the Kennebec Purchase." In this grant Dutton agreed to build a house, live in it for at least five years and place at least five acres under cultivation. Yet Dutton spent precious little, if any, of his time walking the furrows behind his oxen. Like so many in his generation of "settlers," Dutton's preoccupations centered on commerce, land speculation, and timber cutting. As the operator of a Hallowell store, proprietor of land in Unity, and owner of a sawmill on Bond Brook, Dutton's activities reflected the classic incentives which were drawing settlement and investment to Maine. Land and timber were the waiting wealth of Maine; sawmills and ships were the tools that Dutton and many of his contemporaries used for exploiting

this wealth. The cutting of boards in Samuel Dutton's mill was heard in the measured rasp of his one sawblade. Throughout eighteenth-century Maine, the scratch and slap of many such saws was the sound of money.

Research of the history of Dutton's sawmill reminded the museum staff that the settlement of Maine communities during the seventeenth and eighteenth centuries had been invariably accompanied by the construction of sawmills. In many Maine towns, sawmills had been the first frame structures erected, preceding the construction of houses or public buildings. Because sawmills had helped lead the way into the "eastern frontier," they had exerted a substantial influence on early community development by providing lumber for local construction, forming a basis for local and regional trade, offering work for laborers, sawyers and farmers, and providing an incentive to commercial development and investment. Of all of Maine's early industries, none was as pervasive as logging and the sawing of "merchantable boards." In the late-eighteenth century, Maine was full of Samuel Duttons. In town after Maine town, it was commerce — particularly the cutting, sawing, transportation and sale of lumber — which drew families into the Province. When, for instance, Joseph Twitchell arrived in Bethel in 1774, he came to erect a sawmill — a building which preceded the first frame house in the community by five years. Although textile and shoe manufacturing would one day rival lumbering as cornerstones of the state's economy, sawmilling clearly deserves a most prominent place in telling the story of Maine's unique heritage.

It is important to remember that Maine's "forest primeval" had owners, "proprietors" who had purchased or been granted titles and "patents" to Maine lands. The owners were, for the most part, absentee investors and merchants who might not even visit the lands they controlled. They were land speculators and developers. The principal economic value of their holdings consisted of the timber and mineral resources, as well as potential farmland and settlement lots. People were needed to populate these lands, to "improve" them and to provide a workforce available to exploit the natural resources. For this purpose the landowners provided grants of land as incentives to settlement within their territories. Through this pattern of land transfers, Maine lands were organized into a mosaic of fiefdoms. Often it was the granting of land that lured settlers, but it was the potential profits of sawmilling that prompted landowners to make the grants. Thus, the construction of sawmills was often an inducement to settlement along the "eastern frontier."

Millwrights, blacksmiths, and other skilled mechanics were in short supply in eighteenth-century America, and they were especially sought after by proprietors. In April 1771, for example, the proprietors of land in Turner offered "two settling lots" to anyone who would build a sawmill before January 1773, and a grist mill by 1775. (First things came first; lumber, then bread.) In Mechanic Falls, Abel Sawyer contracted with absentee landowners to build a sawmill before 1770; in Bridgton, Jacob Stevens built one in 1768; and in Webster, Jesse Davis signed an agreement to build a mill in 1780.

Until the development of steam engines and railroads, the growth and development of sawmills depended almost entirely upon timberlands located near sites of water power and water-borne shipping routes. From the mid-seventeenth century to the early nineteenth, the expansion of sawmilling activity consisted of constructing more and more small sawmills, rather than enlarging or increasing the efficiency of existing mills. The water power technology common to sawmilling in this period favored smaller mill sites. Even where more than one saw was used in a mill building, each was often powered by its own wheel. In 1790, for example, there were already some 150 sawmills in the Province of Maine, but by the time of statehood, in 1820,

this number had swelled to nearly 750 mills counted by the United States census bureau. By 1840, the number had grown to a high point of nearly 1,400 separate mills operating on virtually even accessible stream in the state.

After 1850 the number of individual sawmills began to stabilize, but by that time improvements in technology had increased the size and productivity of many mills, and as a result, the number of men employed in sawmills continued to grow. At mid-century, some 3,111 men were listed in the census as "sawyers," while another 4,500 claimed employment in sawmills. By 1870, the total had increased to 8,500. In addition to these sawyers and "millmen," a large portion of the state's "laborers" were probably employed in milling or in the Maine woods for at least a part of each year, along with a substantial compliment of the state's farmers.

Research inspired by the find at Bond Brook reinforced the Museum staff's appreciation of the importance of sawmilling in the state's history and the need for a major exhibition devoted to this theme.

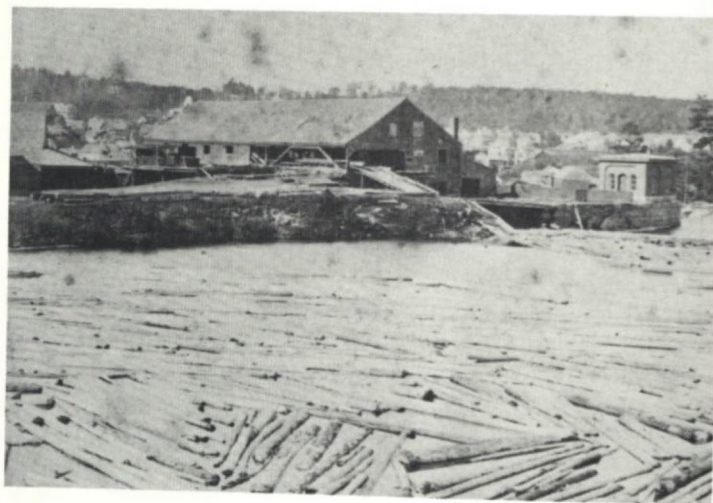


Fig. 8. S. R. Bearce Mill, Lewiston

An upstream view of the Bearce sawmill shows the use of the mill pond to collect the logs of different owners and organize them for cutting. Photograph from a stereoscopic card series "Lewiston, Maine, Second Series," #28, c. 1875. (Courtesy Maine Historic Preservation Commission.)

THE TECHNOLOGY OF SAWMILLING

There was no guesswork involved in the construction of Samuel Dutton's sawmill: the form and technology of sawmills was widely understood in the eighteenth century. Like the houses and barns of that period, all sawmills resembled one another. While there were certainly some incidental choices to be made in building the Dutton sawmill, the principal design decisions had, in fact, been made generations before. By the 1780's, the form, style and machinery of the mill had already become "traditional."

Eighteenth-century sawmilling machinery, like the mill buildings themselves, were built primarily of wood, with the barest minimum of iron fasteners, gudgeons and dogs. The principal iron parts were the sawblade and the crank which raised and lowered the saw and frame. These items required foundry and smith work not always available on the Maine frontier. Aside from these parts, millwrights could expect to fashion the building and its machinery from the nearby forest.

Some of Maine's first sawmills, in the 1630's, are believed to have been shipped from England ready-made, but it is likely that only the iron parts were actually sent from Europe. English investors, and some of New England's early settlers, understood the technology of sawmilling — despite the fact that there were very few, if any, such mills operating in Great Britain in the early-seventeenth century. Timber was in short supply in England at that time and this, coupled with an abundant labor class, repressed the construction of sawmills there. Conditions in seventeenth-century Maine were precisely the opposite — timber was abundant, laborers were not. Here, sawmills made

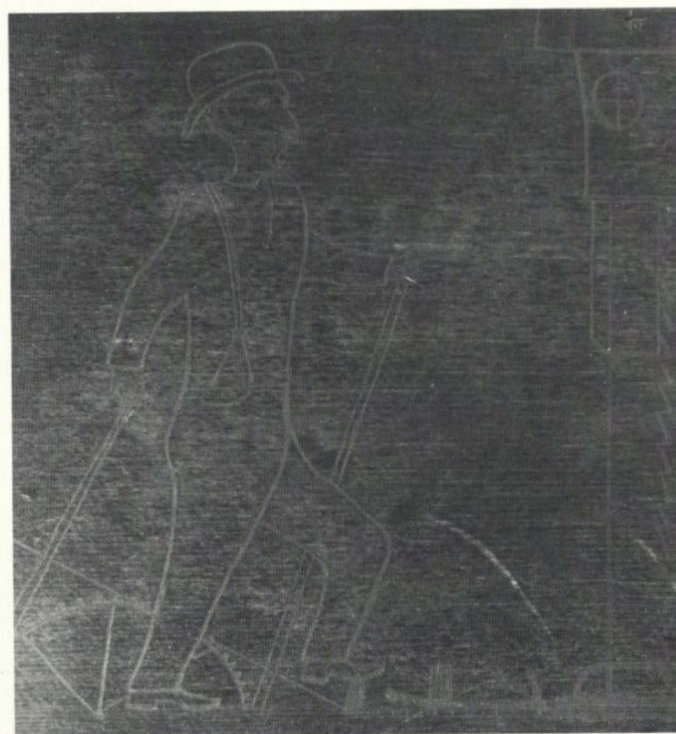


Fig. 9. Sawmill drawing, Whitefield

This pencil drawing of an up-down saw and sawyer was found in a Whitefield Maine sawmill and is dated 1865. The faint image on this board has been enlarged and copied for use in the Museum's lumbering exhibition (see Fig. 2). (Courtesy David Chase, Whitefield.)



Fig. 10. Pit Sawyers at Work

This unidentified photograph shows two sawyers cutting boards with a traditional frame saw. The man working above lifted the frame after each stroke and guided it along a line marked on the log. Cutting was on the downward stroke and the man below, the "pitman," had the more undesirable of the two jobs. Photograph from a stereoscopic card, c. 1865. (Courtesy Maine Historic Preservation Commission.)

economic sense from the earliest years of settlement. Sawmilling began with settlement and was, in fact, often a cause for it.

In seventeenth-century England, sawyers still relied almost exclusively upon the up-down moving pit saw which required the work of two men. Logs were dragged over a dug pit, or rolled onto an elevated staging. One man could then work under the log, while another stood above it or on it. Working below, the "pitman" (literally pit man) pulled the saw downward on the cutting stroke. The task of the second man, above, was to guide the saw along a line on its cutting stroke and to raise it up after each cut. Unlike sawmill frame saws, these hand-operated pit saws were highly versatile and could be used to cut irregular shapes. In Maine, pit saws were used to a limited extent, but their versatility sustained their use even in districts where sawmills abounded. As late the 1850's, a pit saw was still in use in York although sawmills had long operated on several streams in the town. Boards may have been cut with such saws, but their principal benefit arose from the cutting of curved shapes such as ship's knees and frames. In 1783, during the first year that Samuel Dutton's mill was in operation, Moses Davis of Edgecomb, a carpenter, cabinetmaker and shipwright, noted in his diary on November 4 that he had that day "dug a place for Saw Pitt." He was working on vessels for several local merchants. In Maine shipyards, pit saws survived until the 1920's.

Some building materials were not sawed at all, of course. Heavy timbers for house and barn framing could be squared up with the use of a broadaxe. Hand hewn timbers continued in popular use well into the nineteenth century. Meanwhile, clapboards, shingles, barrel staves and some short boards could be split (riven) from straight grained lumber such as cedar and oak. Lumber products worked up in this way, "cloave boards and pipe staves," formed a cargo sent from Saco by Henry Josselyn in 1634. However, the sawmill, not the pit saw or broadaxe, best represents the technology of Maine lumbering from the 1630's onward. Splitting and pit sawing may have dominated the cutting of lumber products in Great Britain, but in New England these techniques were strictly incidental in the harvesting of Maine's timberlands.

The up-down sawmill was really a mechanized pit saw.



Fig. II. Pit Sawyers at Work

The tradition of pit sawing continued into the twentieth century in connection with wooden shipbuilding. Notice that the saw shown in this photograph is not stretched in a frame. Saws of this design could be used to cut curved shapes such as ship's knees, keels, and frames. Photograph from a stereoscopic card, c. 1880. (Courtesy Maine Historic Preservation Commission.)

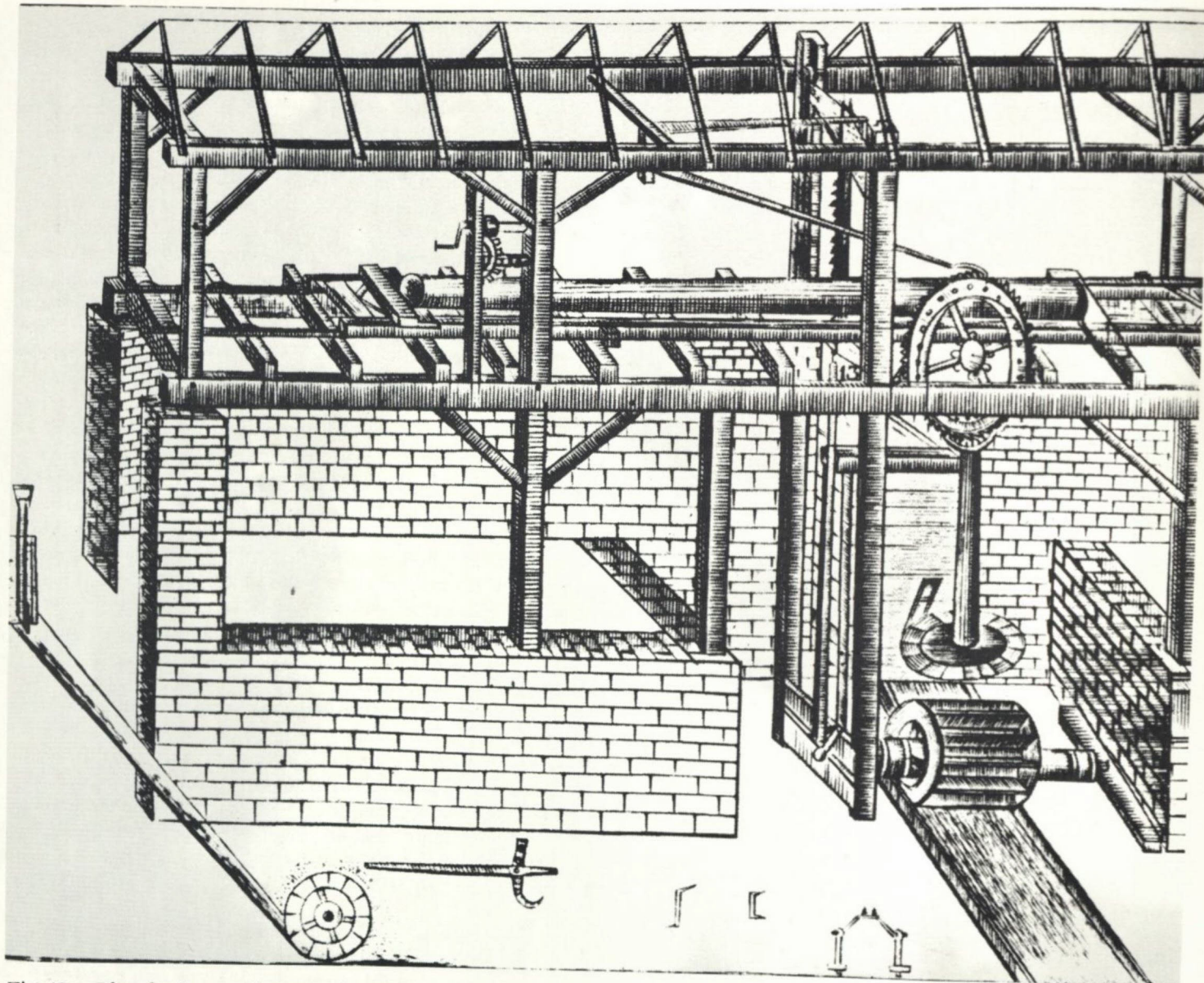


Fig. 12. Plan for Sawmill, 1795 (detail)

By the late eighteenth century the construction of sawmills was already traditional. This illustration shows a generic sawmill built in a manner that would have been commonplace in eighteenth-century Maine. Illustration from Oliver Evans, Young Mill-Wright & Millers Guide, 1795. (Maine State Museum.)

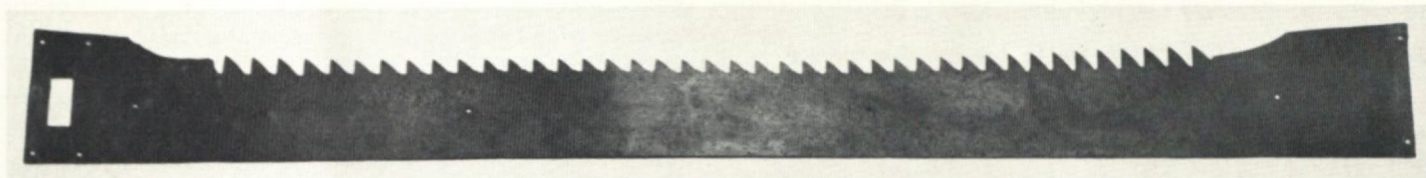


Fig. 13. Moscow Mill

This view of a small mill in Moscow, Maine, shows the operations of a mill located on a stream of water that has only limited water, but a large fall. Notice that there is no mill pond and logs are being delivered below the mill. This was not the most convenient arrangement for water-powered mills. Photograph from a Stereoscopic card by S. S. Vose, c. 1875. (Courtesy Maine Historic Preservation Commission.)

Fig. 14. Up-Down Saw Blade

Up-down sawmills employed frame saws with blades that were generally about seven feet long. A rectangular slot was cut into the lower end of the saw (at left) to be used with wooden wedges in adjusting the "kilter" of the blade. (Maine State Museum.)



Straight sawblades, generally about seven feet long, were held straight by a wooden frame. This saw frame was placed between two vertical "fender posts" which provided guide tracks for the frame in its up-down motion. Taking the place of the man working in the pit, sawmills employed a crank linked to the waterwheel by way of a push rod connecting to the bottom of the saw frame. This push rod was, appropriately, called a "pitman." The crank and pitman also helped to raise the frame, but sometimes counterweights or spring-poles were attached to the top of the saw frame to assist.

Sawyers using pit saws guided the saw blade along a stationary log. Sawmills worked the other way around — the saw frame stayed in one place and the log was moved toward it. The log was attached to a sliding carriage which was placed on a runway or track. The most common method of moving this carriage was through a series of wooden rockers and arms which transferred the motion of the saw frame to a wheel which, in turn, drove the carriage using cogwheels or a "rack and pinion" arrangement.

The construction of sawmills in Maine had continued for 150 years before Samuel Dutton's sawmill was built in the 1780's, and by then most of the improvements had become more or less standardized. The dam built across Bond Brook served three purposes: it raised the "head" of the water, allowing it to fall a greater distance as it powered the waterwheel; it conserved water not used when the mill was idle; and it provided a holding area for logs floated down to the mill. From the pond formed by the dam, logs were dragged up along a ramp to the sawing floor of the mill. Once pulled into the mill, each log was fastened to the saw carriage by adjusting the "tail" block on the carriage to the length of the log, and driving iron pins, or "dogs" into the butt ends of the log. The first cut or cuts were often used to "square up" the log, or, at least, give it a flat surface

which could be placed against the carriage blocks for stability.

To operate the mill, the saw frame was set into motion first, and then the carriage drive was engaged to move the log slowly toward the sawblade in small increments. The boards formed by these cuts were not immediately separated from the log, however. In order to avoid cutting the tail block, and to increase the stability of the remaining portion of the log itself, each board was cut only to about one to two inches from the end. The carriage was then backed away leaving the sawed board in place. To make the next cut, the sawyers had to move the log over by the width of the board. This was done manually — in the case of Dutton's mill, poles were used to pry the log and its previously cut boards sideways to a new spot. The dogs, which had been withdrawn for this move, were driven in again, and the next cut could be made.

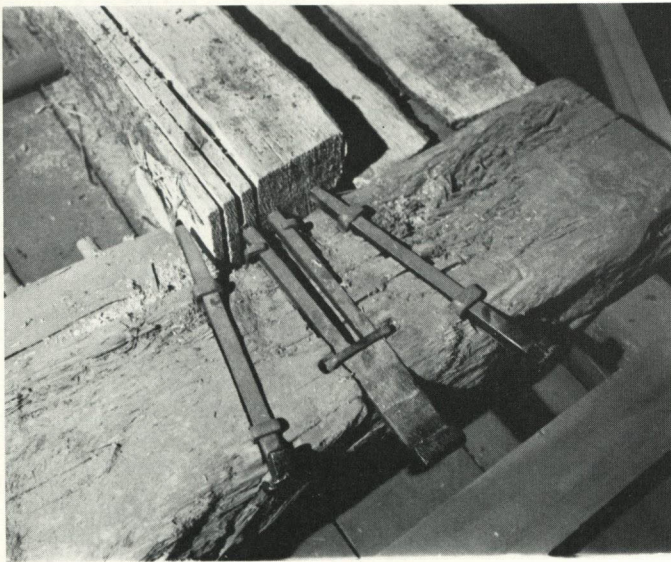


Fig. 15. Head Block, Dutton Mill

The headblock, from the Dutton Mill in Augusta, illustrates the typical method of fastening a piece of timber to the carriage with iron "dogs" driven into the butt ends of the log. Cut boards were left in place until all cuts had been completed. (Maine State Museum.)

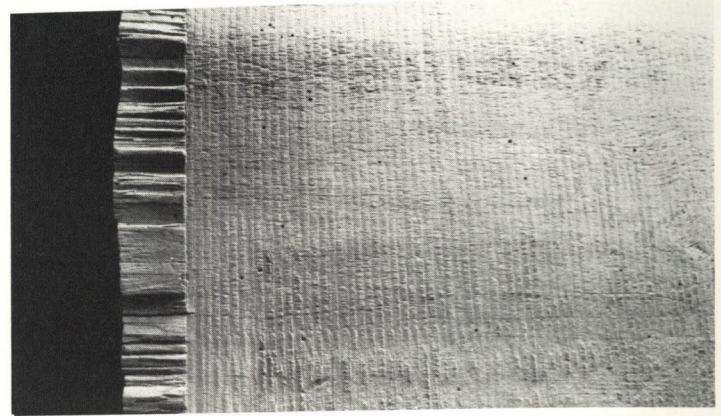


Fig. 16. Sawn Board, Tail Block End

Because iron "dogs" were driven into the butt end of the log at the tailstock, it was not possible for up-down saws to complete their cuts to the very end. Boards sawn in these mills, therefore, show a 1"-1½" scar at the end of each board where they were simply split away from each other. This board was found in the Dutton Mill, Augusta. (Maine State Museum.)

To assure relatively uniform dimensions for the boards, the distance from the sawblade to the edge of the previous cut could be measured by the sawyer at the head end of the log. At the tail stock, the placement could be identified by reference to a pin placed in the block specifically for this purpose, or the sawyer could simply stand behind the sawblade and sight along the length of the log to a mark placed on the end wall of the mill. When all of the boards had been cut in a given log, they were pryed apart — boards sawed by an up-down saw exhibit a tell-tale scar of split wood at the tail end.

