

# Merchant and Millwright

## The Water Powered Sawmills of the Piscataqua

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**L**UMBERING in southern Maine and New Hampshire during the seventeenth and early eighteenth centuries parallels the growth of those colonies. Its development along the tributaries of the Piscataqua and rivers of the Maine coast illustrates the complex relationship between traditional English economy and technology, and the environment of the New World. The early development here of water powered saw mills raises questions of English familiarity with power milling technology, while the interest of English and colonial merchants in northern New England saw mills suggest the importance of lumbering in the economy of the settlements.

Among the earliest records of New Hampshire is a letter from Thomas Eyre, one of the English merchants who owned the Laconia Patent (Maine and New Hampshire), written to Ambrose Gibbons and dated the "last of May, 1631." Gibbon was the agent for the Laconia company at their trading settlement at Newichawannock (present-day South Berwick, Maine). From London, Eyre replied to a series of lost letters:

I like it well that your Governor will have a stock of bords at all times readie. I hope you will find something to relade both the [ships] Pide-Cowe and the Warwicke. I will now put on the sending of you the modell of a saw-mill that you may have one going.<sup>1</sup>

Reference to a model of a saw mill, most likely a drawing rather than a working model, sent in 1631 to the Piscataqua

is especially interesting because of the saw mills erected by two other English members of the Laconia Company. In December, 1633 the company divided portions of the Pascataway Grant among the merchant patentees. Captain John Mason received a tract in Maine beginning at the lowermost falls,

and soe upward along the Newichwannock River to the end of y<sup>e</sup> Patent which is estimated about fifteen miles and a quarter being almost fower miles more than his proportion cometh unto. Yet it is allowed him in regard he is soe farre distant from the Sea.<sup>2</sup>

On March 13, 1633/34, John Mason contracted with three carpenters "to goe over unto the said lands" in New England. James Wall, William Chadbourne, and John Goddard agreed to

make and build such howses Two mills and other frames and things. . . . Thone of w<sup>ch</sup> mills to be a sawe Mill w<sup>ch</sup> shalbe made and sette uppon good sufficient and workmanlike sort and manner. . . . and thother of the said Mills shalbe a water Corne Mill. . . .<sup>3</sup>

Less than twenty years later, when Mason's heirs tried to gain title to New Hampshire, James Wall testified that this contract had been fulfilled. The three carpenters were brought to Mason's grant in 1634 by Henry Josselyn, "Captaine Mason's agente",

and there did builde upp at the fall there (called by the Indian name Asbenbedick) for the use of Captaine Mason & ourselves one sawe mill and one stampinge mill for corne w<sup>ch</sup> we did keep the space of three or fower years next after. . . .<sup>4</sup>

It appears that John Goddard did not complete his part of the contract, as Joseph Mason brought suit against Goddard in 1653 and won. After Captain Mason's death in 1636, the three carpenters moved across the Piscataqua. William Chadbourne appears in Portsmouth, N. H., in 1642, although his son is found as a carpenter and millwright near Mason's mill soon after. James Wall continued building other saw mills in Exeter and Dover, N. H. The quality of his work, however, may be doubted when in 1653 he was sued for taking excessive wages for building a saw mill which proved insufficient.<sup>5</sup>

John Mason was not the only patentee who contracted with English millwrights to build saw mills in New England. Ferdinando Gorges described his own activities in 1623 in his *Brief Narration* (published in 1658):

I sent over for my Son, my Nephew Captain William Gorges . . . with some other Craftsmen for the building of houses, and erecting of Saw-Mills. . . .<sup>6</sup>

While this saw mill does not seem to have succeeded, Gorges did finance another one at the same time that Mason sent over his carpenters. Winthrop noted in his *Journal* on July 9, 1634 that Sir Ferdinando Gorges and Captain Mason had sent carpenters "to Pascataquack and Aguamenticus, with two sawmills, to be erected, in each place one."<sup>7</sup>

As with their other speculations in Maine and New Hampshire, too much rested upon the personal activities of Gorges and Mason in supplying the fledgling saw mills at Berwick and York to survive beyond their deaths. From the scant early records, however, it is evident that both mills were operating during the 1630's. What could be foreseen by these English patentees was not lost upon am-

bitious Englishmen in Massachusetts Bay, nor upon those influential men of the Piscataqua towns in the 1640's and 1650's.