While the water powered mill represented a dramatic improvement over the pit saw, the productivity of the early "up-down" mills was small by contemporary standards. The up-down saws did not move very quickly (a likely estimate of 80 strokes-per-minute in the Dutton mill) and the time spent moving the logs and adjusting the dogs reduced the sawing time. In the eighteenth century, most up-down sawmills could produce about 1,000 board feet of lumber per day. Occasional first-class mills might approach double that amount. (A board-foot is a unit of measurement one foot

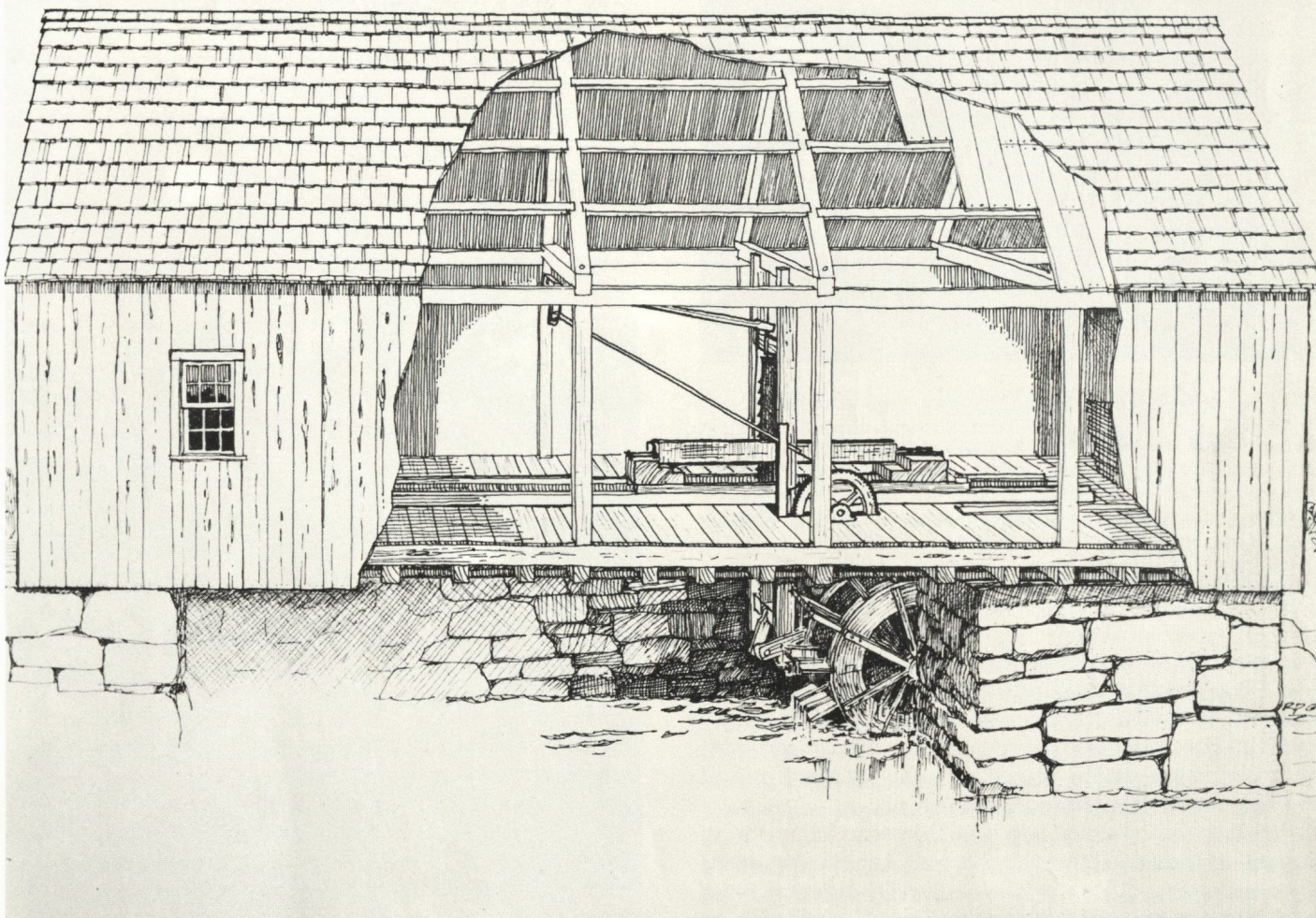


Fig. 17. Dutton Mill Cross-section

This artist's rendering shows a cross-section of the Dutton Mill as it might have looked when in operation in the 1790's. There was little difference between this mill and the generic example which was illustrated in Oliver Evans' Young Mill-Wright & Millers Guide in 1795. Drawing by Donald Bassett. (Maine State Museum.)

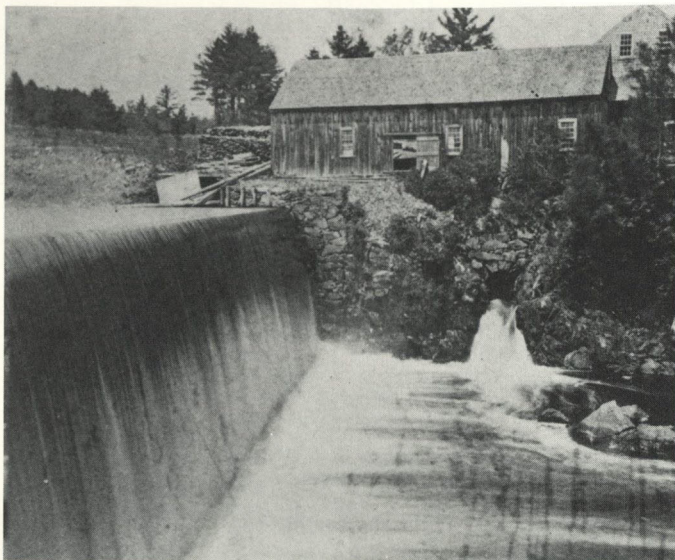


Fig. 18. "Old Saw Mill," Berwick

Here is a small sawmill which draws power from a very substantial dam site. This photograph, which was taken from the Somersworth side of the Salmon Falls River, shows a dam which was part of the system providing power to cotton mills at Great Falls. Photograph from a stereo card by F. C. Philpot, "Travelling Photographic Artist," Limberick, Maine, 1878. (Courtesy Maine Historic Preservation Commission.)

long, one foot wide and one inch thick. Laid flat, side by side, 1,000 board feet of lumber would cover slightly less than half of a regulation tennis court. Regardless of the actual lumber dimensions sawed, the "board foot" measurement was, and remains to this day, the standard unit of measurement for all American lumber.)

Although the up-down saw was slow in comparison to later sawmilling machinery, it was well suited to the speed of its accompanying water wheel. Several different types of wheels were employed in Maine sawmills, none of them especially efficient. The overwhelming percentage of mills built from the early seventeenth century through the first quarter of the nineteenth were driven by the simplest form of undershot or "flutter" wheel which turned by the force of water striking against floats at its lower circumference.

This was probably the type of wheel used by Samuel Dutton. Where natural falls occurred it was sometimes possible to simply install such a wheel in the existing stream bed. More often, however, a minimum of earth work and dam building was needed to control the water flow, conserve it, and channel it through flumes and gates to the mill which might be located beside the stream bed, or over it. The builders of most Maine sawmills in the seventeenth and eighteenth centuries kept such excavation work to a bare minimum.



Fig. 19. "Old Mill," Duck Brook, Mt. Desert

With the mill pond drained, the remains of this mill's wooden dam can be seen below the mill and to the right. Photograph from a stereoscopic card "Photographed and published by B. Bradley, Bar Harbor, Mt. Desert, Me." c. 1880. (Courtesy Maine Historic Preservation Commission.)

Since the speed of up-down saws had technical limits, pressure to increase productivity was often met by running more saw frames in the same building. This was done by mounting more than one sawblade in the same frame (a "gang saw"), or mounting more than one saw frame in a mill. Gang saws required greater operating power and these were mostly used in the larger river mills, particularly those above Bangor after the mid-nineteenth century. Smaller mills more typically resorted to mounting a second frame in the building and adding another waterwheel. The resulting "double sawmills" far outnumbered gang saws.

The advantages of circular saws were recognized long before there was any practical application of this saw design in the Maine woods. The teeth of the circular saw could work continuously against the lumber, and this was a clear

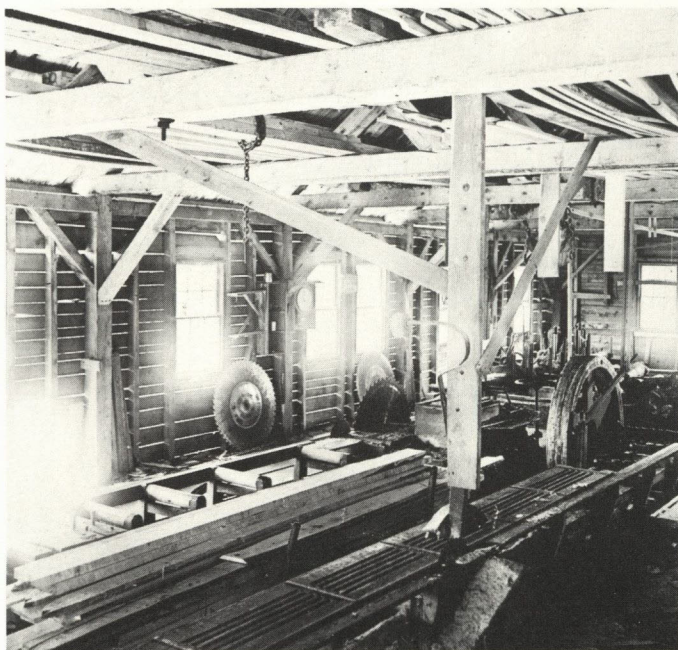


Fig. 20. Circular Sawmill Interior

This anonymous view shows the interior of a mill equipped with a portable circular saw of the type manufactured by T. H. Ricker & Sons, of Harrison, Maine (see fig. 27). (Courtesy Frank Peltier.)

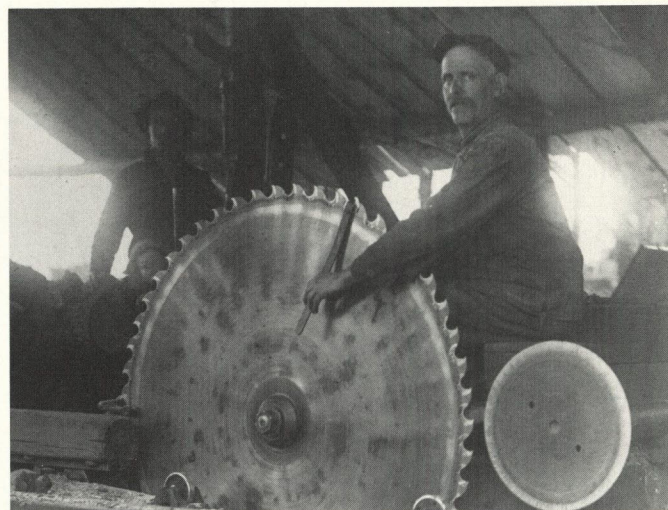


Fig. 21. Sawyer and Circular Saw

Here a Sheepscot-area sawyer pauses while installing newly sharpened teeth in a circular saw. Photograph by E. J. Leighton, c. 1930. (Maine State Museum.)

benefit. But slow-moving circular saws lacked the power of the up-down blade, and this could only be offset by greatly increasing the speed of both the saw and the water wheel. Although it was workable in theory, it proved impractical to engineer a mill system that translated the typical ten revolutions per minute of an undershot wheel into over 400 revolutions per minute for a circular saw. Until these design problems were solved in the mid-1800's, circular saws were used only to cut secondary lumber products such as clapboards, shingles, staves and cabinet veneers.

American experimentation with circular saw technology began in the 1820's, prompted by the widespread advances in machine-building technology taking place in the first decades of the nineteenth century. Maine mechanics played a significant role in this development. In 1820 Robert Eastman and Josiah Jacquith of Brunswick patented a circular saw for cutting clapboards, and in 1829, Job White and Phineas Quimby used a circular saw in their veneer cutting machine in Belfast. The first reported circular sawmill in Maine is thought to have been built along Kenduskeag

stream in the 1820's, while another circular mill in Waterville was reportedly able to cut a 20-foot board in one minute in the 1820's. These were exceptions to the general rule, however. The era of circular saw milling really began a generation later, under the impetus of new foundry and machine-tool technology.

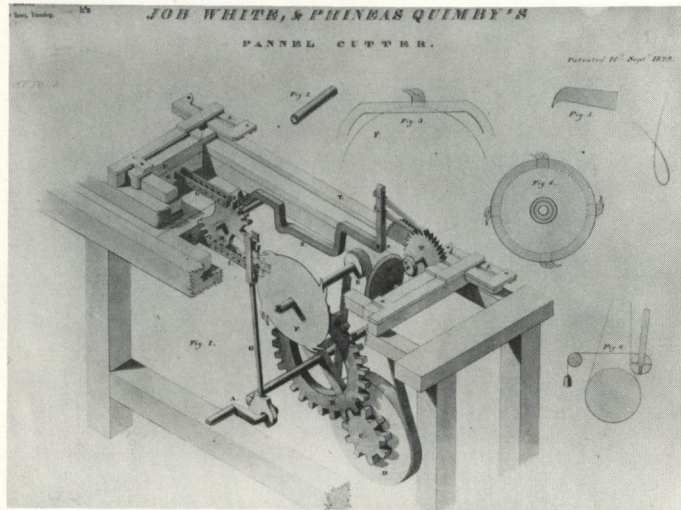


Fig. 22. White and Quimby's Patent

An early patent for circular saw machinery was issued to Job White and Phineas Quimby of Belfast, Maine, on September 12, 1829. This saw was used to cut veneer woods for furniture-making. (Courtesy U. S. Patent Office.)

The nineteenth century development of faster waterwheels (iron turbines) and steam engines capable of powering large gang saws and circular saws very quickly made the ponderous wooden waterwheels and traditional single up-down sawmills of earlier centuries obsolete. Before the end of the century, the industry had been completely transformed. Sawmills such as the one built by Samuel Dutton hardly distinguished the building from the machinery within it. These mills were like single large machines in which the working parts of the saw, carriage, and water wheel were integral to the structure of the building itself. But, circular saws and iron turbine wheels,

by contrast, came ready-made as "manufactured" products. These machines were produced not by millwrights, but by foundries, machine shops, and engineering companies. They were, in fact, movable from one location to another and the portable nature of this new machinery facilitated the relocation of sawmills to remote new sites closer to inland timber stands. By utilizing steam engines, and later gasoline engines, mills could be moved around and housed in simple temporary shelters for several seasons of sawing, then moved to another location. This was a true revolution in the sawmilling industry. In 1892, the fast-moving band-saw was introduced, adding greater force to the revolution.

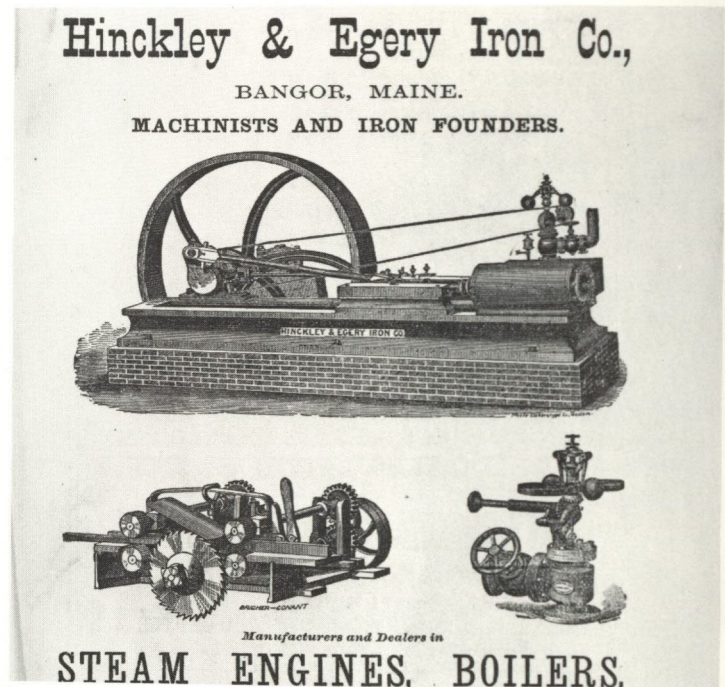


Fig. 23. Hinckley & Egery Advertisement

Most portable sawmills were powered by steam engines. These engines, and the boilers that accompanied them, were manufactured by dozens of Maine foundries and machine shops. The company of Hinckley & Egery of Bangor was among the largest makers of engines and sawmilling machinery. This advertisement is from the Bangor Directory, 1880. (Maine State Museum.)



Fig. 24. Portable Mill, Hiram

The technology of steam engines permitted sawmills to be located anywhere that was convenient for the delivery of timber. In the twentieth century the use of tractors and trucks further reduced the sawmill's dependency on waterways. Photograph by George French, c. 1925. (Courtesy Maine State Archives.)



Fig. 25. Bridgton Machine Advertisement

Wooden water wheels were obsolete well before the middle of the nineteenth century and by the late 1860's virtually all of Maine's water-powered mills were driven by more efficient turbines. Many of these were made in Maine. This advertisement is from The Maine State Business Directory, 1887. (Courtesy Maine Historical Society.)

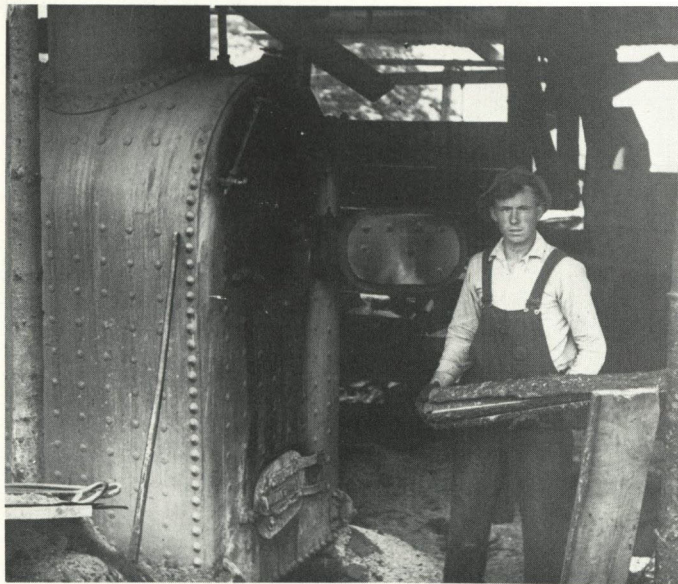


Fig. 26. Feeding the Boiler

Slab wood and assorted lumber scraps provided abundant fuel for the boilers used in Maine sawmills. This photograph was taken in the Sheepscot area by E. J. Leighton, c. 1920. (Maine State Museum).

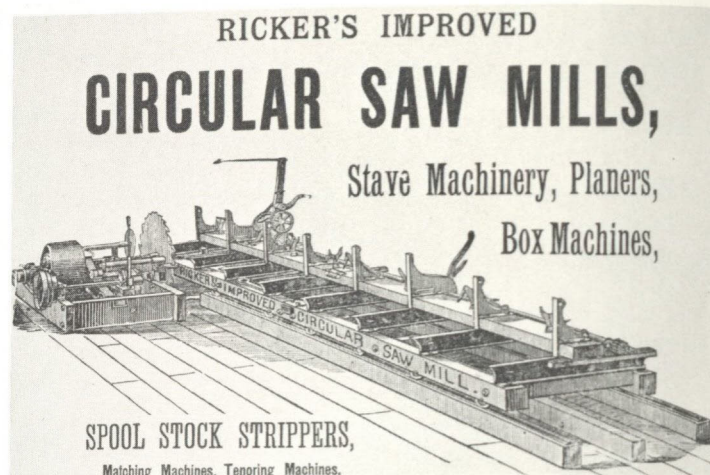


Fig. 27. Ricker Saw Advertisement

Maine's largest manufacturer of portable sawmills and other sawmill machinery was the company of T. H. Ricker & Sons of Harrison. In addition to saws for long lumber, the firm also produced bolt saws, edgers and planers. This advertisement is from The Maine Business Directory, 1887. (Courtesy Maine Historical Society).

The manufacture of portable sawmilling machinery — long lumber saws, table saws, edgers, planers, and mortising machines — emerged as a new branch of industry arising from sawmilling itself. Machine companies introduced their own selections of machinery which could be purchased from catalogs. The largest of these machine builders in nineteenth-century Maine was T. H. Ricker and Sons of Harrison who produced sawmilling machinery from the late 1850's to the early twentieth century. Many T. H. Ricker saws are still in use in Maine today.

So it was that a long sawmilling tradition, which had survived with little change through seven generations of work in the Maine woods, came to an end. In the inexorable drive to improve sawmills with new machinery, the physical record of the up-down sawmilling heritage was nearly eradicated. One sawyer took time to set aside some of this obsolete equipment in a remote location below a mill on Bond Brook and this has made all the difference to the telling of the story of Maine sawmilling at the Maine State Museum.

SEVENTEENTH CENTURY BEGINNINGS

On July 8, 1634 the vessel *Pied Cow* arrived off the coast of Maine, bringing with it the beginnings of Maine's sawmilling history. Aboard were parts destined for the construction of two sawmills, one to be erected on the Little Newichwannock River at Asbenbedick Falls in the present town of South Berwick (then a part of Kittery), and the other on a tidal inlet in Agamenticus (York), later known as the "Old Mill Creek." The shipment was a joint venture by the two principal proprietors of lands in Maine and New Hampshire, Sir Ferdinando Gorges and Capt. John Mason. Also onboard were millwrights and carpenters sent to build the mills.

The *Pied Cow* proceeded up the Piscataqua River on July 13th and dropped anchor about one-half mile below the Asbenedick Falls. There Mason's provisions, mill parts, and employees were unloaded. Mason's agent at Newichwannock, Ambrose Gibbons, was expecting them; on May 5th Mason had written that "These people and provision, which I have now sent with Mr. Jocelyne, are to sett upp two mills upon my owne division of lands."

On July 22, Gibbons reported, "the carpenters began about the mill[s]", and in August he wrote, "Yor Worshp have donne well in setting forward your Plantacion, & your Milles they will pvve [prove] beneficciall unto you . . . Yor Carpenters are wth me & I will further them the best I can." These "carpenters" were partners William Chadbourne, James Wall and John Goddard, who had signed a contract with Mason in March to build houses, plus "two mills and other frames and things . . . Thone of wch mills to be a sawe Mill wch shalbe made and sette upon good sufficient

and workmanlike sort and manner . . . and tother of the said Mills shalbe a water Corne Mill . . ." Their contract included a commitment to operate the mills for a term of three years, working on shares. These three were the principals among a party of eight "servants" of Capt. Mason who arrived aboard the *Pied Cow*. The others included Agent Joscelyn, laborers Thomas Spencer, John Wilcox, and two children of William Chadbourne. These men, working with fittings and ironwork brought from England, established the first sawmill in Maine, and quite probably the first in all of New England.

On July 19, having unloaded the cargo and work crew for Mason's mill, the *Pied Cow* "fell down the River" and sailed the short distance to Agamenticus to deliver the second part of its cargo to the baronial seat of Sir Ferdinando Gorge's lands at present-day York.

Gorges held many dreams for his Maine estates, and may have first considered constructing a sawmill there as early as 1620. According to his *Recollections*, in 1623 he "sent over my Son, my Nephew Captain William Gorges . . . with other craftsmen for the building of houses, and erecting sawmills." But, no sawmill appears to have actually been built until the *Pied Cow's* arrival 11 years later. The job of erecting this mill is thought to have been given to Bartholomew Barnard, a capenter; Robert Knight, a mason; and John Ingleby, a sawyer.

Mason's and Gorges' pioneer sawmills demonstrated the utility of sawmilling on the New England frontier. They produced boards useful in building up the proprietors' "plantacions" and as export products to England. Yet,

neither was a surpassing commercial success. Apparently the York mill was not well planned, and became a burden to Gorges' son, Thomas, who was sent over to attend to his father's business ventures in Maine. In 1640, Thomas reported that the mill was "out of repair," and a year later he complained to Ferdinando that "the cranke of your saw mill is broke . . . The smith doubts his ability to fix it."

Locating Gorges' mill on a tidal inlet proved to be a poor choice. It used both fresh and salt water, but could only run as the tide went out leaving water backed up above the dam. In addition to water flow problems, the mill was not well placed on secure foundations. So, in 1642, when several millwrights were called in to advise on the mill's problems, they all agreed that it should simply be relocated. The mill was apparently leased to a sawyer named Bennett who did not prosper in his activity. This led Thomas Gorges to conclude that Bennett "would willingly be rid of [the mills]."

The partners operating Mason's Asbendedick Falls mills fared a good deal better under the leadership of Henry Joscelyn. After his death in 1638, however, chaos descended on all of Mason's properities. With Mason's grants challenged by the Massachusetts Bay Colony, the "servants" at Newichwannock simply embezzled most of the estate. The mills were allowed to fall into ruin and were ultimately burned to the ground. Meanwhile the former employees of this proprietor adopted lands to their own usage and, under the direction of Joscelyn's successor, Capt. Francis Norton, provided a spectacle in seventeenth century New England by driving some 100 head of Mason's cattle to Boston and selling them for a small fortune. It was a sad end to a remarkable endeavor.

Although milling continued in improved facilities on Old Mill Creek in York through the early 1640's, and in nearby Wells another mill was established by that community's founder, Rev. John Wheelwright, in 1642 or 1643, there was little further development of sawmills until the 1650's. From this point onward, however, the construction of sawmills proceeded steadily along New Hampshire and southern Maine coast. By the end of the century, there were some 60 mills between Hampton, New Hampshire, and the Royal River in North Yarmouth. Many were sizable enterprises which produced substantial quantities of sawed boards — a staple of the local economy. In the 1650's, at

the site of Mason's original mill, the former superintendent of the Saugus Ironworks, Richard Leader, conceived of an elaborate sawmilling plan which, it was claimed, "shall work with nere 20 saws at once." Although Leader's mills never reached such a scale, his scheme was dubbed "Great Works," a name still used to refer to this part of South Berwick.

By 1653 there were two sawmills on Old Mill Creek in Agamenticus and, beginning in 1658, three more were added to those already on New Mill Creek, also in Agamenticus. Mills at Saco Falls were first built in 1653 and by 1674 the "Casco Mill" was in operation in North Yarmouth, but the center of the lumber industry remained in the Piscataqua River drainage and the nearby mills in York and Wells. The spectacle of so many sawmills at work, a scene totally unfamiliar in England, so impressed chronicler William Hubbard that he departed from his narrative, *History of the Indian Wars*, published in London in 1677, to comment upon it:

All of the forementioned Towns and Plantations are seated upon, and near some River greater or lesser, whose Streams are principally employed for the driving of Saw-mills: Those late Inventions, so useful for the Destruction of Wood and Timber, specially of Fir Trees, which no doubt so abound in those Coasts, that there is scarce a River or a Creek in those Parts that hath not some of those Engines erected upon them . . . The upper branches of the famous River Piscataqua, being also employed all of them that way . . . [These communities'] principal Trade is in Deal-boards, cut by those Saw-mills, since their Rift Timber is nearly all consumed.

It is unlikely that Maine's first millwrights based their constructions on any British model since sawmills were virtually non-existent in England. Hubbard notes simply that these mills appeared as "late Inventions." Evidence suggests that the prototypes for these first New England mills were probably based upon examples in operation in Scandinavia and Holland where sawmills had been used for generations. Using descriptions of these examples, it is thought that English millwrights could have handled the engineering with little difficulty. The technology of build-

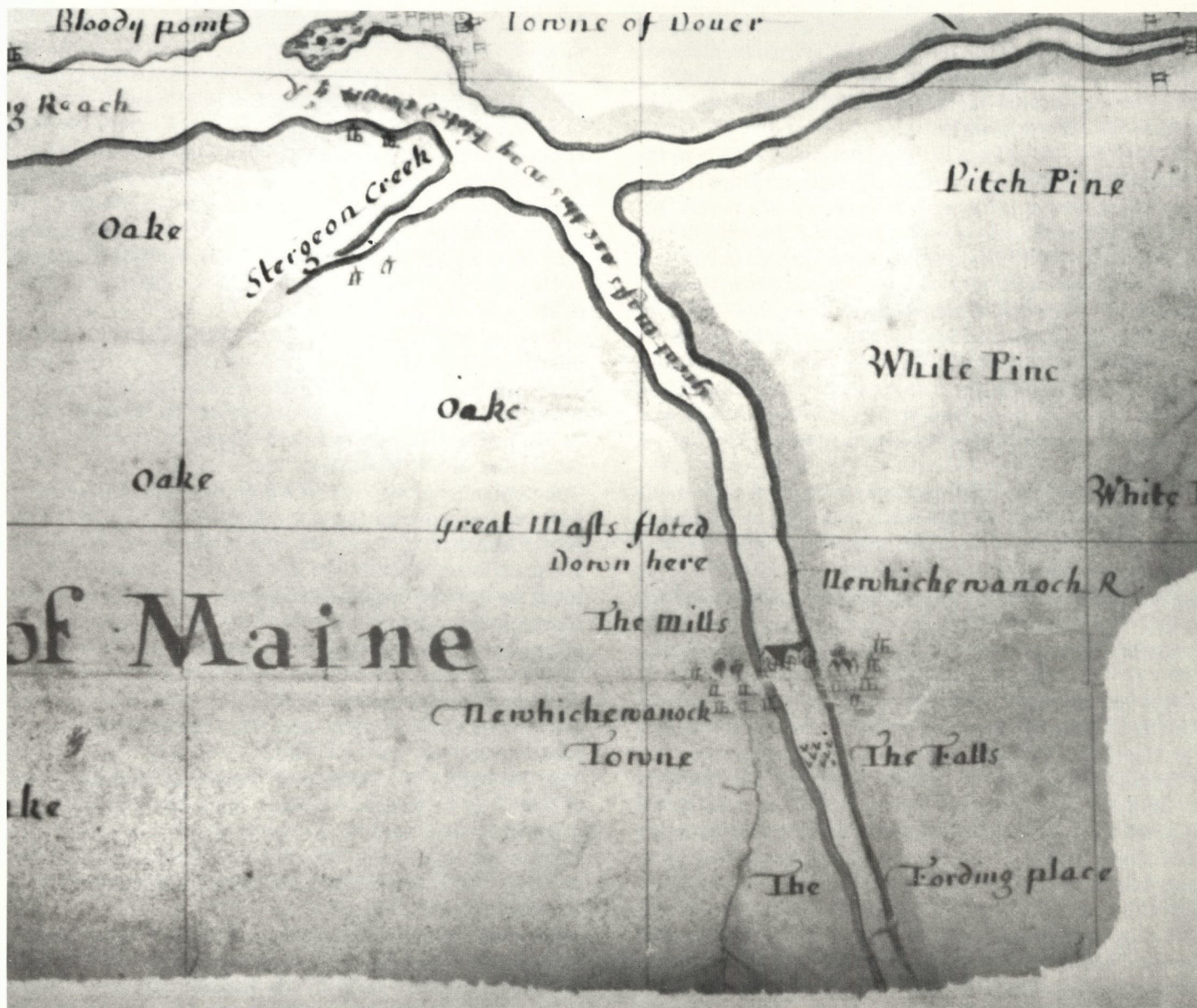


Fig. 28. "A Survey of the Piscataqua Riv[er] by: I B:"

This is a detail from a map of Maine and New Hampshire drawn around 1700. Shown here are the falls at Newichwannock and the mills at "Great Works." (Courtesy Public Records Office, London.)

ing the saw frame and crank was not excessively complex and the remainder of the building, flumes, dams, raceways and wheels was familiar to the builders of grist and fulling mills. (And, it should be remembered that not all the mills were very well built, either.)

Norwegian sawmills may have been better known to the residents of Scotland — seven Scots were employed in the Piscataqua region, principally as loggers and sawyers. According to Kennebunk historian Edward E. Bourne, "these scotchmen came over to this country to engage in business of this kind, bringing with them several machines as auxiliaries to their work." Meanwhile, the possible Dutch influence may be reflected by the siting and construction of several of the earliest mills; despite abundant water power sources, the mill at Agamenticus was a tidal mill, and, in nearby Hampton, New Hampshire, the first sawmill was a windmill. Both of these types of mills were best known in Holland.

While the earliest mills appear to have been built using parts sent over from England (but, possibly, purchased in Holland), it appears that those built after the 1640's were crafted primarily from local materials, with ironwork being perhaps the only imported components. A tradition of New England mill construction developed quickly, and it was soon possible for would-be mill operators to gain essential know-how at an existing mill and then contract experienced carpenters and millwrights to construct a mill for them. This is illustrated by an agreement to build a sawmill in Saco in 1686: John Hill and Francis Backhouse agreed to build the mill, and as part of the bargain "sd Hill shall after he hath had a convenient Opportunity of bing Instructed by a workman how to Kilter ye saws and keep them in due order, he sd Hill is hereby Ingaged to whet and keep them in good order."

In the spread and improvement of well-engineered sawmills, the contribution of Henry Sayward of York is notable. Sayward began his career as a millwright by constructing the windmill at Hampton, New Hampshire in 1642. Shortly afterward he moved to York where, on New Mill Creek, he built three sawmills which came to be known as the "Yorke Mills." Sayward was the most respected mill builder in the region. When his mills at York burned in 1669 he was lured to Wells. There, in 1672, he established sawmills on the

Mousam River at present-day Kennebunk. His interests extended as far as North Yarmouth where he built the "Casco" Mill in 1674. Not only did Sayward influence the course of Maine's mill construction by his involvement in so many different projects, his mills were generally very substantial. He estimated his loss from the 1669 fire at 1000 £, and his mills at Kennebunk were probably the most expensive and advanced for their time (valued at 1,200 £ at a time when the Saugus Ironworks had been capitalized at only 1000 £). Edward E. Bourne concluded that Sayward's mills were "built in a style altogether beyond the demands of the age."

Sayward was a better engineer and mechanic than a businessman. Although many settlers and mill operators were indebted to him for his invaluable services, he died leaving numerous mortgages and debts. His true legacy lay in the instruction and example which he set for a whole generation of mill builders.

Commercial motives of land proprietors and millwrights inspired the construction of many sawmills, but the needs of the community were also met by the mills. When the construction of a sawmill required the approval of the town itself, as it most frequently did after the 1650's when the Massachusetts Bay Colony supplanted the original proprietors in determining land policy, the "common good" of the township became a consideration. So, when Roger Spencer was permitted to build a sawmill in Saco in 1653, it was with the expressed condition that the mill be completed within one year and that the townsmen "have boards 12d. cheaper than strangers," and that townsmen be preferred as employees. In 1652, John Davis proposed to construct another mill in the community. Although never built, it was approved by the town conditional on an agreement to "furnish boards 10d. per 100 less than current rates to inhabitants of the town."

Clearly, Maine's seventeenth-century sawmills greatly advanced the building of settlements by providing boards for local construction. But, the size and number of mills in Maine suggest that it was the export trade in boards that accounted for the vast proportion of the sawing done. Sawing boards was a principal source of profits for the early proprietors, "adventurers" participating in New England trading companies, and merchants in both England and

New England. The first mills were owned directly by the principal proprietors. Even those erected later by millwrights like Henry Sayward, did not survive for very long without the financial assistance of the timber merchants. Richard Leader's ambitious mill project at "Great Works" was soon mortgaged to Jno. Beex & Company and Richard Hutchinson, both of London, each holding one-quarter interest. Jordan and Spencer of Saco sold one-quarter interest in their mill to Thomas Savage of Boston, while Sayward's Kennebunk mills were mortgaged to Robert Gibbs, also of Boston.

By controlling a part interest in sawmills, merchants could compel production and assure themselves of a ready supply of sawed boards for their export businesses. For the mill operators, the cash provided by the merchants served as an advance against the costs of hiring loggers, sawyers, and teamsters to cut, haul and saw the boards. Some of Henry Sayward's mortgages are instructive. An agreement with Daniel Epps of Ipswich provided that "the sayd Sayward is to pay the three next Insewing years, the first payment to be the yeare 1671: by the last of May eight thousand of merchantble boards to bee Delivered at such wharffe in Boston as I shall appoynt, & so the two years the like Number boards by the yeare which is for ye rent of the Land . . ." In a mortgage to Robert Gibbs of Boston, Sayward agreed to saw "Two hundred thousand foote (board feet) of Mrchtble [merchantable] square edg'd pine boards . . ." The first 60,000 feet was to be delivered in 90 days, an additional 40,000 six months later and the second 100,000 before July 31, 1673 — a little more than one year and one month after the agreement was signed. The sawing of such a quantity of boards in just thirteen months attests to the quality of Sayward's mills. For a one-third interest in his mills in York, Sayward promised to produce 135 £ 15s in "saw Mill pine boards, square edged, full Inch thicke, to be Delivered in Boston." The many loans kept the sawmills operating — to the benefit of the Boston merchants or the English companies, not necessarily for the millwrights and sawyers. Investors frequently appointed agents to oversee the management of their interests. John Mason sent Henry Josselyn along with his carpenters in 1634, and Jno. Beex & Company sent over Edward Rishworth to serve as agent for their investments.

The division of mill ownership by fractions and "shares" was destined to continue well into the nineteenth century. Although there were sawmills built and owned by one individual, these were decidedly the minority. Fractional ownership provided a means to secure capital funds, to pay the sawyers on a share basis, and to afford access to the mills by others who might wish to profit through the cutting of timber on their lands. For example, the proprietors of land in the Sanford area granted a mill privilege and land to David Bennett for the construction of a sawmill to be owned by a number of shareholders. A grant of additional land in 1742 was approved in order to ". . . supply him with Timber for building a Meeting House and the Accomodation of the Inhabitants with boards at a reasonable rate, So as not to interfere with the Proprietors and Settler's Lots."

Not only was the ownership and management of the sawmills developed at an early date, but so were the techniques and terminology of logging, lumbering and sawmilling. By the middle of the seventeenth century, young men working in the woods were known as "loggers." Jeremiah Moulton of York worked as a logger for Henry Sayward's York mills, while Scotsmen James Oare, Henry Brown and Nicholas Cole worked as "Loggers and Sawyers . . . in and about the mill at Mowsome." Logs were cut in winter and floated down to the larger mills where they were caught in a "boom." Hull, Plaisted and Wincoll had "boome peeres" at their mill in 1679. "Wiers" were used to catch debris at the head of the "flume" which guided water to the wheel. "Schidds" were used to haul logs and lumber in the winter.

The construction of sawmills was proceeding rapidly in southern Maine until it was interrupted in 1675 by King Philip's War, the first in a long series of violent conflicts between the English, French and Indians — known as the "Indian Wars." These conflicts continued spasmodically through to the 1760's, making the Maine frontier an unstable and often a dangerous place to live. Sawmills were sometimes fortified against attack, but most caught in the line of conflict were destroyed. From 1689 to 1713, settlement in Maine was confined to the three communities of Kittery, York, and Wells. During any brief period of peace, enterprising individuals began the construction of sawmills in frontier areas.

In the absence of frontier settlements, timber "pirates" often ventured into remote inlets to plunder uninhabited timberlands. The best protection against trespasser traffic and also the best shield against Indian "molestations," was the extension of settlement farther into the frontier. The role of serving as a "buffer" for the older settlements was not enviable, but the inducements in terms of land grants were often particularly substantial during the Indian Wars.

The last of the Indian Wars ended in 1763 with the triumph of the English over the French in Canada. During the ninety-three years of warfare, the settlement line in Maine had moved steadily, but tenuously, to the north and east. Decisive victories, such as that of Capt. John Lovewell against the Pequawket Indians in 1725 at Fryeberg (the later site of a sawmill, by the way), opened new tracts to settle-

ment and sawmilling. Investment in Maine became far more secure with the closing episode in these long wars. Many would-be proprietors and mill owners had been standing by anxious to advance up the coast and into the interior of the Province to find their fortunes. Their eagerness was evidenced in a new aggressive era of settlement and sawmill construction. From the mid-1760's to the end of the American Revolution, sites were developed along all major rivers of Maine. In the central Kennebec River area, Fort Halifax in Winslow, and Fort Western in Augusta, stood sentinel over the renewal of settlement and enterprise. It was in this environment that Samuel Dutton, land speculator and merchant, came to Hallowell, and it was in this era of growth and opportunity that sawmilling came to Bond Brook.

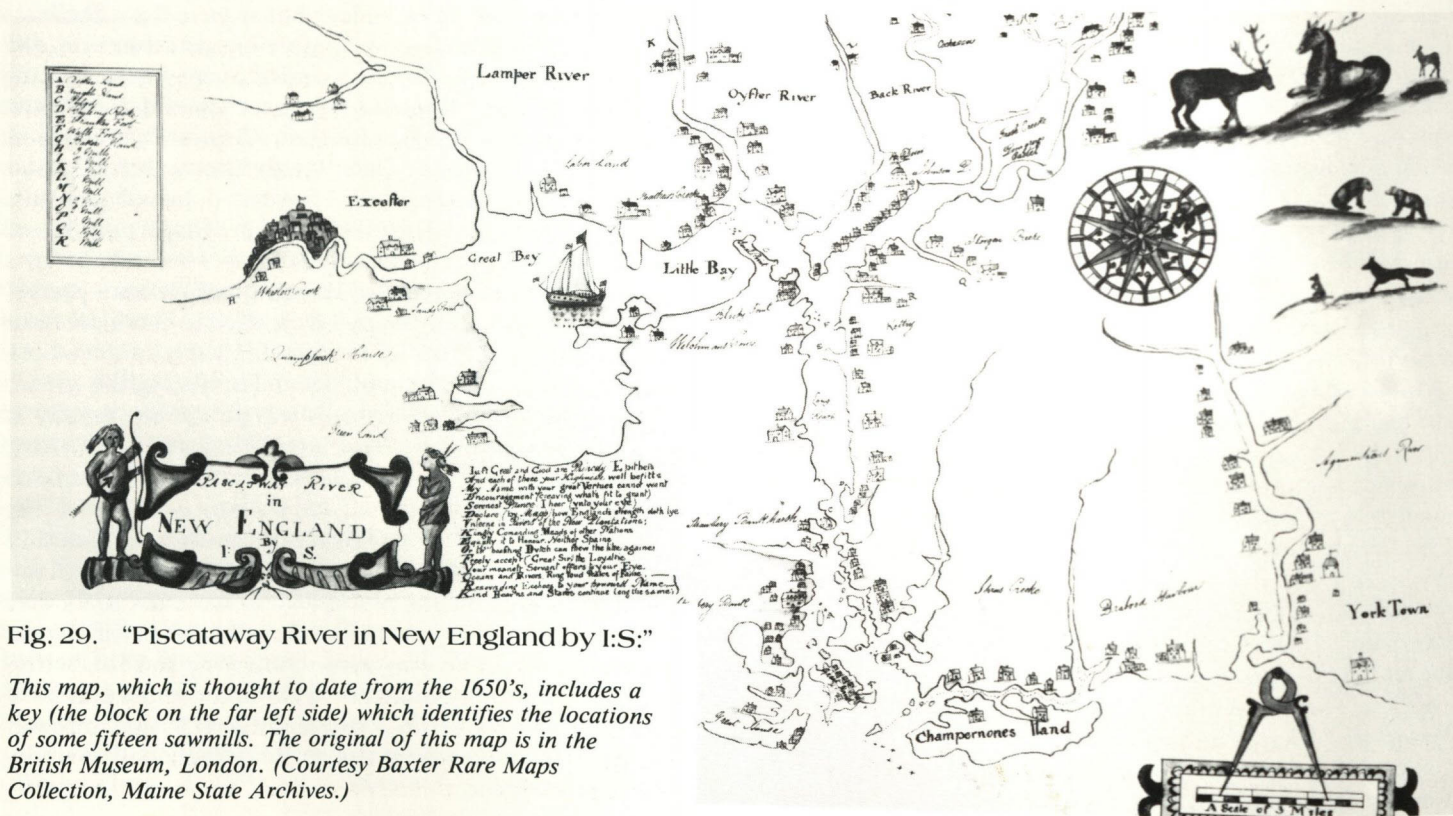


Fig. 29. "Piscataway River in New England by I:S."

This map, which is thought to date from the 1650's, includes a key (the block on the far left side) which identifies the locations of some fifteen sawmills. The original of this map is in the British Museum, London. (Courtesy Baxter Rare Maps Collection, Maine State Archives.)

SACO RIVER SAWMILLS

The landscape of Maine offered early investors abundant opportunities for lumbering and sawmilling. The forest grew unimpeded right up to the banks of rivers and streams, and down to the beaches and the sea along the entire coast. Where rapids and waterfalls cascaded to sea level, the relative ease of sawing lumber and transporting it to distant markets was immediately obvious. The sea itself, and Maine's major river systems, provided access to sites along the entire coastline. The building of sawmills was as easy in Machias as in York. The distribution of the earliest mills was, therefore, largely determined by the security of the frontier itself. Between the 1670's and the 1760's this frontier moved cautiously to the north and east.