After the deaths of the major proprietors, the right to timber lands and privileges of erecting saw mills was given by each town. Because few records survive for this period, it is difficult to determine whether any other mill grants were made prior to the mid-1640's. In all probability there were none, as an insufficient labor force was matched only by the lack of capital. The earliest New Hampshire court cases, prior to unification with Massachusetts Bay in 1642, involved payment in pipe staves and clapboards which were hand-riven rather than "merchantable sawn boards" as became common after mid-century.<sup>8</sup>

Throughout the seventeenth century, land grants were made some years before the actual site was laid out to the owner. For example, in 1647 Dover granted 200 acres to Hatevil Nutter and Edward Starbuck "for Accomadation of a saw mill at Lamperell River" which the two men agreed to divide in 1649. Nutter received the south side of the lower falls near an earlier grant:

And it is ffurther agreed that if one Bulds a mill before the other, that when the Other Bulds hee shall paye to him that bult firs one halfe the vawew of what Indeferent men shall Judg the mill Dam to be worth at said time of the latter Bulding of a mill. . . .<sup>9</sup>

One such mill was in the process of completion as the century neared mid-point. In August, 1649,

Richard Waldren of Quechecho in Piscataq river granted to James Wall of Exeter Carpenter all his right for erecting a saw mill at Quechecho, together w<sup>th</sup> sixty Acres of land at the ffalls of Quecheco & fifteen hundred of trees. And all work that hath beene done (both timber & yron work) towards erecting the sd mill.<sup>10</sup>

Wall paid for this mill right with "money received, worke done, & a bill for one C. thousa foote of merch<sup>table</sup> boards."<sup>11</sup> This suggests that there was a lack of local capital for the completion of the mill, dam and iron saws. Certainly, lack of sufficient capital may be seen in the mill grants made to a number of Massachusetts merchants who acquired land in Maine and New Hampshire at this time.

Edward Gilman emigrated to Hingham, Massachusetts, with his parents and their family in 1638 from Hingham, Norfolk, England. He was accepted as an inhabitant of Exeter in 1647 and given 100 acres with mill and timber rights. As Edward began to purchase other lands, his brothers John and Moses joined him in 1648 to help in these activities. The first sign of financial difficulties caused by the building of Edward's mills is a mortgage for £200 made in 1651. It was held by his father-in-law, Richard Smith, of Stropsham near Hingham, England. Smith had lived in Ipswich, Massachusetts, and returned to England prior to 1651 when he provided the needed support for

one saw mil, on y<sup>e</sup> Easterne side of y<sup>e</sup> River, & also y<sup>e</sup> one halfe of three parts of a saw mill on the other side of the river . . . and y<sup>e</sup> one halfe of all my land in Exiter. . . .<sup>12</sup>

It is not known whether the mortgage was repaid in London within the year as required, but in December, 1652 Edward sold his brother, John Gilman, one quarter of each of the same mills on either side of the "River uppon Exiter falls" for £150.<sup>13</sup>

Across the Piscataqua in Maine, prior to that colony's submission to Massachusetts Bay, a similar enterprise was being formed which would involve English capital. Richard Leader had been the agent and manager of the iron works at Saugus and Braintree, Massachusetts,

from 1645 to 1650. This manufactory had been promoted and partially owned by John Winthrop, Jr., with various English and local shareholders. Caught between the interference of the English Undertakers of this corporation and the local problems of an infant industry in the Puritan state, Leader gave up his post for other occupations. A letter between some of the investors written on August 28, 1650, notes that Leader "hath dismist the works by the Consent of the Company and is mynded to follow his other occations. . . ."<sup>14</sup>

By Christmas of 1650, some idea of his new interest was reported to John Winthrop by his uncle Emanuel Downing writing from Salem.

I suppose you have heard how m<sup>r</sup> Ledder Late left the Ironworks, and lives at p<sup>r</sup>sent in Boston, he is about erecting a saw mill at a place nere pascattaway that shall work w<sup>th</sup> nere 20 sawes at once. . . .<sup>15</sup>

By March 1650/51 Richard Leader was in Kittery, Maine, where he made "sertaine propositions" to the Court "for the Erectinge of a Mille or Milles for the improvement of these parts and the advancement of trade here amongst us."<sup>16</sup>

Meanwhile, Leader had sailed to London, apparently to make an account to some of the Undertakers of the Ironworks, especially John Bexx, a Dutch protestant merchant residing in London and holding a major share of that company. That Leader made this voyage, while planning the Maine saw mills, is testified to by his trial in May 1651 for speaking out against the Massachusetts government "spoken neere about the midway between this & England!"<sup>17</sup>

The site granted by the Maine Court in 1651 included the abandoned mills of Captain John Mason within the 400 acres on either side of the Little River at Ne-

wichawannock. Thus, in 1652, Mason's heirs brought suit against Leader for trespass and building houses, as well as cutting timber to erect a saw mill "In o<sup>r</sup> Antient possessed place wheron wee formerly began & do intend to pceed in y<sup>e</sup> like work imeadiately."<sup>18</sup> The suit was referred to the Massachusetts General Court since Maine had submitted to that government, and little action was taken on this Masonian claim for some years.<sup>19</sup>

If Leader's mills were being erected in 1652, he must have had immediate financial problems. In 1653 Leader sold three quarters of the mills to John Bex, Richard Hutchinson, Colonel William Beale and Captain Thomas Alderne. Bex and Hutchinson were London merchants with considerable interest in the Saugus ironworks, and their backing may have been arranged the previous winter when Leader appears to have made still another voyage to London, acting as an agent of the province of Maine.<sup>20</sup> Despite the new English capital, the venture proved unsuccessful and he was forced to mortgage the remaining quarter share in the mills to secure an appearance in London with his brother George Leader to account to Bex and Company. The London backers had already placed Edward Rishworth, Court Recorder of Maine, as their agent in the mills. In this capacity, Rishworth rented the mills in 1655 to Richard Tucker.<sup>21</sup>

While Richard Leader departed to Barbadoes to run a saltworks for Thomas Broughton, a Boston merchant with numerous interests in Piscataqua saw mills, the Great Works (as Leader's saw mills were known) passed into several different hands.<sup>22</sup> By 1669, when an inventory of the mills was made at Rishworth's request, the site contained

A broaken dwelling house ready to fall, & a barne much out of repayre, Two orchards with-

out fence. . . . The broaken Mill with the Iron & Utensills . . . .

With a smith's shop, meadows, falls and timber grant the whole was valued at £493.<sup>23</sup>

While Leader's Great Works mill never returned the profits which Bex and Company must have desired, especially after the expensive bankruptcy of the Saugus ironworks, New England merchants and millwrights cooperated on dozens of saw mills in the Piscataqua region. Around 1655 an anonymous "I.S." prepared a map of the "Pascatway River in New England" dedicated to James, Duke of York, to "Declare (by Mapp) how Englands strength doth lye / Un-seene in *Rivers* of the New Plantations" (Fig. 1). The hidden strength which the artist illustrated along the interior rivers flowing into the Piscataqua represented no less than 15 mills, all of which can be identified as saw mills by contemporary documents.<sup>24</sup>

Added to these were the mills built in York and other rivers of the Maine coast. More than half a dozen can be identified prior to 1660 in York, Wells, and Saco alone. By the end of the century more than 60 mills can be identified between Hampton, N. H., and Casco, Maine, including the few early ones which failed (see Appendix). Many of these were in the hands of the same owners, although nearly all were owned or mortgaged to merchants other than the original owners. In fact, the bulk of the financial support for most of these mills took the form of partnerships between a millwright or carpenter and a merchant from Boston, Salem, or Ipswich. If a mill was built without aid of partnership, it often fell into difficulties and was mortgaged to one of these same merchants.