Sailing eastward from Newichwannock, and from Sayward's mills in York and Wells, lumbermen and investors next encountered the Saco River. Here they found a nearly ideal site for the construction of sawmills. An unfailing supply of water descended from the White Mountains, some 140 miles upstream, and crashed into the sea at falls located at the head of navigation. "It is no exaggeration to say," a contributor to the Massachusetts Historical Society Collection wrote in 1815, that "there is not a better place in the world for all kinds of mills and factories. Vessels of 100 tons can come up within a few rods of all these mill seats — This town [Saco] will one day be celebrated for its manufactories."

Indeed, these falls would later be the site of Maine's first manufacturing city, a community of giant brick factories and cotton spinning machines where nineteenth-century Maine girls worked to produce millions of yards of cloth

each year. These "celebrated . . . manufactories" were built, beginning in the late 1820's, on the sites of earlier sawmills. When Saco's first spinning machines were set into motion, the rasp of saws had already filled the air around the Saco Falls for over a century and a half.

The Saco River offered many mill sites, but in the seventeenth century only those near the sea were deemed truly desirable. It was, therefore, the land granted to Richard Vines on the Saco Falls which interested Jno. Beex and Company and, ultimately, William Phillips, a wealthy Boston merchant, who built a mill "under Sacoe Falls" around 1662. Having first purchased a one-quarter share in Roger Spencer's mill (built in 1650), Phillips then hired his son-in-law, Capt. John Alden (son of the Mayflower pilgrim of the same name), to build a second. Meanwhile, on the eastern side of the river, Benjamin Blackman began his sawmill construction in 1680.

The Saco Falls were also the site for a sawmilling enterprise directed by one of Maine's most prominent eighteenth century merchants, William Pepperell. Pepperell purchased the right to the Blackman mill property in 1716 and promptly initiated agreements with partners who would build and operate the mill. For himself, Pepperell retained one-half interest in the buildings, timberlands, and other property, and also reserved for himself one-half of all profits which might accrue from the logging and lumbering operations. Two other partners, Humphrey Scammon, Jr., a mariner, and Nathaniel Weare, a millwright, each received one-quarter interests in the mill — their contribution probably included the building and operating of the mill



Bonney-Eagle Falls, Buxton, Hollis and Standish.

Fig. 30. "Bonney-Eagle Falls, Buxton, Hollis and Standish"

This illustration, from the Water Power of Maine published in 1869, shows two sawmills in Hollis (left side) owned by Abijah Usher and M. M. Came and a double sawmill in Buxton (right). The Buxton mill is shown in figs. 32 and 33. (Maine State Museum.)

and the transportation of the sawn lumber. Pepperell and his partners had soon erected the mill and also a dwelling to house the mill workers. They agreed among themselves that they would "reserve the liberty to bring timber any ways upon all the aforesaid land to the said mill or the river, without it be through a mowing field, or cornfield, or orchard."

Pepperell's mill illustrates well the use of fractional mill shares provided to partners who might contribute to the venture land and timber, water power sites, mill construction and management skills, or cash investment. The shares, once formally divided, could be subdivided yet again and resold or mortgaged as the several distinct owners might see fit. For example, there were two saw frames in operation in the Pepperell Mill and, in 1717, the partners decided to actually divide up their several shares. Pepperell took "the saw and frame next to the land, and the piling place next to the land; and the saw frame and frame next to the river, said Weare and said Scammon are to have, and the piling place on the rock next to the river; each owner of said saw is to maintain and keep in order his running gear and saw and all that belongs to each frame." To make matters more complex, it was possible that none of the actual mill owners would actually work at the mill at all. Secondary agreements often provided for the actual management of the sawmilling work. In 1731, for instance, millwright Nathaniel Weare (now designated "Esquire") sold his share of the mill for 500 £, and agreed to buy it back for 250 £ — it was presumably worth a good deal less after the new owner had been at work cutting the good timber for several years. This contract was actually a form of lease.

These complex arrangements involving landowners, merchant investors, subcontractors, sawyers, and others, have left a confusing legacy of mill ownership in the Saco River Valley. The system obviously worked well; by the 1770's the port of Saco was Maine's principal depot for sawed lumber. There were, before 1800, some seventeen sawmills at work "about the falls" in Saco and Biddeford — four on the western side, three on the eastern, four on Gooch's Island, four on Spring Island, and two on Indian Island. Many, if not most of these, had two or more saw frames at work under different managers and owners. Although it took many sawmills to achieve it, the produc-

tivity of the Saco mills in the late-eighteenth century was truly remarkable. Generally these seventeen mills, most with multiple saw frames and possible gang saws, were operating twenty-four hours a day, six days a week. The production at this one location totaled some 50,000 board feet of lumber per day before the end of the eighteenth century!

The cutting power of Saco's mills soon diminished the forests of the area. By the 1770's the search for timber for these sawmills had reached up the river to Fryeburg. Logs could be floated downstream from as far as New Hampshire to the mills at Saco. But, by this time the Indian Wars had ended, and land grants and settlements were increasingly encumbering the wilderness of the Saco valley. Sawmills began to appear in a thirty-five mile stretch of river extending from Saco inland to Hiram Falls. Principal locations included "Steep Falls" in Limington; "Bonney Eagle," "Bar Mills," "Salmon Falls" and "Union Falls" in Hollis and Buxton. Some of these were planned as early as the 1740's, but few materialized until the 1770's and, most, after 1790.

The practice of building sawmills in fractional shares continued as sawmilling extended up the Saco River. In 1807 at Bar Mills, for example, a double sawmill was divided in precisely the same manner that Pepperell's mill had been divided in 1717. There were several mills located at Bar Mills, and some straddled a bar in the river at that location. So, when Samuel Sands purchased a portion of one of these mills, his deed provided that for \$370 he owned "one fourth part of the stream saw mill in a double saw mill called the lower bar sawmill." The "shore saw of said mill" was then owned by John Palmer and Joseph Atkinson.

Sometimes the sawmill shares could not be conveniently divided up in physical terms. It was not always possible to simply designate one saw or one portion of a mill that represented the fractional share of the ownership. As the shares became smaller, this division was accomplished by assigning a value to the share expressed in the number of days of mill work that the share represented. Sawmills were divided into twenty-four parts, called "days." A person owning the right to use the mill one day a month had 1/24th of the mill, or "one day." A one-quarter interest in a sawmill equaled six days (or, if there were two saws that could be used, twelve days). The subdivision of sawmill ownership in this way reached absurd proportions in which shares

were even expressed in terms of hours and minutes. When Daniel Cleaves sold his share of the upper "stream saw" at Bar Mills in 1817, he conveyed "five days or five twenty-fourths of the privileges and appurtenances belonging to said stream saw, and to receive the income or possession of said mill from the 20th day of March." Elsewhere saw-mills were owned in truly miniscule shares. In Limington, for example, the mill built by Jonathan Norris in 1792 was purchased jointly by a number of landowners and became

known as the "Proprietor's Mill." One proprietor, William Small, owned "one tenth part and one forty-eighth part of the mill privilege." Samuel Small owned even stranger shares described as "one forty-fifth part and three thirtieths of a certain mill privilege [on the] western side of the Saco River in said Limington . . . together with one forty-fifth and three thirtieths part of a double saw mill standing on said privilege."



Fig. 31. Dam at Bar Mills

This view of a dam at Bar Mills shows a typical construction of earth and logs. According to the Water Power of Maine in 1869, there was here "an old wooden dam at the head of the falls, which allows a great waste of water." Photograph from "Stereoscopic Views by S. Towle, Lowell, Mass.," c. 1870. (Courtesy Maine Historic Preservation Commission.)



Fig. 32. Buxton (Standish) Double Sawmill

This photograph, looking toward the eastern side of Bonny Eagle Falls, shows a double sawmill that was equipped with two single saws and other milling machinery in 1869. At that time, this mill was capable of producing some 2,000,000 feet of long lumber each year. Photograph c. 1880. (Courtesy Maine Historic Preservation Commission).



Fig. 33. Mill Ruins at Bonney Eagle Falls

With the dam destroyed at Bonney Eagle, the double mill on the Buxton side appears desolate. This image reflects the common fate of virtually all Maine sawmills. Photograph c. 1900. (Courtesy Maine Historic Preservation Commission.)

As ownerships in these were transferred by inheritance, the confusion of ownership titles grew worse. There is some evidence which suggests that the "days" of sawmill ownership were actually used to cut logs belonging individually to the several owners. As late as 1847, for example, the owners of Chase's sawmill in Limington entered into an agreement providing that each owner could use and occupy the mill during certain pre-established periods each and every month. Most of the mills were probably not run in this way, however. It is more likely that a few leading merchants controlled the vast majority of the shares in most mills. John and William Woodsum, for instance, owned shares in both the lower and the upper sawmills at Bar Mills, and other mill shares in Limington. Together with Isaac Andrews, the Woodsums controlled many of

these mills between 1808 and 1815. Later, control of virtually the entire watershed was assembled in the hands of Ellis B. Usher who became truly the "King of Lumbering" on the Saco River during its declining years in the 1830's. For many of these merchants, the use of fractional shares may simply have been a mechanism of profit-sharing extending to the owners of many small tracts of land.

Sawmilling activities along the Saco, particularly after 1770, were paralleled by the development of mills along the Kennebec. The center of this trade was Gardiner. Here, beginning in the 1760's, Dr. Sylvester Gardiner built an empire based on baronial control of waterpower and sawmilling sites. There were absolutely no fractional shares in any of the mills here.

GARDINER ON THE KENNEBEC

On a summer day around the year 1890, Dresden, Maine photographer Aaron B. Houdlette set out to record a piece of local history. Carrying his camera, tripod, and glass plates to the bank of a small stream leading into the Eastern River, Houdlette focused upon the remains of a wooden building which was collapsing into the stream below. This building had been a common feature in the community since the first year of its settlement, but it was unlikely to survive another winter, and Houdlette knew it. This day might provide the last opportunity to photograph the oldest structure standing in the town, the small sawmill built by Sylvester Gardiner in 1753.

Aaron Houdlette's world of 1890 was filled with sawmills. On the Eastern River, and particularly along Cobbosseecontee Stream where it flows into the Kennebec in Gardiner, several generations of sawmills had been built and rebuilt to saw logs floated down the river from distances of nearly 100 miles. Sawmilling was the region's most impressive industry, the source of the area's greatest wealth, and, aside from agriculture, it provided the greatest number of jobs. Sawmills had been built on every stream in the area, and large mill complexes had been developed in Gardiner and South Gardiner. This sawmilling tradition had begun at Sylvester Gardiner's 1753 sawmill.

The economic importance of Kennebec River lands had been recognized by New England's first explorers and settlers. As early as 1629 the Pilgrims of the Plymouth Colony in Massachusetts had applied for a patent for a "fitt trading place in the river Kennebec." A trading post was established in the early 1630's near the later site of Fort

Western in present-day Augusta. Unlike the contemporary efforts of Ferdinando Gorges, John Mason and others in York County, however, the Plymouth Colony's interest was in the fur trade, not in the sawing of boards. Sawmilling did not come to the Kennebec River for over another century.

The slow start in exploiting the forest land along the Kennebec was due, in great part, to the Indian Wars. But in the 1750's, guarded by forts Shirley, Western, and Halifax, settlers began to populate the region. Trade was still an objective, as it had been for the Pilgrims over a century before, but now the principal articles of trade were seen to be the products of the forest itself.

Houdlette's photograph of the mill in Dresden provides a valuable glimpse of a mid-eighteenth century Maine sawmill, a view which illustrates the typical construction, placement and technology of up-down sawmills built throughout the region. The main platform supporting the mill was built directly over the streambed itself. The elevated floor structure, sometimes called the "stage," stood about 12 to 14 feet above the stream. This floor provided some protection from ice and snow to the water wheel and primary gearing located below. The saw frame, log carriage, tracks, and winches were located on the floor itself and some fragments of these parts can be seen in Houdlette's photograph. The tail block of the log carriage can be seen flipped upside-down while the head block lies tipped up next to the saw frame. Under magnification these parts look nearly identical to those found near Samuel Dutton's mill in Augusta.

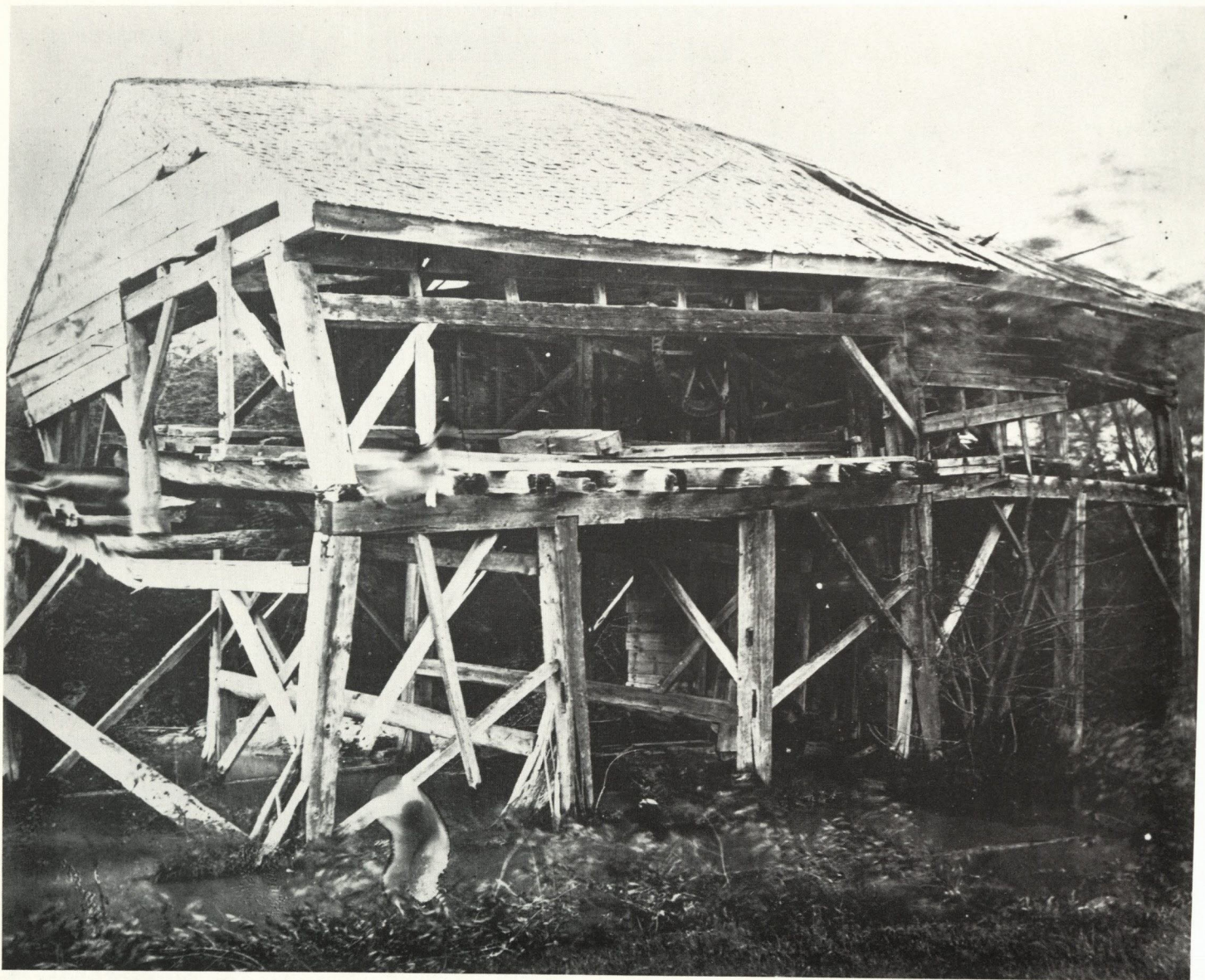


Fig. 34. Gardiner's Dresden Mill

Aaron Houdelette of Dresden, Maine, captured this image of Sylvester Gardiner's 1753 sawmill shortly before the mill collapsed. This photograph taken around 1890, provides a remarkable view of an eighteenth century Maine sawmill. (Courtesy Maine Historic Preservation Commission.)

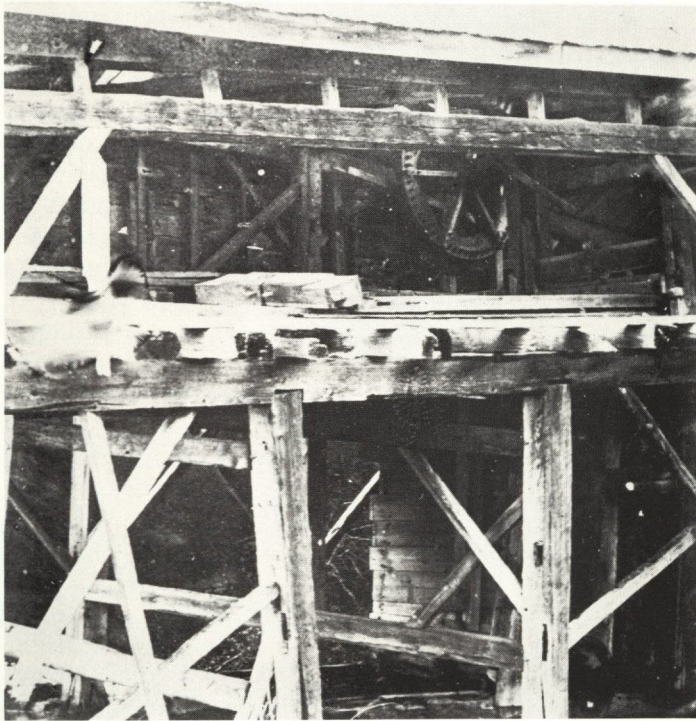


Fig. 35. Gardiner's Dresden Mill (detail)

This glimpse into the interior of Sylvester Gardiner's mill allows us to look back to the eighteenth century. The remains of the saw frame can be seen near the floor to the right of the large wheel. Below it lies one of the two end blocks. Near the center of the photograph is the other block which has been flipped upside down. (Courtesy Maine Historic Preservation Commission.)

A particularly interesting architectural detail is the roof support trusswork. This was done to provide a broad opening in the side of the mill building. Dutton's mill had a similar opening built on the shore side of the saw, presumably to allow for the easy loading of sawed boards on the road leading to the mill. In this eighteenth century Dresden mill, however, an opening was built on the stream side and, additionally, the floor support beams were extended out beyond the building wall over the stream. Since most of the boards were destined for shipment to Boston, it is possible that

this construction was designed to facilitate the loading of boards directly on the decks of waiting vessels or rafts standing below the mill in the Eastern River.

Aaron Houdlette's photograph has provided modern researchers with a valuable architectural and historical document. It also provides an important historical view because Sylvester Gardiner's 1753 Dresden sawmill was the first in the Kennebec River watershed and it marks the beginning of the development of the Kennebec as a major lumber emporium in Maine.

The Kennebec, which covers some 150 miles in its passage from Moosehead Lake to Merrymeeting Bay, descends over 1000 feet through rapids and waterfalls to present-day Augusta. The river is open to commercial navigation below Augusta, and this region, therefore, attracted the interest of the earliest explorers and settlers in New England.

As always, the most prized location for sawmills was near the head of tide, at a place where the drainage of interior lakes and streams coincided with waterpower and sea travel. On the Saco River, this point was relatively near the open ocean. On the Kennebec, this spot was some seventeen miles upstream from Bath, near the site of present-day Augusta. Here, rapids stopped navigation for larger vessels. Six miles below these rapids and falls, in present-day Gardiner, the Cobbosseecontee Stream flowed into the river from the west. This stream drained a series of lakes and ponds with a combined surface area of over twenty miles, and in a stretch of less than one mile above the Kennebec, it fell some 130 feet. Not surprisingly, the most ambitious development of sawmilling on the Kennebec was located here.

The construction of sawmills on Cobbosseecontee was in many ways entirely typical. In both architecture and technology, the mills resembled those built elsewhere and the management of the mills followed a common pattern as well. Sawyers were employed to work for merchants who themselves leased the mills and water power sites from the builders and owners. Sawmill construction on this one-mile stream was, however, noteworthy and unusual for two reasons. First, from an early date the mills were concentrated in one small area. Second, all of the mills were built and owned by one man — Sylvester Gardiner.

The development of central Maine's Kennebec River region, including the mills at Cobbosseecontee at its center, arose from the activities of the Boston-based Kennebec River Purchase Company that had inherited a land-claim descended from the original Plymouth Colony. The proprietors of this "purchase" included a number of Boston's social and monied elite — Thomas Hancock, William Brattle, James Bowdoin, James Pitts, and Sylvester Gardiner among others. Of these men, Sylvester Gardiner displayed the keenest interest in the Kennebec. Through this interest he ultimately added to his already considerable fortune. Beginning in the 1760's, Gardiner built an empire based on baronial control of waterpower and sawmilling sites.

There were absolutely no fractional ownerships in any mills built in eighteenth-century Gardiner. In fact there were no owners of any mills other than Sylvester Gardiner. Here, alone the Cobbosseecontee, Gardiner and his heirs established a fiefdom that has been estimated at no less than 100,000 acres of land. Sawmills were at the center of this empire. The policy instituted by Gardiner, and continued by his grand-son-in-law, Robert Hallowell Gardiner, was to retain all titles to dams, mills, buildings and water rights and to lease these privileges and facilities to individual tenants who were the actual operators. Through this arrangement, the property remained in the Gardiner family and the income on their capital investments was returned in the form of rent. Their profits from Maine timberlands were achieved, in part, through the rentals which they controlled.

Through his land-management policies and his sawmills on the Cobbosseecontee, Sylvester Gardiner achieved the wealth and nearly feudal autocracy which so many New England investors and proprietors had sought. Building and maintaining such an empire required ruthless management, and Gardiner was equal to this challenge. "Dr. Sylvester" emerges from history, therefore, as a somewhat unpopular and unsympathetic figure. Nonetheless, the secure capital base provided by him, and later by Robert Hallowell Gardiner, fostered the development of the Cobbosseecontee Stream's water power in a way unparalleled in the 18th century in Maine, and indeed throughout the period up to Statehood in 1820.

The first saw and grist mills were constructed on the

stream in 1760 or 1761 on what later became known as "dam #1." Ultimately there would be eight separate dams, but on this first dam alone there were to be some thirteen sawmills placed in operation by the Gardiner family over the first fifty years of their management. This concentration of mills led one nineteenth-century historian of the region, Henry D. Kingsbury to note that "... it can probably be said with truth, of sawmills there was no end. Where there was a sawmill is not so much a question as where there wasn't one . . . Two or three generations of sawmills were built, worn out and replaced with new ones."