One of the most illuminating examples of these practices may be seen in the his-

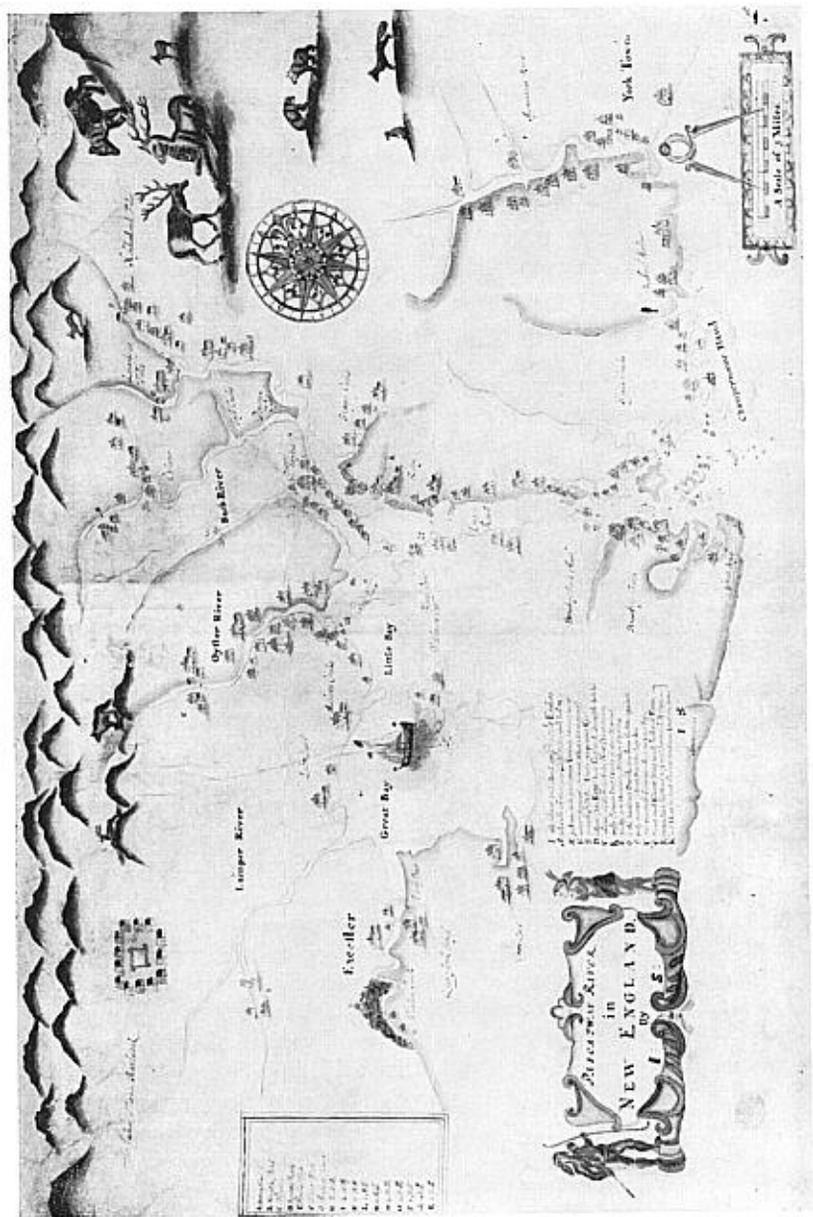


FIG. 1. "PASCATAWAY RIVER IN NEW ENGLAND BY I.S." Internal evidence indicates a date between 1654 and 1659. The key locates fifteen sawmills by letters "H" through "R". Courtesy of the Trustees of the British Museum.

tory of the mills at Oyster River (Durham, N. H.) within the town of Dover. Sometime prior to 1649 Valentine Hill, a Boston merchant, purchased 500 acres "uppon Pascataq river neere the Oyster river. . . ." <sup>25</sup> In November of that year the town of Dover granted a mill right to Valentine Hill and Thomas Beard, a local carpenter who undoubtedly constructed the mill. Briefly mortgaged in that year, the land was in Hill's hands again by 1651 when he mortgaged "all that my graunts of land made to me by the Towne of Dover at the oyster River & the Sawe mills standing and erected thereuppon. . . ." <sup>26</sup> These were mortgaged to his brother-in-law, Thomas Cobbett of Lynn, Jane Skipper and Joshua Scottow of Boston. In a society without banks, family loans and the funds of unmarried women or those of merchants were the most common forms of raising capital. Repayment of £50 sterling to Mr. Cobbett and Miss Skipper was to be in equal currency, but merchant Scottow was to be repaid by June in "good merchantable pine boards." <sup>27</sup>

Hill maintained this and interests in other mills, but did not rely solely upon the milling of lumber after settling at Oyster River. In 1656 he entered into an agreement with Captain Thomas Clark and William Paddy of Boston "Concerning y<sup>e</sup> Enacting of a Trade in Pascataqua River. . . ." By the terms of this contract, Clark and Paddy supplied more than £50 yearly "of such suteable goods as may be for y<sup>e</sup> use of y<sup>e</sup> people of y<sup>e</sup> sd River" to Hill for three years. In return, Hill acted as their agent, buying whatever "goods as the River affords, as boards planke pipestaves hog-staves trunells & y<sup>e</sup> like" and taking one third of the clear profit from both the imports and exports. <sup>28</sup>

Clark was already part owner of two saw mills in York, while Paddy became a partner with Hill and Richard Leader in a mill on Lamperill River in 1657. Such business contracts provided profits for each of the partners. As owner of the saw mills, Hill could provide the merchantable lumber to the trading firm, while maintaining another third of the profit in the sale of both goods and produce. Clark and Paddy, on the other hand, had a monopoly on importation of goods to Hill at Oyster River. In effect, they may have acted as the sole suppliers to the community which developed about the mills.

A clearer picture of how such a community would be supplied by the mill owner acting as shipping agent for the transportation which carried lumber from the mill to Massachusetts is found in the mills on the Cape Porpus River in Wells, Maine. This mill was built by Henry Sayword, a millwright and carpenter of York who owned several saw mills and died in 1679 amid a morass of mortgages. One third of his estate was claimed by Henry Webb, who placed his lawyer Jonathan Corwin of Boston in charge of the operation of the Cape Porpus mills. The town of Wells confirmed the grant formerly made to Sayword into the hands of Corwin, who proceeded to hire loggers and sawyers. The mills were placed in the management of Edmund Littlefield, a Wells sawyer, in 1680. <sup>29</sup>

Among Jonathan Corwin's papers in the Essex Institute in Salem, Massachusetts, is a ledger for several months during 1679-1680. In it are listed the goods supplied by Corwin to nearly 40 inhabitants of Wells. Debts for food, clothing, hardware and other items were paid with either local produce or, most commonly, work done in supplying the mill with logs,

sawing of boards, or other services. One £2 account for salt, nails, molasses, rum and other goods was paid by "4 dayes worke done at the mills" and "2 dayes helping goods ashore" plus a small note of credit.<sup>30</sup>

Such debts for a three month period range from less than £1 to £15 per person. Corwin also supplied Jeremiah Storer, another Wells saw mill owner, with "Goods sent from Salem at several times" to be repaid in sawn boards the next spring. Ships returning from Cape Porpus carried the milled products, such as the "7000 foote of m<sup>r</sup>chantable boards ptt aboard" one ship by several of the loggers. Some idea of the mill's activities can be obtained from an account of its production from March 17, 1681, to June 3, 1682, which totaled 59,320 feet of sawn boards.<sup>31</sup>

The ambidexterous nature of these merchant mill-owners created what later would come to be called "company towns," profiting from decreased operational costs in supplying workers as well as the export of sawn lumber. While English merchant capitalists seem to have been disappointed in their success in Piscataqua saw mills, their Massachusetts counterparts acquired increasing interests in nearly all the mills in the region. As suppliers, carriers and owners they might profit on each transaction, even if the capital expended resulted in foreclosure. The importance of the mercantile aspects may account for the fact that most mill mortgages were concluded in cargos of lumber. Henry Sayword's mortgage of the "Mill I am now Building at Wells" to Robert Gibbs was to be repaid in £400's worth of lumber, or 200,000 "foote of M<sup>r</sup>cht<sup>ble</sup> square edg'd pine boards."<sup>32</sup>

The quality of the sawn boards exported from the Piscataqua mills was the

subject of an order of the New Hampshire Governor and Council in 1683:

Whereas frequent complaints are made by the Merchants, inhabitants of Jamaica, Barbadoes, and Leeward Islands, and other his Majesty's plantations, to which pine boards are exported from this said Province, of the unreasonable thinness and uneven and wavy edge of boards

it was ordered that no pine board would be accounted as "merchantable" that was not "one full inch in thickness, and square edged."<sup>33</sup>