Before 1834 the Gardiner system of sawmills on dam #1 included six complete mills located under three roofs. These mills might elsewhere have been called "double sawmills." Where waterpower permitted it, productivity was expanded by locating duplicate sawing machinery side by side in buildings only slightly larger than those of single-saw mills. Routinely, the management of each "complete sawmill" was in the hands of a separate tenant. Down through the first decades of the nineteenth century, the expansion of single mill buildings was primarily due to the doubling of equipment. As late as 1870, it appears that the Gardiner Mill of N. O. Mitchell was an identical copy of that run by Arthur Berry "next door." The "double sawmill" system permitted independent outside access to each saw along opposite sides of the building, and it was perhaps fostered also by the limitations of pent-roof construction which made wider buildings more difficult and expensive to construct. Most likely, however, the practical limitation on sawmill size was a function of water-power technology.

The transfer of power in early mills (whether saw, grist, cotton or other) was more or less direct from the waterwheel to the mechanisms driven. With this common system, the use of more saws required more waterwheels. Following the lead of textile factories, however, new systems were developed to transfer power a considerable distance from the waterwheel, using line shafting and belting. These improvements, coupled with smaller, faster, water turbines resulted in the expansion and improvement of Gardiner mills in the 1830's. Ultimately all wooden dams were replaced with stone. Shortly after 1834, another four complete mills were built on dam #1, all located in one large building. Using turbines and line shafting it was now possi-

ble to operate a number of independent saws and smaller machines from one central power source. Each of the ten "mills" now located on this upper dam were managed by ten separate tenants.

Circular saws were first employed for edging, and the cutting of shingles and clapboards. By mid-century, however, these saws became popular for the cutting of long lumber. Since they used more power than up-down saws, and turned at far greater speeds, the introduction of circular saws paralleled the use of water turbines. Among the lumbermen of Gardiner, however, the greatest increase in productivity came with the employment of up-down moving gang saws.

The idea of hanging more than one sawblade in the up-down saw frame was very old. Indeed, Richard Leader had intended just such a mill at "Great Works" in the 1650's. Unquestionably, many of the best double sawmills operated with frames that carried several saws. Improvements in metallurgy and engineering, as noted above, made possible the development of large gangs of saws by the time of the Civil War. When Gardiner lumber manufacturers reported the use of "up-down" saws in the 1870 census, they meant up-down gangs of saws, which might employ as many as eighteen, twenty, or even twenty-four separate sawblades each!



Fig. 36. Mills on Cobbossee, c. 1870

The architecture of sawmills began to change noticeably in the 1860's as the influence of large-scale factory systems were applied to sawmilling districts. In this foreground of this view is the "double" sawmill of Arthur Berry and beyond it is the similar mill of N. O. Mitchell. Photograph from the stereoscopic card series "Photographic Views," by A. F. Morse, Hallowell, Maine, c. 1870. (Courtesy Maine Historic Preservation Commission.)

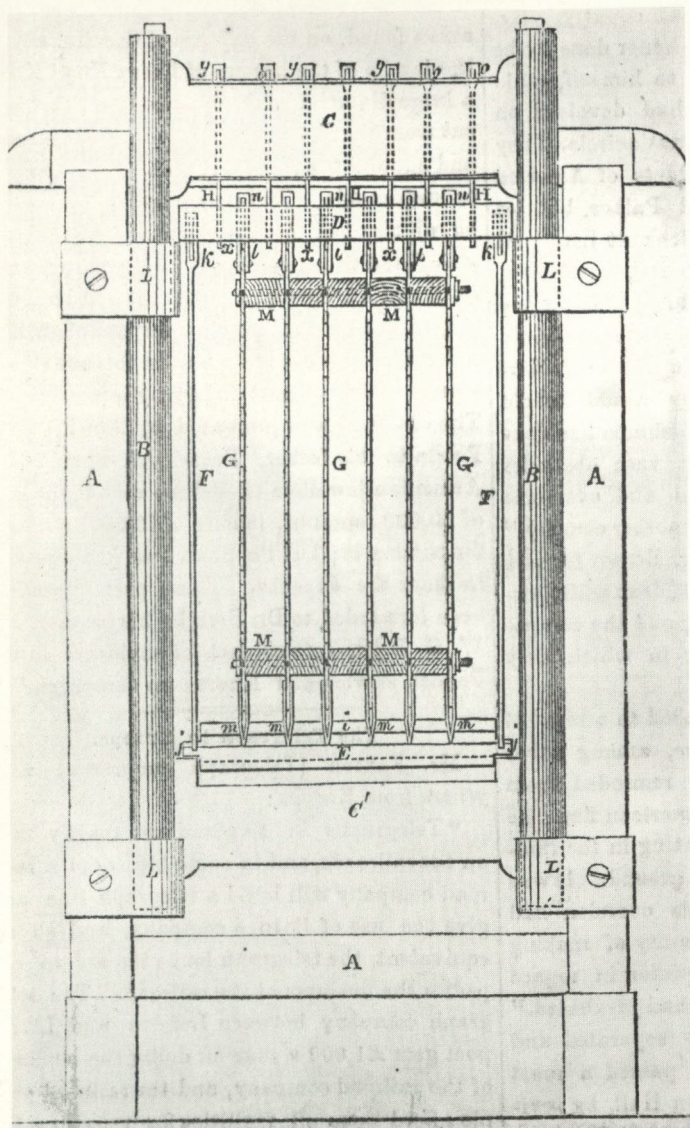


Fig. 37. Bronson's Gang Saw

Although the concept of gang sawing can be traced back in Maine to the 1650's, major improvements in this technology came in the 1830's and later. The illustration accompanied an article in Scientific American on August 16, 1851. (Maine State Museum.)

The strength of Gardiner family capital supporting the sawmills is illustrated by the occasion of a fire in 1844 which burned them all down. Robert Hallowell Gardiner promptly rebuilt them all and continued the leases with all of his tenants. When a second fire broke out in 1860 Gardiner allowed the tenants to rebuild their own mills, though he continued to lease land and water power for the remainder of his life. It was probably at this point that the Cobboseecontee's many mills were consolidated and restructured along the lines of the larger lumber mills of the Union and Penobscot rivers to the north.

The mills at Gardiner were sustained by the intergenerational business savvy of the Gardiner family, and their juxtaposition to the Kennebec River which provided a highway for logs and sawed lumber. Timber stands in the immediate Gardiner area were exhausted at a very early date due to mill activity as well as to pirating by settlers in the region during the chaotic period the American Revolution. The continued growth of the mills, side by side, was only possible because the river could afford transportation for logs cut far upstream. In this regard the confluence of the Cobboseecontee and the Kennebec proved particularly fortunate. From the 1860's to 1890's Gardiner mills were cutting boards from trees felled in the region of Moosehead Lake, some 150 miles away! In 1869 the Gray mill sawed 3,000,000 feet with one gang saw, Arthur Berry and N. O. Mitchell each sawed 5,000,000 feet with three gang saws each, and H. W. Jewett sawed 6,000,000 with his three gang saws. By its fortunate location and technological improvements, the Cobboseecontee mills survived and prospered for over a century and a quarter.

The pattern of mill development and leases instituted by Sylvester Gardiner were significant for their day, but ultimately, in the nineteenth century, these practices were commonplace. By investing in the construction costs of dams and mill buildings, and then leasing them to other manufacturers, Gardiner previewed the organization of the waterpower companies which undertook the development of factory cities in Saco and later Lewiston, and the development of major sawmilling districts. This separation of construction investment from the actual work of manufacturing lumber, became a characteristic of Maine's sawmill industry in the nineteenth century, including the

enormous developments of the Penobscot. In the 1830's, for instance, some saws at Bangor were rented at a cost of some \$1000 per season, while in the 1840's it was reported that six saws on the Kennebec were rented for \$900 each for the season. In other cases, contracts established payment for lumber sawed "on toll," with a fee paid to the owners depending on the board feet of lumber cut. Another popular lease system involved establishing a schedule of prices on which the contractor agreed to do sawing for the owners.

Sawmill management in Gardiner foresaw the merchant control of water power, mills, and natural resources which later came to characterize the development of the larger textile manufacturing cities. This control of all aspects of lumbering and milling — timberland management, harvesting, log driving, water power, sawmills and transportation of lumber to markets — is a characteristic of larger lumbering enterprises in Maine during the mid- to late-nineteenth century. While there always remained a large number of entrepreneurs who built and ran small sawmills, the export trade in lumber was ultimately a big business dominated by powerful merchant interests.

While most of the earliest mills discussed in this booklet were built on relatively small streams demanded little engineering expense, the development of the more substantial mill complexes required an infusion of capital similar to that provided by Sylvester Gardiner, and later, Robert Hallowell Gardiner. Most were built on rivers considerably larger than the Cobbosseecontee. The promoters of many water power and sawmilling developments in Maine were not primarily timber merchants, but investors and developers. Under this influence, the development of sawmills began to resemble that witnessed with the birth of textile mill villages and cities. The impetus and capital often arose from investors who controlled their sawmills from afar through hired agents. These investors stood at the top of an organization chart which included land and water power speculators. They developed their lands and power sites much as Gardiner had done, and appointed agents to run them and to manage their contracts with the various tenants of the several mills. This pattern of investor financing can be illustrated by reference to sawmills built in the communities of Ellsworth and Whitneyville.

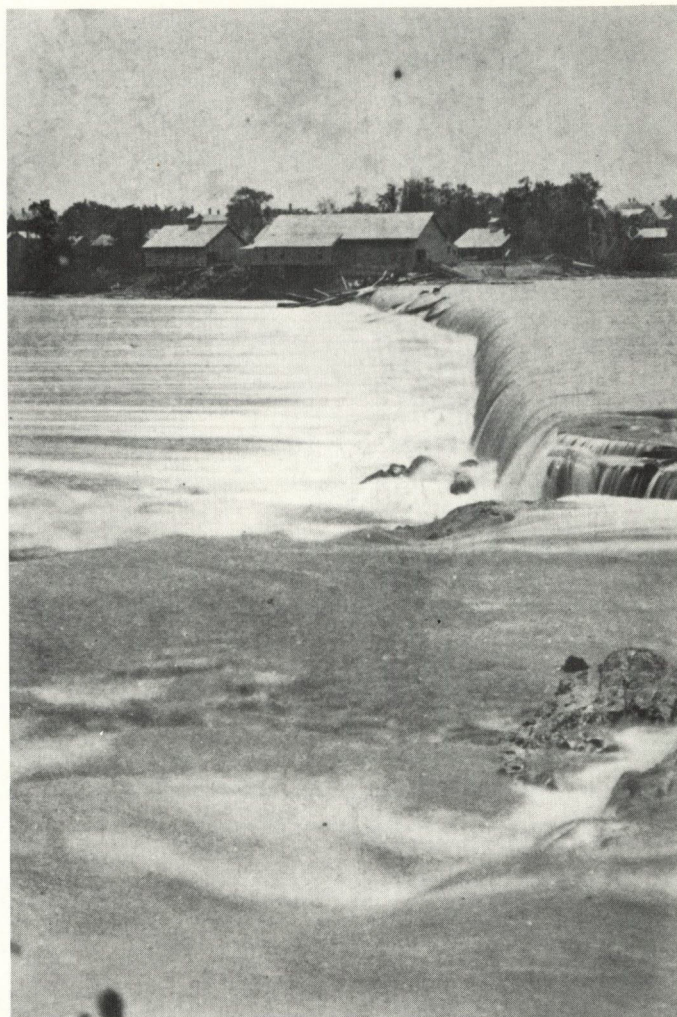


Fig. 38. Dam at Fairfield

The development of water power sites on larger rivers was pioneered in conjunction with the construction of textile mill villages and cities. These large construction projects were commonly undertaken by development corporations that leased water power rights and mill buildings to tenants. The largest of these developers on the Kennebec at Fairfield were the "Kendall's Mills Water Power Company," and the owners of "Somerset Mills." Photograph from a stereoscopic card, c. 1875. (Courtesy Maine Historic Preservation Commission.)

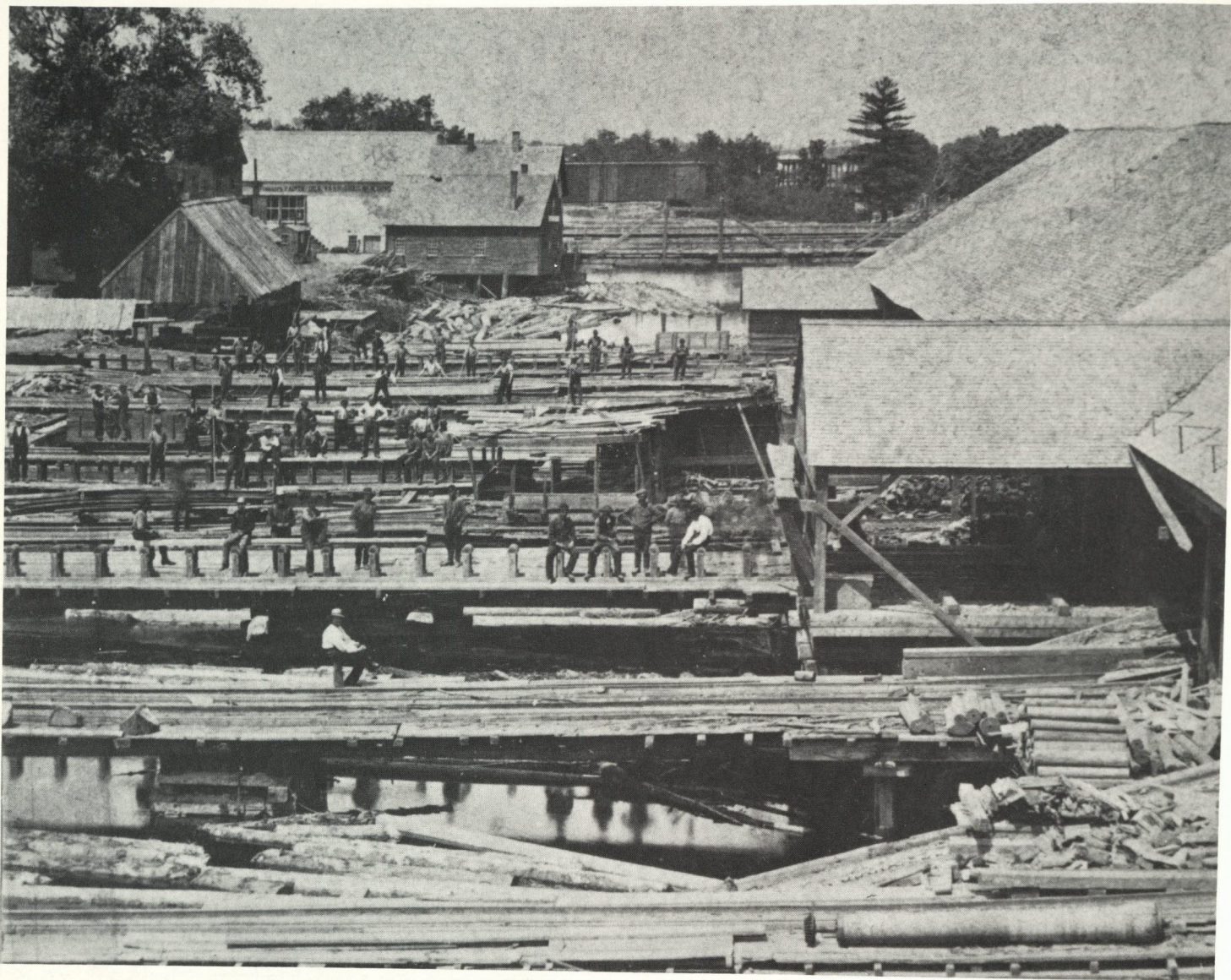


Fig. 39. Mills at Fairfield

The construction of large dams across major rivers impeded the use of the rivers as highways for logs and lumber. Beginning in the late 1830's railroads provided a transportation alternative. This view shows rail lines which extend to each of a number of saws. Lumber is rolled alongside the tracks with roller stands and loaded onto smaller lumber carts. This photograph from a stereoscopic series "New England Views," by J. Batchelder, West Andover, N.H., c. 1875. (Courtesy Maine Historic Preservation Commission.)

MILLS "DOWN-EAST"

The American Revolution cast the rights of many colonial proprietors in doubt. When the war was over and the Constitution ratified, however, the distribution and purchase of lands resumed at a feverish pace. Massachusetts sold vast tracts of Maine lands to speculators to raise money and to promote the expansion of the population to these territories. Revolutionary leader and later Secretary of War, General Henry Knox of Thomaston, speculated in the purchase of some one million acres of land on the Kennebec as well as land in Hancock and Washington counties. His purchase agreement, typically, provided that Knox would establish townships and promote settlements within a fixed period of time.

Land speculators imagined that their lands could be resold at a profit through sale to new settlers. It was quickly realized, however, that there would be no stampede to occupy Maine townships away from the coast and some investors were forced to abandon their inland speculation. In Knox's case, his commitments were assumed by Philadelphia merchant William Bingham. Bingham's Maine empire ultimately consisted of two large land tracts, composed of 1,000,000 acres each — the "Kennebec million," and the "Penobscot million." To manage the use and resale of these lands, Bingham appointed an agent, General David Cobb, who established his Maine headquarters in Gouldsboro. Cobb's task was to fulfill the terms of the land purchase, to settle forty families in each township within seven years.

It became clear to Bingham and Cobb that their land was relatively poor to farm. The principal value of their holdings

lay in the timber growth on it. To exploit the timber for profit, they needed control over cutting, and sawmills to turn the raw material into saleable boards. To better accomplish these objectives the headquarters of Bingham's estate was shifted to Ellsworth on the Union River. One sawmill had been built here at the upper falls, later known as "Mariaville," as early as 1765, and another in 1768. Beginning 1798, however, the Bingham interests planned the construction of a new dam to pond up the Union River and provide a holding area for logs. Mr. Peters and Mr. Pond were hired to build a new "double" sawmill, the "Peters and Pond" mill, which was completed in 1801. This mill was reputed to be one of the finest mills in eastern Maine.

In 1810 Col. John Black was appointed as the local agent for Bingham's estates in Washington and Hancock counties, taking the place of Gen. Cobb. He moved to Ellsworth, took charge of managing the lands and the mills, and finally began to pull a profit from them for the heirs of William Bingham. By 1820 Black was agent for all of the vast Bingham estate in Maine. Black recognized clearly that the profits arising from Bingham's "millions" rested with its timber and that, in turn, the potential of these forests demanded an emporium for collecting logs, sawing lumber and shipping the boards. Beginning in 1818 with his purchase of the Peters and Pond mill, Black took personal charge of a large portion of the lumber production in the Ellsworth area. Not only did he continue to serve as agent for the Bingham estates, but he also operated his own lumber business, Black and Company of Boston.

The history of sawmills on the Union River represents

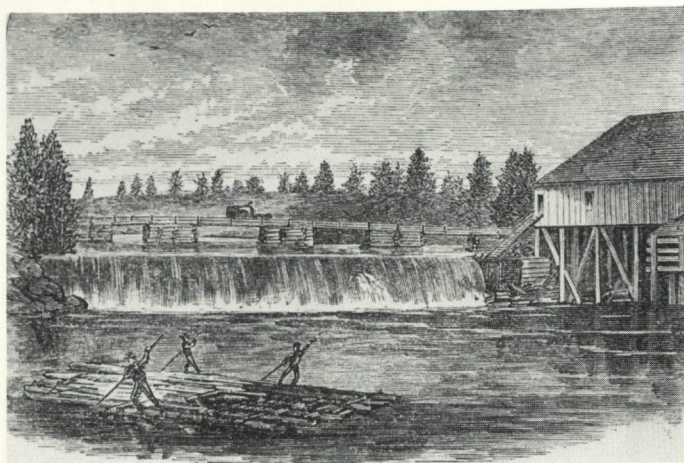


Fig. 40. "Upper Dam, Ellsworth"

This illustration shows the first of a series of dams built on the Union River in Ellsworth. It was estimated that this dam was responsible for "flowing the current back about ten miles and slackening it 12 or 15 miles." This image is from Water Power of Maine, 1868. (Maine State Museum.)

a typical sequence of construction, technological improvement, destruction by fire and freshet, and rebuilding. Many of the mills were burned in 1834, and replaced in 1835. By 1850, there were twelve separate sawmill operators at work in Ellsworth and the largest of these, Seth Tisdale, employed fifty men in the production of some 10,000,000 board feet of pine lumber. By the late 1850's there were thirteen lumber producers employing over 350 men to saw over 36,000,000 feet of boards. Although there remained several single saw mills, most of the latest advances in mill equipment were employed in Ellsworth. By 1860, eight of the mills were equipped with gang saws.

A brief review of sawmills built in Ellsworth does not reveal anything new concerning the appearance or technology of Maine sawmills. It is possible to observe here, however, a number of significant characteristics of nineteenth century Maine mill development. First, the mills on the Union River underscore a principal incentive to sawmilling — land ownership. Sawmills came to the falls at Mariaville and Ellsworth simply because exploitation of Bingham's million acres demanded it.

With land and water resources completely controlled by the Bingham interests, the development of the Union River offered an uncommon opportunity to centralize all aspects of lumbering, from forest to marketplace, emulating the development of cotton mills. But, this was an opportunity missed or, perhaps, deliberately avoided. The sale of Bingham lands, and the award of contracts to cut timber from these lands continued to permit a large number of distinct enterprises to work, and compete, side by side. Even while Col. John Black controlled the use of the Bingham lands, it was possible for another lumber merchant, Seth Tisdale, to build and operate sawmills larger and more productive than Black's. The reason for this is simple: the Bingham, like so many other speculators in land, were investors, not manufacturers or merchants. They sought profits through developing their lands, seeing them increase in value, and exploiting the resources they offered. These speculators and investors operated in a fashion similar to the developers of modern-day shopping malls. The builders of malls are not necessarily themselves the retailers who will operate shops or stores in the completed space. Viewed in this way it can be seen that the construction of the dam in Ellsworth was a desirable public improvement which made all of the Bingham's lands more valuable. The sale or rental of sawmill spaces below this dam was little different than the rental space in a mall. Just as Sylvester Gardiner profited from both the rental of mills, and from the sale of logs to the mill operators, the heirs of William Bingham also profited from the presence of a large number of separately run sawmills competing to sawn timber from their lands in Ellsworth.

In the classic pattern, the various mills and individual saws were leased to the several "manufacturers." The mill owners commonly retained responsibility for the maintenance of the water wheels, dams, and mill machinery. In one mill operated by Col. Black, a mechanic named "Milliken" attended to maintaining the machinery leased by a number of the tenants, while several other operators took care of other repairs. In April of 1830, for example, Milliken fixed the gate to the stream saw while "Barker" fixed his saw. During June and July, Barker put new teeth in his saw and "Warren" got his saw "mended," while Milliken put a "new treat back in Smith's saw," repaired "Moses saw," fixed the

gudgeons to "Moses saw," and made a new "cog wheel for the stream lath mill." So, in this one sawmill in 1830, the saws were operated by Moses, Smith, Warren and Barker, at the very least, with assistance from Milliken who was probably the company's head mechanic.

The original scheme for land development in Bingham's two million-acre lots involved establishing townships and settling families in them. Once the potential for direct profit from selling land and stumpage, renting waterpower sites and marketing of boards was reaffirmed, however, it fostered

land speculation and development schemes designed to exploit the forests from the outset. As always the best sites for sawmills were near a hinterland of timber and a water-power source situated near watercourses connected to the sea. But, by the 1830's there were few new sites like this left to develop, and further investment called for innovations in transportation. Among the more interesting of these investment strategies was the construction of sawmills at Whitneyville in the Machias area.



Fig. 41. Lower Dam, Ellsworth

By the time that the water of the Union River had passed the lower dam in Ellsworth it had descended some 85 feet in a distance of some two miles. In the 1860's the power of these many falls was used to produce more than 35,000,000 board feet of lumber annually. Photograph from a stereoscopic card series "Ellsworth Views," #46, published by B. J. Joy, c. 1880. (Courtesy Maine Historic Preservation Commission.)

The Machias region offered many of the classic incentives to logging and lumbering development. Timber stands were generous and located near the Machias and East Machias Rivers which provided ample water power sites as they descended to Machias Bay. Sawmills could be constructed just above the head of navigation and with these geographical attributes it is not surprising that the Machias area was discovered by investors and lumbermen in the eighteenth century. As early as 1770, Ichabod Jones, Jonathan Longfellow and David Gardiner had built a "double sawmill" near the outlet of Gardiner's Lake, just one mile above the sea. Along both the Machias and East Machias Rivers, and its tributaries, numerous small sawmills were constructed during the eighteenth-century and into the early decades of the nineteenth.

Sawmills built in Machias and East Machias were depicted in two remarkable nineteenth-century paintings. One of these, a watercolor entitled "Mechios Mills," shows a double sawmill perched precariously on a natural waterfall. Logs can be seen piled to the right of the mill, suggesting that they may not have been drawn from an upstream pond. Interestingly, the sawed boards appear to have been organized on rafts that are being towed by rowboat out of the mill channel. This watercolor is the best eighteenth century view of a Maine up-down sawmill that is known to survive today.

The second painting, located in the East Machias Public Library, depicts the village as it appeared in 1855. This work is notable in that it shows not only the sawmill, by also the aspects of the village which supported the mill — the timber hinterlands upstream, the logs brought by water to the mill, and, in the foreground, the access to the sea which fostered the export of the sawed boards.

By the 1830's the best sawmilling sites in the Machias area were already occupied. Still, there was considerable timber remaining on the upper reaches of the rivers — enough to encourage investors to participate in a scheme to build sawmills at an up-river location on the Machias River. This plan was developed in 1835 by a group of Boston merchants together with Joseph Whitney of Calais. They formed a trust known as the Machias West River Mill & Land Company, with the objective of buying timberland on the west side of the Machias River, erecting a dam across



Fig. 42. East Machias, 1855 (detail)

This view of East Machias illustrates all of the classic incentives for the selection of sawmilling sites. A river leading from the interior is available to bring logs to the sawmill. Water power exists at the falls to run the mills, and, below, ships can approach the mill to bring the sawn lumber to market. (Photograph from Maine Historic Preservation Commission, courtesy East Machias Public Library.)

the entire river to provide power and create a pond for logs, and delivering the sawn lumber to a nearby port. Integral to the overall scheme was the construction of a railroad which would take the sawed lumber to the deepwater wharves of Machiasport while bypassing the dams and mills posing obstacles downriver. Here was an investment scheme designed to create a suitable sawmilling site where none existed naturally. It resulted in the new village of Whitneyville. As elsewhere, the sawmills located here would be leased to tenants from the Company's agency.

The trust partnership was reorganized in 1836 as the Boston and Eastern Mill & Land Company. A fifteen-foot dam was constructed which increased the natural fall of water from eight to fifteen feet and caused the river to pond up for a distance of five or six miles upstream. The power of the newly-created falls was adequate to drive up to ten individual saw frames as well as a number of individual clapboard and shingle machines. These mills were in operation before the railroad was completed, so initially the sawed lumber had to be taken overland in carts. Upon completion, under a separate charter, the 7⁷/₈ mile rail line connected the sawmills and Machiasport. This small railroad was among the first in the State.



Fig. 43. "A Sketch of Mechios Mills"

There is no earlier, or better, view of an early Maine sawmill site than this print, published in 1776. Natural geography dictated the placement of these mill buildings and little expense was incurred in the building of dams and flumes. Illustration from J. F. W. Des Barres in the Atlantic Neptune, London, 1776. (Copy in the collection of the Maine State Museum.)

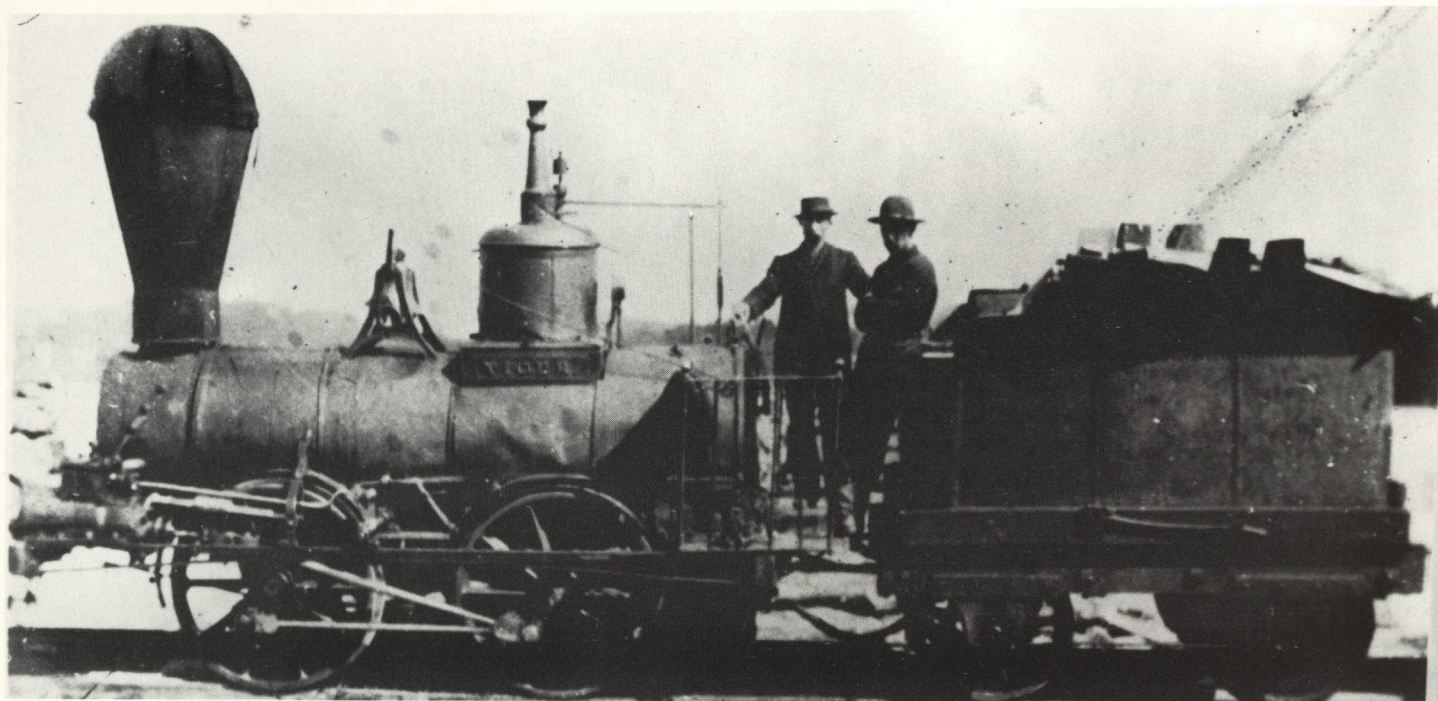


Fig. 44. Locomotive Engine *Tiger*

The first locomotive engine built expressly for a Maine lumber railroad was the Tiger. This engine, built by Hinckley & Drury of Boston in 1842, was used on the Whitneyville and Machiasport Railroad until its in 1892. (Maine State Museum.)

The Whitneyville sawmills were built adjacent to the dam and provided spaces for eight separate tenants, plus two more saws run directly by the company. In the late 1840's, the largest producer was Thurston and Robinson whose mill employed thirteen men and produced some 2,500,000 board feet of lumber each year. In all, the several mills employed sixty-two men. At the height of sawmill activity in Whitneyville, the company's tenants were sending a combined total of 11,000,000 board feet of lumber, plus large quantities of laths, shingles and clapboards, down to Machiasport under the steam power provided by the sister locomotive engines, *Lion* and *Tiger*.

In the 1860's the timber resources located on company land began to decline markedly, and at this point the land, mills and railroad were sold to Cornelius Sullivan, former

agent for the company and former engineer on the locomotive engines. Tenants still ran the mills, but under the influence of improved sawing equipment, there was room (and business) for fewer of them. By the late 1860's there were only three sawmill tenants — Talbot & Dunning operated a gang of eighteen saws, plus four circular saws; S. W. Pope ran a gang of twenty saws and six circular saws; and E. Longfellow operated a gang of twenty saws. Important changes in the technology and operation of Maine sawmills are illustrated here. Where fifteen years earlier some ten separate mills were operated by tenants of the Boston and Eastern Mill & Land Company, there were only three by 1869, but these operated in gangs totaling some fifty-eight single and up-down saws and three circular saws.

THE LUMBER CAPITAL OF THE WORLD

Whitneyville's lumber railroad was one of the earlier railroads in Maine, but it was not the first. This distinction belongs to another lumber railroad, the *Bangor and Old Town*, which connected the sawmills of Old Town, Bradley, Milford, Orono and Veazie with the city of Bangor. This railroad, chartered in 1832, ran for some twelve miles along the Penobscot above Bangor, passing the most extraordinary assemblage of sawmills ever built in Maine, and bringing many of the voluminous products of these mills to Bangor at the head of navigation. The development of sawmill villages along the Penobscot above Bangor was not unlike that seen elsewhere in Maine. However, along with this particular stretch of river every aspect of lumbering was magnified to a scale which exceeded all other regions of the state. As early as 1840, one-half of Maine's 200,000,000 ft. of lumber production was sawed on the Penobscot, and the majority of that total was cut on only 12 miles of the river. It is no wonder that, by the 1840's, Bangor was known as "lumber capitol of the world."

The rise of lumbering enterprises near Bangor in the 1830's did not fail to impress early visitors to the area. The industry was clustered here in a manner which shaped the popular perceptions of Maine lumbering itself and contributed a fair share to local legends and exaggerations as well. The scale and concentration of mills was indeed extraordinary to behold, as the *Niles Register* noted in 1836:

There are now in operation night and day, within a few miles of Bangor, principally within the limits of Orono, more than 200 sawmills for boards . . . manufacturing more than 1,500,000 feet of boards

daily. This is cutting up lumber on a scale, which no one, who has ever been "down east" can have an adequate conception of.

On its face, this count of sawmills seems clearly to be an exaggeration. In part, though, this is an illusion caused by the changing definition of the term "mill." In the eighteenth century and earlier, the term "mill" was used to identify a facility for grinding corn, or any mechanism driven by water power. At first, the machinery of many kinds of "mills" were not portable machines, but rather an integral part of the architecture of the buildings. The distinction between a "machine" and a "mill" was only gradually defined. In the case of an eighteenth-century sawmill, for instance, the construction of the saw frames, fender posts, cranks and waterwheel was integral with the building structure itself. To many, if not most, sawyers in the eighteenth century the "mill" was the sawing machines, not the walls and roof that surrounded it. This concept of "mill" contributed to the designation of saw frames as "mills." Multiple saws located in one building might then be referred to as "six saw mills under three roofs." Each individual saw was, under this scene, counted as a mill.

This practice appears to have been continued on the Penobscot. The 200 sawmills reported in *Niles Register* were meant to be counted as 200 separate saws, not 200 separate buildings. Taken this way, the estimate may not have been far from accurate.

Certainly by the late 1840's, however, there were in this district over 150 single saws and 15 gang saws at work. The

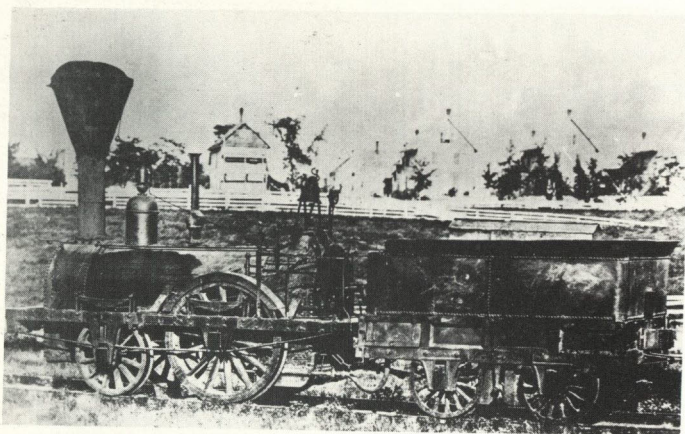


Fig. 45. Locomotive Engine *Pioneer*

The first locomotive engine used in Maine was the Pioneer used on the Bangor and Oldtown Railroad beginning in 1836. The Pioneer was purchased second-hand and was probably originally known as the Meteor when used on the Boston & Worcester Railroad. This photograph was taken c. 1867. (Courtesy Smithsonian Institution.)

spectacle presented by the sawmills of Orono and Old Town was captured by the pen of Henry David Thoreau in his 1846 classic, *The Maine Woods*:

Within a dozen miles of Bangor we passed through the villages of Stillwater and Orono, built the falls of the Penobscot, which furnish the principal power by which the Maine woods are converted into lumber. The mills are built directly over and across the river. Here is a close jam, a hard rub, at all seasons; and then the once green tree, long since white, I need not say as the driven snow, but as a driven log, becomes lumber merely. Here your inch, your two and your three inch stuff begin to be, and Mr. Sawyer marks off those spaces which decide the destiny of so many prostrate forests. Through his steel riddles, more or less coarse, is the arrowy Maine forest, from Ktaadn to Chesuncook, and the head-waters of the St. John, relentlessly sifted, till it comes out boards, clapboards, laths, and shingles such as the wind can take, still perchance to be slit and slit again, till men get a size that will suit.

Although the Colburn and Eayres sawmill had been built in Orono in 1774, the massive development of the region's sawmills did not come until after 1830, and particularly between 1832 and 1838. This was a period of feverish land speculation, a stampede of speculative investment in Maine timberlands. Known as "The Great Land Speculation," the hectic six years from 1832 and 1838 witnessed a tremendous inflation in the value of Maine timberlands and a waiting line of investors. Col. Black, who had been marketing land in William Bingham's 1,000,000 Penobscot acres, sold more than one-quarter of the whole domain in just one winter! Speculators would commonly place only a small downpayment on their land purchases, get a bond for deed, and then sell bonds. So long as values continued to climb, there was a heyday of profiteering, but ultimately the consequences of these unsound business practices led to a major collapse. Speculation in Maine, as elsewhere in the country, contributed to the Panic of 1837. Fortunes had been made, and lost. But through it sawmilling had come to the Orono district in a major way.



Fig. 46. Morse's Mills, Bangor

In 1870 this mill on the Kenduskeag Stream in Bangor was driven by two "Stearns" turbines. Twenty-five men worked in this mill to saw over 4,000,000 ft. of lumber annually. Photograph from a stereoscopic card series "Views of Bangor & Vicinity," published by C. L. Marston, Bangor, Maine, c. 1875. (Courtesy Maine Historic Preservation Commission.)

The construction of dams, canals and sawmills was a direct consequence of the land speculation. Since the value of Penobscot lands was understood to lie principally in its timber reserves, the ability for investors to profit from their lands depended on mills to turn the trees into boards. The explosion in land speculation led necessarily to a parallel explosion in mill construction. Between 1832 and 1837 the population of Orono rose from 1500 to about 6000 and this was almost entirely due to the growth in lumbering and sawmilling activity.

In the eighteenth century, few mills were built directly on the larger rivers. Smaller tributary streams such as the Cobbosseecontee in Gardiner and the Chace's Stream in Machias were better suited to the technology of the period and required somewhat simpler dam and canal construction work. Although the expansion of sawmills in places like Gardiner was extraordinary, there was a limit to the number of mills that such sites could support. To reach the scale of sawing demanded on the Penobscot it was necessary to manage waterpower on a grander scale and to utilize the full power of the main river itself. The development of the Orono district in the 1830's resembled more closely the parallel development of dams and sawmills in Whitneyville. Here too, the dams stretched across the entire river and the mills were also constructed to stretch from bank to bank.

It is unlikely that some of the earliest mills built in the Orono area were relatively small and traditional in design. In the 1830's, however, the wholesale development of the Penobscot River began in earnest. This is illustrated well by the construction of the lower dam in Orono. This dam site was purchased by the investors in a joint-stock company known as The Bangor Lower Stillwater Mill Company. Led by big-time speculator Robert M. N. Smyth and a group of Massachusetts capitalists, the company purchased Eayres Island, its water power and standing mills (the Union block), as well as several hundred acres of land. This whole parcel was laid out in house lots, store lots, factory lots, water lots and etc. The best sites were reserved for use by the company itself, but the remainder were auctioned off in a large sale held in Bangor in 1836. Through this mechanism, the ownership of sawmills was divided among a number of proprietors.



Fig. 47. Kenduskeag Stream

Bangor's Kenduskeag Stream was home to many sawmills. No fewer than five dams were used across this waterway between "Six Mile Falls" to the west and "Drummond's Mills" near the Penobscot. Photograph from a stereoscopic card "American Scenery — New England Views," c. 1875. (Courtesy Maine Historic Preservation Commission.)

As noted earlier, the fractional ownership of sawmills, and the separate management of individual saws within mills were common features of Maine sawmills. These organizational and management considerations did not exert a significant impact upon the architecture of the mills, however. Most looked more or less like Samuel Dutton's 18th century mill on Bond Brook. In constructing mills stretching entirely across a larger river, however, the architecture of the mills changed noticeably. Now, for the first time, the individuality of single or even double mills was lost and replaced by mill "blocks." These blocks contained as many as eight or ten separate saws, and each might be operated, or owned, by a different manufacturer.

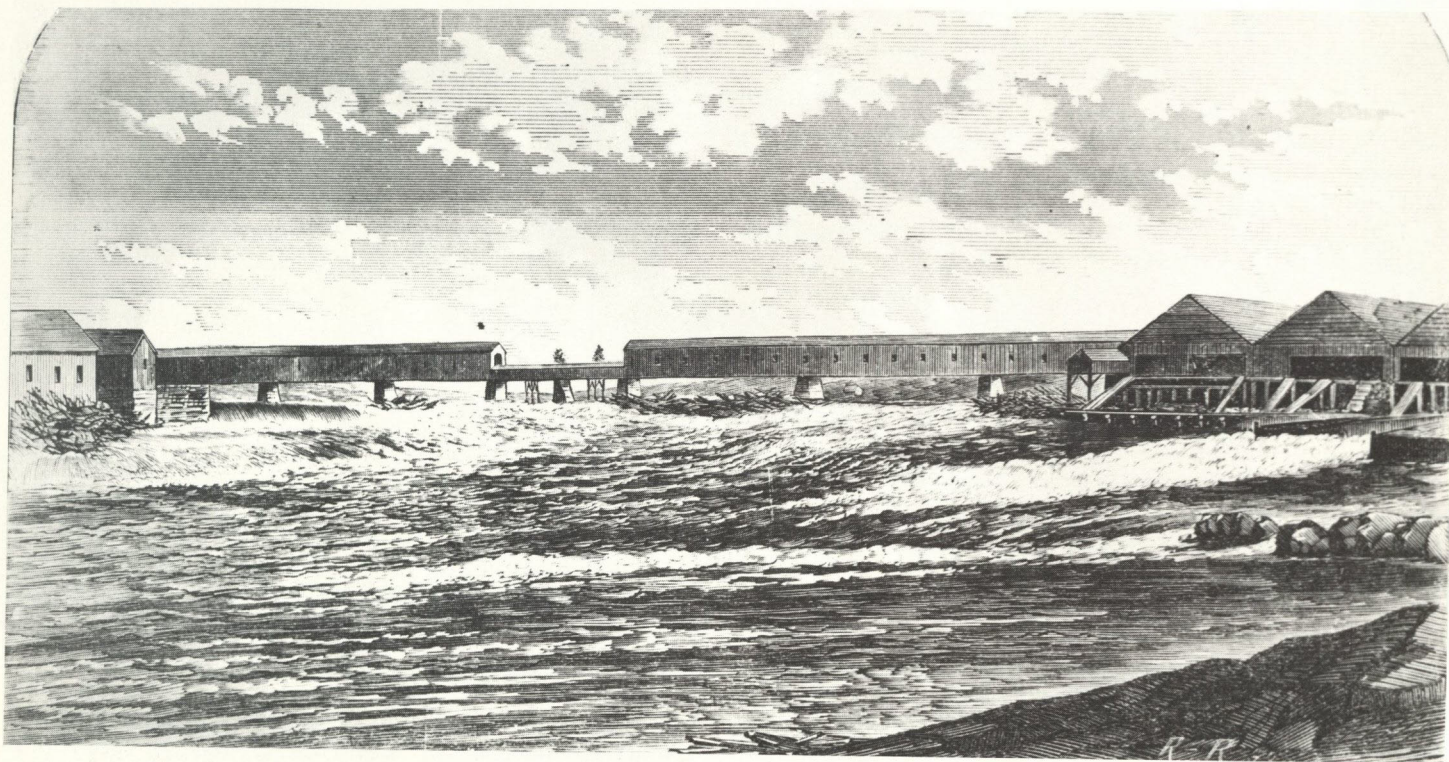


Fig. 48. "Oldtown Falls"

This illustration of Oldtown Falls provides a glimpse of some of the sawmills located here as they appeared in the mid-1860's. Note that there are three "double sawmills" pictured at the far right. Illustration from Water Power of Maine. (Maine State Museum.)

So, in the period from 1833 to 1838, the sawmills constructed on the lower dam were known by such names as the "Perkins block," the "Union block," the "six-saw block," and the "Island block." There were also two older, traditional, mill structures in this area, the "Reed mill," and the "Rigby mill." The Bangor Lower Stillwater Mill Company retained the ownership of some twenty-two saws in this complex which they operated as "Anson Mills." The "Perkins block" had eight saws, and four of them, "Nos. 5, 6, 7 and 8" belonged to our old friends from Ellsworth Messrs, Peters and Pond. They also owned half of the "stone mill," a double saw mill. The other half was owned by Albert G. Brown who, incidentally, also owned one of the

eight saws in the Perkins block. (His share was listed in the tax bill for 1837 as "1/8 of eight saws in the Perkins block.") The architecture of the mill blocks was no longer governed by tradition; the size of blocks was essentially unlimited. By 1854 General Veazie had constructed a block of some 475 feet in length, a "mill" said to be the longest in the world. This block alone contained two gangs and fourteen single saws.

In the 1830's and 1840's, the principal sawmilling villages above Bangor included Orono, Old Town (originally a part of Orono), Great Works (Bradley), Milford, and Veazie. Many of the mills in these villages were served by the *Bangor and Old Town Railroad*, though the bulk of sawed

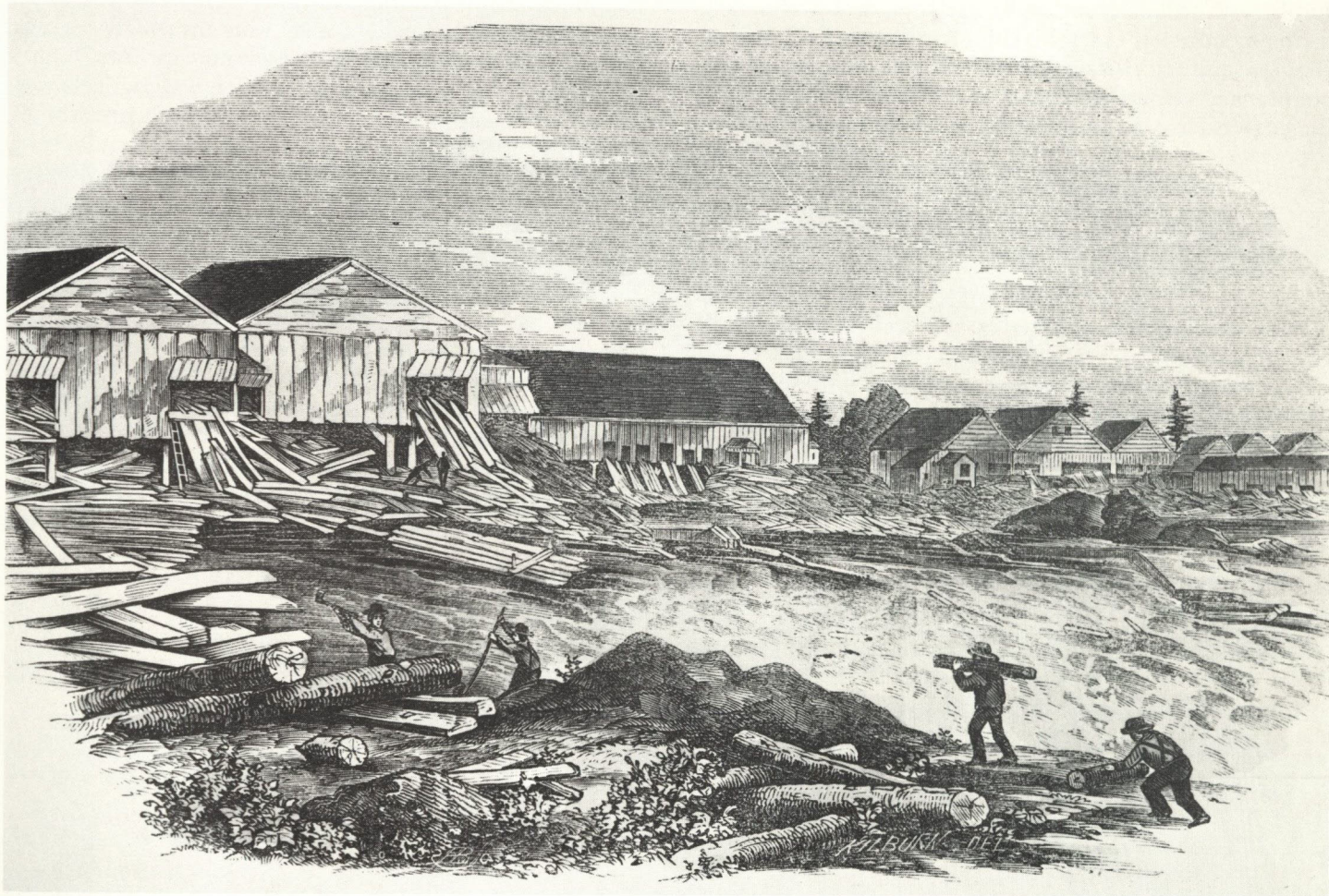


Fig. 49. "Saw-Mills on the Penobscot River, at Oldtown, Maine"

This important view of the mills at Oldtown was published in 1854. It reveals a number of "double sawmills" of the traditional design (as seen also in Figs. 48 and 50). In the center of this image, however, there is a mill "block" (possibly Rufus Dwinel's new mill, built in 1854) which reveals the beginnings of a new construction style that later spread across this entire site (see Fig. 51). Illustration from Gleason's Pictorial Drawing-Room Companion, May 20, 1854. (Courtesy Maine Historic Preservation Commission.)

lumber was still delivered to Bangor wharves by rafts. Just as the speculation in timberlands had fostered the rise of these sawmilling villages, the sawmills in turn created the commercial center of Bangor. At the head of navigation, Bangor was boasting by 1842 that it was the largest lumber-exporting city in the world. "There stands the city of Bangor," Thoreau wrote in 1846, "fifty miles up the Penobscot, at the head of navigation for vessels of the larger class, the principal lumber depot on this continent, with a population of twelve thousand, like a star on the edge of the night, still hewing at the forest of which it is built, already overflowing with the luxuries and refinements of Europe, and sending its vessels to Spain, the England, and to the West Indies for its groceries, — and yet only a few axe-men have gone 'up river,' into the howling wilderness that feeds it."

The pressures for productivity made for long working hours during sawing seasons, and many mills simply worked around the clock. This environment encouraged

technological progress and as mills were destroyed by fire or washed away in freshets, they were invariably replaced immediately by mills that were even more modern. It must be assumed that old-fashioned wooden waterwheels were immediately superceded here by iron wheels or turbines. The potential existed for an early adoption of circular saws, but it is important to note that following the failure of a circular saw mill built in Kenduskeag in 1820 (though not because of it), circular mills were not a favored improvement except for the sawing of "short" lumber. Instead, the Penobscot mills turned to the old idea of the gang saw to increase productivity. Although the idea of mounting several up-down saw blades in a single saw frame was considered from the time of Maine's first sawmills, it was not until the 1840's that the use of vertical gang saws gained widespread popularity. The first of these on the Penobscot was set in motion at the Dakin mill at Ayers Falls in Orono in 1842. Soon gang saws were commonplace in the mill blocks of the Penobscot. By 1850, in the twelve miles above

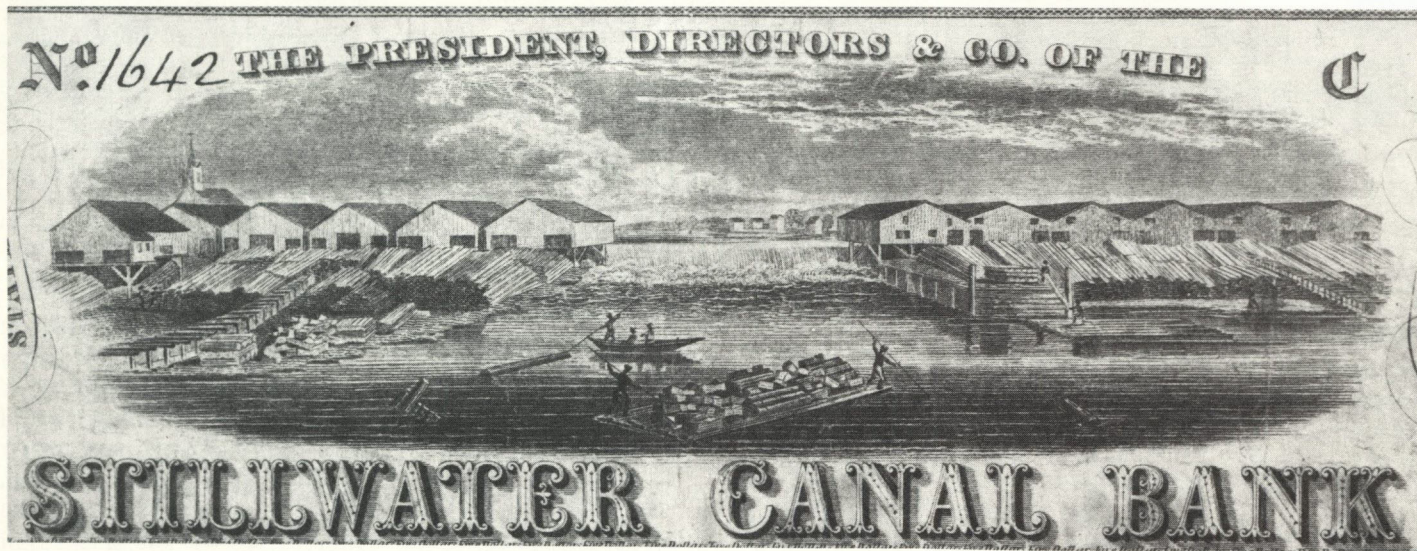


Fig. 50. Stillwater Canal Banknote (detail)

The earliest look at Oldtown's sawmills is provided by this banknote, published by the Stillwater Canal Bank in 1835. This image captures the first generation of sawmills here. On the left side are six "double sawmills" built by Rufus Dwinel in 1833 and 1834. These mills were burned first in 1856 and again in 1864. They were replaced by the mill "block" shown in Fig. 51. (Maine State Museum.)

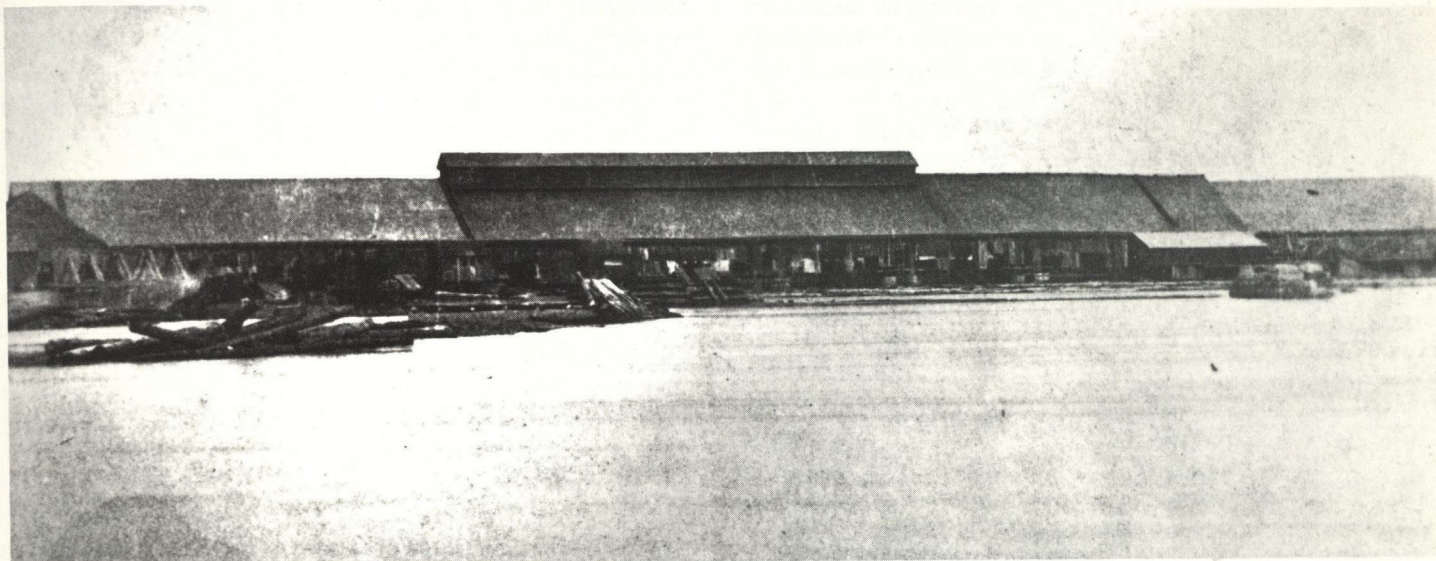


Fig. 51. Dwinel Mill, Oldtown

The ultimate evolution of Penobscot sawmill sites is shown in this view of Rufus Dwinel's mill block as reconstructed in 1864 after the second fire at the site. Mill buildings of this sort maximized the potential of the river and replaced an earlier assemblage of buildings with one building fitted with saws leased to various persons. Photograph from a stereoscopic card, c. 1870. (Courtesy Maine Historic Preservation Commission.)

Bangor, there were fifteen such gangs at work, as well as 154 single saws. In 1855 the *Maine Register* reported:

A great improvement has been made, within a few years past, in many places in the State, in the manufacture of lumber. The Gang Mill is now in operation, which saws an entire log into boards almost as quick as a common saw-mill can saw a single board . . .

At first the number of blades hung in each gang was not very large — generally not more than four. In computing the productivity of the Penobscot mills for a railroad corporation survey in 1850, the engineers figured that each gang saw would produce as much lumber as three single saws. There were two "classes" of gang saw, as reported in the *Scientific American*:

. . . one is called the "flat" and the other the "round gang." The logs are first slabbed on two sides by

separate saws for the flat gang, and the logs are laid flat on the bed. The boards and plank come out of such a gang finished. The logs are fed without slabbing to the round gang. The boards thus produced are afterward trimmed at their edges by small circular saws. By this latter method, a greater quantity of timber is saved.

Clearly gang saws were best suited to the mass production of timber cut to uniform dimensions. In this regard the popularity of gang saws was both a result of, and a cause of, changes in building technology. Beginning in the 1840's, the manufacture of cheaper nails and the availability of standardized lumber, led builders away from the large-timbered mortised and pegged joint building techniques to lighter, "balloon frame" construction. It was at this time that 2x4 emerged as a stock material for the building of

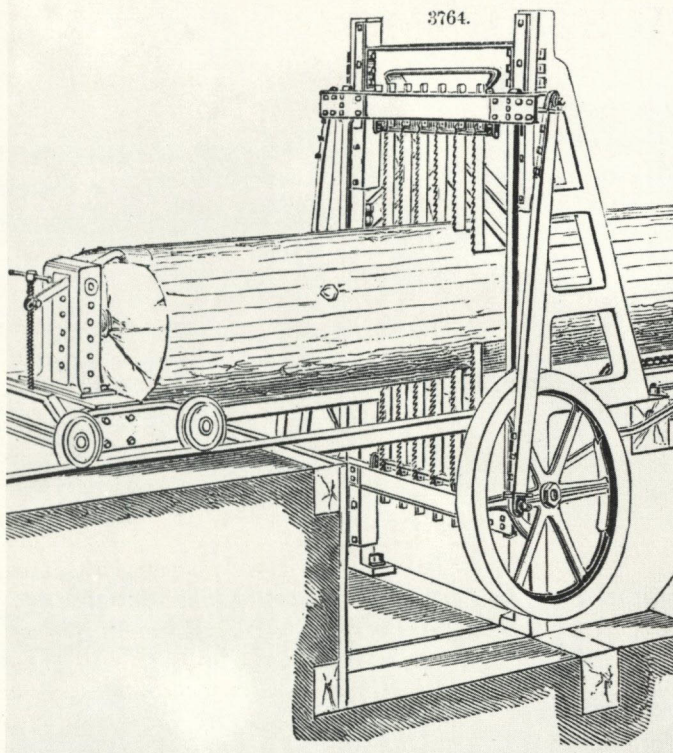


Fig. 52. Gang Saw

The larger sawmills on the Penobscot relied on gang saws composed of from four to twenty-four blades. These were the "riddles" that Henry David Thoreau described in his passages on the sawmills of Orono. This illustration from Appleton's Cycloepedia, 1880. (Maine State Museum).

houses. The gang saws proved ideal for turning out the "2 inch stuff" that Thoreau noticed on his visit to Maine.

Between 1850 and 1870 gang saws grew both in quantity and in the number of blades carried within the frames. The mid-century average of about four blades per gang saw soon expanded to the threshold of absurdity. By the late 1860's the Orono sawmill of William M. Rollins boasted a gang of some twenty-three saws, while the nearby mill of Samuel White had a gang of twenty-six saws. Both J. S. Hamilton

and Palmer Chapman operated gangs of twenty-four saws each, while James Walker & Company ran a total of four gangs, side-by-side, which contained a total of eighty-four saws! Until the continuous band saw was introduced in 1889, the gang saw was the most widely used technological innovation in the Penobscot district.

Other innovations for increasing productivity in the Penobscot sawmills included the "muley" saw. The muley was a fast-moving single saw which ran between guides rather than in a frame. It was wasteful of lumber because it cut a wide curf, but it was useful in slabbing large dramatic logs. There were not many of these used in the Orono-Old Town areas, although in 1869 there was one in use at Great Works (Bradley), and two more running at "Dwinel Privelge" in Milford.

Rotary, or circular, saws were less popular among the larger sawmills on the major water powers than they were among the smaller mills of the State. As late as 1870, there were far fewer rotary saws employed in the district above Bangor than either gangs and single sash saws. While the number of single saws declined in the Orono district from 154 in 1850 to only 91 in 1869, these saws were universally replaced by larger gangs. There were fifteen gangs at work at mid-century and by 1870 there were forty-one. Among the many blocks of mills in Orono, Veazie, Old Town, Milford and Bradley, there were only eight circular saws counted in the late 1860's. (Comparatively, the Whitneyville mills used at least ten circular saws before 1870 and the Gardiner mills about nine.)

The preference for gang saws in many larger mill districts, particularly on the Penobscot, should not obscure the great significance of the circular saw. It, like the gang saw, underwent considerable technological improvement from the 1840's through the 1860's, and each of these saws played a distinctly important role in the industry. While the gang saw helped to sustain increased productivity on the Penobscot, the circular saw, used first to saw "short" lumber products (shingles, laths, clapboards and staves), helped sustain the spread of sawmilling to regions throughout the state.

SMALLER MILLS ON SMALLER STREAMS

Lumbering on the Penobscot led the state in capital investment. It also shaped the fantastic image of Maine logging and lumbering in the popular consciousness. But, the impressive concentration of sawmills above Bangor was not typical. Less noticeable in popular history, but equally significant in economic and social terms, were sawmills scattered throughout Maine. Even while the Bangor area sawmills were reaching their apex of growth and productivity in the 1870's, there were more than 1100 active sawmills in the state, and the vast majority of these were relatively small. This archipelago of smaller mills echoed a tradition that began in the seventeenth century and continues to the present day.

Many smaller mills were operated essentially in the same way as were their larger contemporaries — with developers, owners, investors, merchants, sawyers and laborers all playing roles in their establishment and operation. Lease and rental contracts for use of whole mills, or the individual saws within them, were commonplace in the management of smaller mills. This is illustrated well by a small mill in Norway which was rented by local builder and contractor Ezra Beal in 1850. It had been erected by a corporation of local merchants who had invested in developing the water-power and bringing industry to the town. In 1850 Beal wrote that he had "leas'd the Saw & Grist Mill for 6 years from the first day of january Next" and agreed to pay a rent of "\$400 for 4/5 of the property per year." It was not Beal's intent to run the sawmill himself, however, and he contracted with a sawyer to carry out this work under the terms of yet another contract:

[to] run the saw mills the present season and until all the lumber now at mill and the pond is cut into, taking one half of the proceeds of the saw mill, shingle and lath mills to himself. He is to find all his tools, files, etc. for which I have paid him \$6. He is to run the mill at his own expense and to take the whole charge of the lumber, logs, etc. and cut lumber, relieving the owners of the mills, or myself, from care or responsibility concerning the saw mill, charging for such services as is done not belonging to running the mill, and machines, and properly taking care of the staff. Mr. Wilkins agrees to keep the mill and machines in repair so far as can be done by his own skill. The Smith work to be paid for by Beal. He is to run the mill all the time when the water can be spared from the grist mill and to cut the lumber to such dimensions as the owners of logs may direct. He is to cut up and throw out all slabs and firewood not suitable for laths and take 1/2 of the wood to himself.

Wilkins continued to operate the mill in Norway for Beal until the fall of 1855. He boarded with Beal himself during the terms of the contract. When Beal gave up his "hire of the mills" to the Mill Company in January 1858, the sawmill was then leased to another local contractor and merchant, Frank Whitman. The agreement between the mill owners and Whitman was somewhat different than the one with Beal. Whitman agreed to pay the taxes and make the repairs as needed, and also pay the company a toll of 75 cents for each 1000 board feet of lumber sawed (except for oak which was to be \$1.00 per thousand).



Fig. 53. Water Works, Norway, Maine

This view of water power sites in Norway, Maine, is dated March 27, 1865. It was along this stream that Ezra Beal leased his sawmill in 1850. Photograph from a stereoscopic card, 1865. (Courtesy Maine Historic Preservation Commission.)

A number of factors helped foster the survival and importance of small "local" sawmills such as the one in Norway. First, Maine towns and villages were growing in the nineteenth century, and a nearby sawmill was needed to transform the timber standing on the lots of farmers into barn and house building materials. This was a custom-order sawmilling activity.

A second factor in the endurance of sawmills was the development of the steam engine which permitted the construction of relatively low-cost, even portable, mills that were well suited to remote interior locations where timber resources were abundant, but water power was not. By 1832 there were only nine steam engines in use in Maine. But the benefits of steam were soon appreciated by sawmill investors. Not only could steam power be used to run locomotives to carry lumber from mills to wharves, but the

portability of the steam boiler and engine made it possible to relocate the sawmill itself to the wharf. This happened in Bangor as early as 1849 when the "Rollins" steam mill was built. A steam-powered mill had one other great advantage: it could operate year around while the great gang saws on the river were in operation no more than seven months a year. By 1873 some eight percent of Maine sawmills were run by steam, and these mills had been built even in regions noted for their enormous water power.

The availability of steam boilers and engines, and small iron water turbines, brought portable circular saws into favor. While sash saws and gangs dominated the development of the larger commercial milling sites, the "portable



Fig. 54. Lower Dam, Norway, Maine

Even where the flow of water was not great, considerable power could sometimes be harnessed where the fall of water was substantial. A series of dams was often required to achieve this result, and this was the case in Norway. Photograph from a stereoscopic card, dated December 2, 1864. (Courtesy Maine Historic Preservation Commission.)

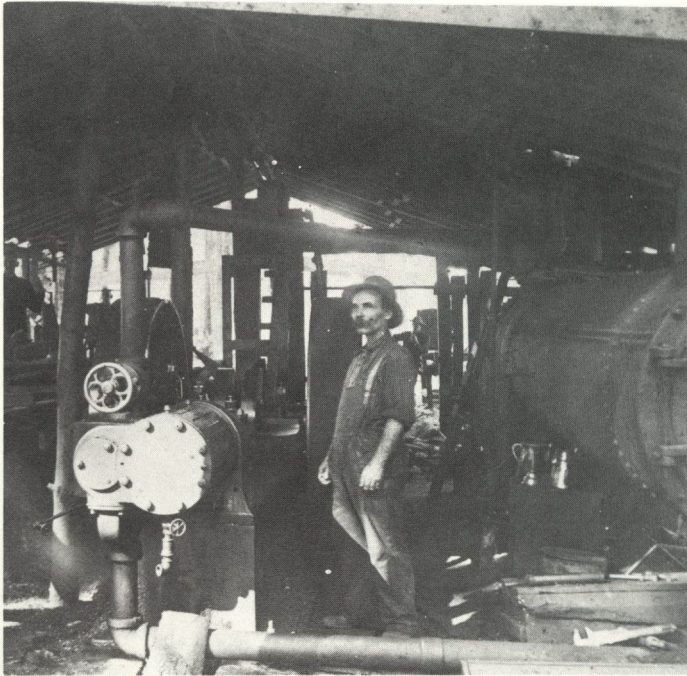


Fig. 55. Edward Robinson and Steam Engine

Here Edward Robinson posed in 1897 at the portable sawmill of Lewis P. Knight at the mouth of the Chute River in Naples, Maine. (Courtesy Beatrice Mitchell.)

sawmill" along with the turbine and steam engine, revolutionized and sustained the tradition of smaller mills. By 1870 there were very few up-down saws still at work among the many hundreds of small mills located throughout the state. In response to this new technology, Maine machine shops and iron foundries marketed new lines of sawmilling machinery. The Harrison, Maine firm of T. H. Ricker was the longest-lived and most important of the nineteenth-century manufacturers of Maine sawmilling machinery of this sort. Meanwhile, a wide selection of water turbines was available to run these mills. By 1870, over twenty different makers of turbine wheels saw their products used in Maine mills. The popular wheels were known by the names "Reynolds," "Rose," and "Tuttle." Four makes were manufactured in Maine: the "Carleton," made in Garland; the

"Gould," made in Skowhegan; and the "Blake" and "Holmes" wheels made in Gardiner.

Portable power for sawmills also meant that sawmill ownership was no longer vested entirely in the hands of those who owned the water power of falls, or the adjacent land. It was no longer necessary to be a water power developer to purchase and operate sawmill equipment. Under the influence of steam power, many small mills that could only operate during the "wet" seasons expanded to a year-round sawing schedule if they wished.

The survival of smaller sawmills was assisted not only by the invention of steam power, but by the development of machinery for the manufacture of building materials other than "long lumber." These machines included saws to cut shingles, clapboards, laths and barrel staves, and planers to produce window and door mouldings and other ready-made building components. The mass cutting of these "secondary" wood products soon fostered the development of sawmills to produce the bolts from which they were made.

As compared to the sawing of "long lumber," the production of such secondary wood products can be easily over-



Fig. 56. Portable Sawmill and Crew

An anonymous work crew posed at a portable sawmill in the Sanford area. Photograph by Fred Libby, Sanford, c. 1910. (Maine State Museum.)



Fig. 57. Water Powered Mill, Andover

This 1930's view of a water-powered mill in Andover, Maine, shows a sawmilling tradition that continued little changed from the seventeenth to the early twentieth century. Well before the time of this photograph, this mill's up-down saw had been replaced by a circular saw. Otherwise, this mill identical to its eighteenth-century predecessors. (Courtesy Maine State Archives.)

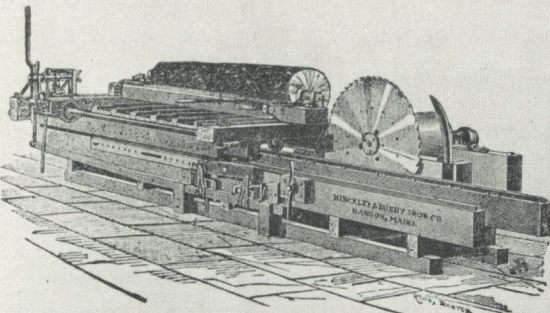


Fig. 58. Portable Mill, Sheepscot Area

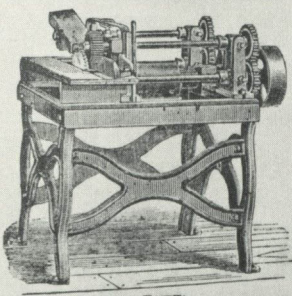
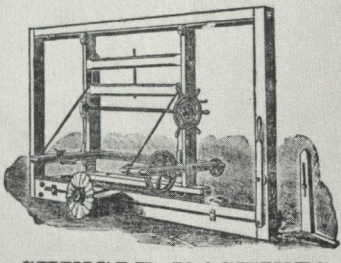
In contrast to the view shown in Fig. 57 (opposite), the photograph shown above depicts the temporary conditions of a portable sawmill driven by a portable steam engine and boiler. Photograph by E. J. Leighton, c. 1910. (Maine State Museum.)

looked. Until the second quarter of the nineteenth century many of these products were still produced by hand, the splitting and shaving done by farmers in the off-season and by laborers. A number of machines were developed to cut these products during the nineteenth century and this, in

HINCKLEY & EGERY IRON CO.
FOUNDERS AND MACHINISTS,
 —AND MANUFACTURERS OF—
AUTOMATIC BOX BOARD MACHINES.



GANG LATH MILL. Davis Patent Clapboard Machine.

SHINGLE MACHINES.

RICHARDSON PATENT GANG EDGERS.
OAK STREET - - - BANGOR, ME.

Fig. 59. Hinckley & Egery Advertisement

In addition to steam engines (see Fig. 23), the company of Hinckley & Egery in Bangor specialized in the manufacture of portable saws and other sawmill machinery. Illustration from an advertisement in the Maine Business Directory, 1885. (Maine State Museum.)

T. H. RICKER & SONS,
 Manufacturers of
RICKER'S IMPROVED CIRCULAR SAW MILLS,
 Stave Machinery, Planers, Box Machines, Spool Stock Strippers, Matching Machines, Saw Arbors, Shafting, Pulleys, etc.
 Agents for the "Simonds" and "Disston" Circular Saws.
Harrison, Me.

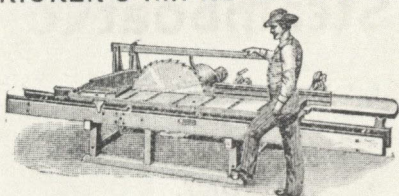


Fig. 60. Box Saw Advertisement

In addition to "long lumber," Maine mills used specialty saws to produce a wide variety of smaller products including box parts. Illustration from an advertisement in the Maine Register, 1891-1892. (Courtesy Maine Historical Society.)

turn, fostered a transfer of these manufactures from the farm outbuilding to the mill site itself. Furthermore, the development of machinery for planing both long and short lumber stock led the sawmill toward the manufacture of standard dimensioned lumber and ultimately the products of the planing mill — sash and door frames, mouldings and architectural details. Under the influence of machine development, ancillary building materials rose to become an integral part of virtually all lumber producers. Every sawmill in the Orono district, for example, was equipped at least with a lath machine, and most had shingle "mills" and clapboard machines as well.

The manufacture of considerable quantities of both pine and cedar shingles began prior to the development of machinery specialized for the task. The work of the hand shingle maker, or "shingle weaver," involved the splitting and shaving of individual shingles from logs which had already been sawed into blocks or "bolts." In an average day one shingle maker was reputed to be able to split, shave, and bundle a thousand shingles. This activity occupied a great many laborers and farm hands through the first part of the nineteenth century, and as late as 1850 it was estimated that some 75 million shingles were still produced in this old-fashioned way in Aroostook County, where shingles represented a form of currency for trade. In 1855 it was noted that the "poorer classes" in Rangeley had shaved one million shingles in the previous four months.

Meanwhile, however, shingle saws were producing nearly 100 million pine and cedar shingles per year. The centers of this immense industry, not surprisingly, were also the centers of sawmilling. In 1850, the largest production was in Gardiner and Orono. These two communities combined sawed more than one quarter of all the shingles produced by Maine mills at mid-century. The largest individual mills were in Gardiner where two establishments sawed upwards of five million pieces each. Elsewhere, among the several hundred other shingle mills in Maine, a common yearly production ranged from 100,000 to 400,000 shingles per year.

The development of shingle cutting saws transformed shingle making into a sawmill product. Shingle saws of various descriptions were produced and sold for about \$100, and sawmill operators rapidly adopted them. By 1870, some 128 sawmills reported in the *Water Power of Maine* that they had shingle mills attached. In addition there were nearly 300 mills devoted exclusively to shingle production.

Payment for shingles was computed by the bundle or the count. Their manufacture, therefore, was a piecework process in which speed translated into pay. For this reason, the effort to improve and speed-up the process of shingle sawing continued throughout the century, and some notable improvements were made in Maine. Augusta machinist J. G. Johnson began selling "Johnson's Improved Shingle

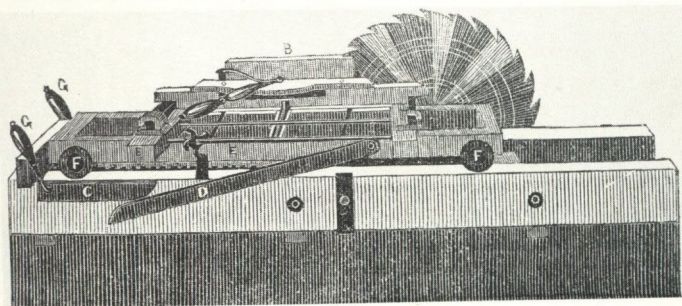


Fig. 61. "Johnson's Shingle Machine"

Augusta machinist J. G. Johnson received national attention for his shingle cutting machine when the *Scientific American* featured an article and this illustration in their Dec. 30, 1848 issue. Illustration from *Scientific American*, Vol. 4, No. 15. (Maine State Museum.)

Machine" in 1847, according to an issue of *Scientific American* which deemed his improvement worthy of extended notice.

The piecework production of shingles led to some informal competition for productivity. In 1856, for instance, the *Hallowell Gazette* reported that two men in Durham, Maine had sawed and bundled 11,250 shingles in one day, a feat which was claimed by the paper to be "a little the smartest day's work, in the shingle line on record." In truth,



Fig. 62. "Shingle Machine"

Many small Maine mills specialized in the cutting of shingles. Not surprisingly, the centers of this production were in the larger sawmilling districts of Gardiner and Orono. A number of shingle machines were manufactured in Maine, beginning in the 1840's. Illustration from an advertisement in the *Maine State Directory & Gazeteer*, 1894. (Courtesy Maine Historical Society.)

however, this was not the record. Eight years earlier the *Scientific American* had reported:

Mr. Daniel G. Marden, of Swanville, Me., one day last week, sawed 13½ thousand of shingles in one machine. It was done on a wager of ten dollars—the wager being that he could not saw 10 M. in a day. Mr. Marden thinks that it will be hard to beat this. Zina Knowlton bunched them all in a day, and those who have worked in that line of business will understand what kind of day's work this was.

The productivity of shingle mills varied considerably depending on the number of machines employed and the term of operation: many mills were only run seasonally. In 1869, the annual production of individual shingle mills in the state ranged between 200,000 and 800,000. However, there were more ambitious efforts. One mill in Stetson manufactured 25,000 shingles per day! And "Hathorn's" mill in Pittsfield claimed an annual output of four million shingles.

The manufacture of clapboards paralleled that of shingles. As machinists developed improved saws for cutting clapboards, traditionally split and shaved by hand, many sawmills began offering clapboards as an ancillary product. By the end of the Civil War there were about fifty clapboard mills in operation throughout the state. Over two million clapboards were manufactured in Orono alone in 1854 — by clapboard machines located in the same mill blocks that produced the long lumber of this region. Fifteen years later, the average production of clapboards per mill was probably between 25,000 and 125,000 clapboards per year: the "Carleton" mill in Troy made 30,000, while a mill at Remick's Falls in Orrington produced 100,000 (along with two million shingles).

The sawing of laths for plastering work was a logical extension of all sawmills since this tributary manufacture utilized the slabwood left over from the sawing of long lumber. Made from otherwise junk wood, laths were among the more humble mill products, and there were few statistics to show the breadth of this manufacture throughout the state. The export from just a few locations, however, reveals the prodigious activity of lath making which ex-

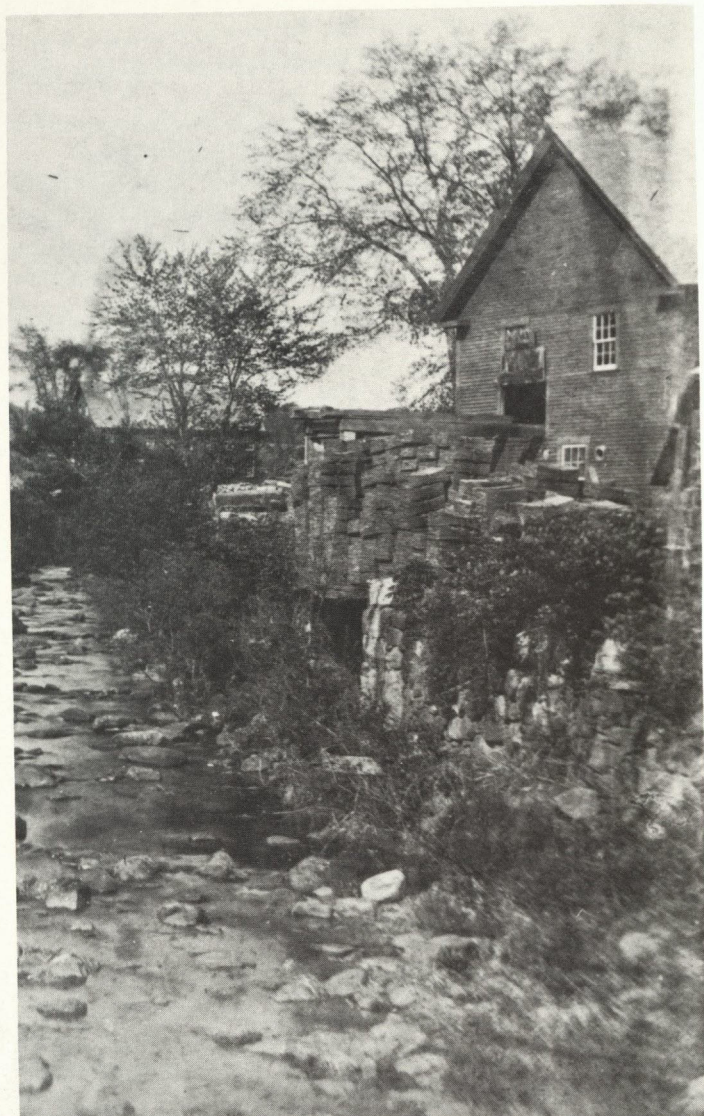


Fig. 63. Shingle Mill, Wilton

By the late 1860's there were over three hundred Maine mills that were described by the term "shingle mill." Bundles of shingles can be seen stacked outside this small mill in Wilton.

Photograph from a stereoscopic card, c. 1880. (Courtesy Maine Historic Preservation Commission.)



Fig. 64. Treat and Lang Mill, Bath

Steam power permitted sawmills to be located adjacent to shipping wharves. At the Treat & Lang Mill in Bath (where Bath Ironworks now stands) ships could be loaded directly from the mill for ultimate efficiency. Photograph from a stereoscopic card, c. 1875. (Courtesy Maine Historic Preservation Commission.)



Fig. 65. Portable Mill, Sheepscot Area

This view shows clearly the several key aspects of portable sawmills. On the left is the portable saw, and to the right is the portable boiler with pipes leading to the steam engine located under the piece of corrugated metal in the center. All of this is placed under a highly temporary structure. Photograph by E. J. Leighton, c. 1910. (Maine State Museum.)

tended generally to all sawmill sites. In 1826, it was reported that the retail value of laths exported from Machias was \$21,000 — indicating that there was considerable profit to be made from recycled waste lumber. Twenty years later, in 1846, one Ellsworth mill reported the production of some 2.5 million laths — and six years later, lath production in the same mill had grown to over six million. Although the sawing of laths was not of major commercial importance compared to other lumber mill products, this manufacture was widespread and it provided yet another relatively unskilled task within the setting of the sawmill.

As with the cutting of shingles and clapboards, the manufacture of laths provided an important early use for small circular saws. It is likely that the use of circular saws for this purpose began in the 1820's. The slabwood used in this manufacture was generated on the main floor of sawmills and commonly tossed out of the mill, or dropped to the level below where it would be out of the way. Lath machines were commonly located below the main sawing floor, sharing space with the major mill gearing.

The development of machines for cutting barrel staves and headings helped reorganize coopering away from the skilled craftsmen toward machine production. Stave sawing machinery provided the local cooper with barrel parts requiring only a small amount of finish work. This tended to diminish the cooper's trade as a craft specialty, especially in the manufacture of dry barrels. In many cases the sawmill and related sawing machinery displaced hand processes which required labor, but little skill.

Stave and heading mills tended to group themselves tributary to the centers of barrel use, such as the lime industry on the central-Maine coast. The town of Washington, Maine, for example, which lies upstream from Rockland at the source of waterpower, was home for six stave mills in 1850. Together, these six mills produced in that one year some 810,000 staves and at least 129,000 headings. Because the stave mill produced products which still needed attention by coopers and shook makers, these mills tended to operate within somewhat narrower territorial limits than mills that made shingles, clapboards and laths. Machinery for cutting staves and headings were manufactured in Liberty, Maine, in the second-half of the nineteenth century.

All of the secondary lumber items described here was significant items of export from Maine. While much of the production went via coastal ships to Massachusetts, the West Indies market for these goods was also very important. In 1817, of the 3,686,000 shingles, and 334,000 staves and headings exported from Castine, most of the shingles were probably delivered along the coastal routes, but more than one-half of the staves were shipped directly to the West Indies. While dwarfed by the production of long lumber, the manufacturer of the ancillary mill products formed an important component of the State's trade and provided employment within a mill setting for a growing number of semi-skilled workers laboring at an increasing assortment of specialty tools and saws.

Yet another group of woodworking machines was introduced to the mill during the nineteenth century — planers and shapers. Finish carpenters had traditionally used hand planes to produce a wide range of interior woodwork, including doors and window sash. This custom work continued throughout the century, but predictably, sawmill machinery was expanded to facilitate the mass production of many of these commodities.

While the Kennebec was overtaken by the Penobscot and Washington County in the manufacture of long lumber, a concentration of larger door and sash mills were started in the Augusta area in the 1860's. In that decade the firm of Jeremiah Furbish in Waterville utilized a suite of eleven machines (three planing and two moulding machines) to produce 10,000 doors, 60,000 sash, and 2,600 blinds (shutters). Meanwhile, in Augusta, D. W. Mosher employed some twenty men and fifteen machines in the manufacture of 12,000 doors and a large quantity of sash and blinds, while J. P. Wyman and Son employed twice that number in the production of 18,000 doors, 14,000 sash and 7,200 window frames.

The manufacture of shingles, staves, clapboards, laths, sash, doors, blinds, as well as bobbins, spools and novelty wooden items, greatly expanded the commercial use of Maine timberlands and helped sustain the operation of sawmills throughout the State.



Fig. 66. "Old Stone Mill," Dresden

As the era of small water-powered mills ended, the picturesque quality of the "old mill" attracted photographers. This photograph was taken by Aaron Houdelette of Dresden, c. 1890. (Courtesy Maine Historic Preservation Commission.)

FINAL NOTES

Although the manufacture of textiles and shoes in the second half of the nineteenth century ultimately surpassed lumbering in retail sales values, sawmilling and lumbering clearly deserve a place in Maine history that cannot be rivalled. The memory of Maine's sawmilling heyday is preserved in the stories, songs and visual image of the Maine woods. Literary giants such as Thoreau have written about it, and all Mainers recall it as a unique and special chapter in their past.

While memories of Maine's sawmill era are intact, physical remnants of these mills, and the saws they used, are extremely scarce. Of the many hundreds, indeed thousands, of up-down sash saws used throughout Maine, only a few fragmentary remains have survived. Freshets, fire, technological progress and decay have virtually eradicated this part of the state's history. Nor are there traces of mills built on the larger rivers, or the gang saws used there. Of the thousands of mid-nineteenth century shingle saws, only a few exist today. Just one mid-nineteenth century clapboard saw is known, and no lath machines.

What does remain to speak of the fabulous sawmill era are the rows of fine mansions along Broadway in Bangor that were built with lumbering money. Likewise the Victorian houses on Maine and Brunswick Avenues in Gardiner, as well as Robert Hallowell Gardiner's gothic manor on the banks of the Kennebec, are reminders of the wealth generated by the Cobbosseecontee mills. But the mansions do not tell the real story of sawmilling. Affluent neighborhoods, and indeed cities, were built by commerce in lumber, not so much by its actual manufacture. In the long run,

sawmills were ephemeral and sawmilling was a transient's occupation. As a result, the physical remains of this enterprise are scarce. Today the Penobscot towns of Veazie, Old Town, Bradley, Orono and Milford — once teeming with lumberjacks and sawyers — are still relatively small towns. Aside from one paper mill of modest size and a small electric company generating station, the Cobbosseecontee is deserted. This is a long-recognized phenomenon of sawmill and lumbering in general. The *Water Power of Maine* noted glumly in 1869 that "no wealthy and stable communities are or ever can be created on the basis of this resource."

In no part of Maine history is there found a story of greater significance than that of the sawmill industry — and simultaneously, one in which so few tangible remains have survived. This is why the discovery of an eighteenth century up-down saw on Bond Brook in Augusta is considered one of the State Museum's most significant finds. And this is why a new logging and lumbering exhibition was built to display these early fragments, and why this small booklet to accompany the exhibit was prepared.



Fig. 67. Mill and Crew, Sanford Area

The eye of Fred Libby's camera seems to strain here for a last glimpse at the past. On a summer afternoon around the year 1910 these men took a break to record this moment in a day's work. It is in remembrance of these men, and tens of thousands like them, that this book was written. Photograph by Fred Libby, Sanford, c. 1910. (Maine State Museum.)