This order indicated that Piscataqua lumber was shipped in quantities enough to warrant frequent complaint from other English colonies in the West Indies. That New Hampshire was considered a major milling colony is also suggested by the Council's fear that poor quality boards might "prove of great detriment to the trade of the Provinces, and loss of trade."<sup>34</sup> A similar view was reported in 1701 by Lord Bellomont in a letter to the Lords of Trade. Describing the saw mills in New York, he wrote:

They have got about 40 saw mills up in this Province [N. Y.], which I hear rids more work or destroys more timber than all the saw mills in New Hampshire. Four saws are the most in New Hampshire that work in one mill, and here is a Dutchman lately come over who is an extraordinary artist at those mills. M<sup>r</sup> Livingston told me this last summer he has made him a mill that went with 12 saws.<sup>35</sup>

If Bellomont's information may be trusted, it confirms the impression that Leader's "Great Works" mill never achieved the nearly twenty saws that he had envisioned in 1650. This report also indicates that by 1700 New York saw mills had made great strides in the technology of water powered saw mills by the importation of a Dutch millwright. Such comments raise questions concerning the origins of saw mills on the Piscataqua, and their method of construction and op-

eration. While direct information on each of these aspects is scarce, individual threads gathered from many different mills may be woven into a reasonably complete composite picture.

The technological source and origins of the saw mills erected along the Piscataqua involve obscure questions of architectural history and technological influence. The 1631 letter from Thomas Eyre sending a model of a saw mill to the Laconia Company's agent that he might "have one going," followed by the erection of Mason's and Gorges' mills in 1634, illustrates the interest of English merchants in water powered saw mills. Mason's contract of 1633/4 with three English carpenters would seem to argue for their familiarity with the construction of such saw mills.

James Wall, who erected the corn stamping mill and saw mill with William Chadbourne in 1634, as well as the 1649 Coheco (Dover) saw mill, is thought to have come from Devon. William Chadbourne was born in Winchecomb, Gloucestershire, while his son was born in Tamworth, Warwickshire. John Goddard, who contracted to build Mason's mills, is unidentified prior to that English contract. Whether or not he actually completed his work for Mason, he died in 1666 owning  $\frac{3}{8}$  of "pascassick mills" valued at £120. It may be assumed that he constructed and operated the mills for the Gilmans, as his inventory contained his "bed & two Ruggs & 2 blanketts at the mill."<sup>36</sup>

Of the other first generation millwrights whose origins have been identified genealogically, there is a wide range of southern and central English counties. Henry Sayword was from Essex, the Gilmans were from Norfolk, the Littlefield family was of Hampshire, Robert Page

came from Norfolk, Thomas Beard emigrated from London, and Captain John Pickering left Warwickshire.<sup>37</sup> One hypothesis to be drawn from these facts might be that the source of the Piscataqua saw mills erected by the English carpenters was a similar type of sawmill in England.

Except for the few references to water power saw-milling in England prior to emigration, published herein by Mr. Forman, the evidence suggests that wind-power was more commonly harnessed to this purpose. A few Englishmen following the lead of Dutch "paltrok" windmills invented *c.* 1592 erected "Paltrok" mills, tower windmills with sides built out to support timber lengths, which appear in England by 1658. A view of Lambeth, London, published in 1660 shows one of these wind saw-mills surrounded by piles of sawn timber.<sup>38</sup>

That the Dutch adaptation of windmills for sawing may not have been commonly attempted in England for 40 years after 1592, in a period of active trade and communication, suggests that there were social reasons rather than a simple lag in technology. Indeed, the application of power milling in England was opposed for more than a century by the hand sawyers, who felt their work endangered by this form of automation. The threat of unemployment for what must have been a great number of hand sawyers in a period when England's forests were diminishing may account for the fact that some of the "paltrok" windmills in England were burned down by the sawyers.<sup>39</sup>

While the application of power saw milling proved socially unacceptable in England, there is little doubt that Englishmen could (or did occasionally) harness either wind or water power for that purpose. The mechanical differences be-

tween milling of grains and sawing of timber were small, and England had a long tradition of grist mills.<sup>40</sup> That other countries, without the island's labor problems, had solved problems of water-powered saw mills by the seventeenth century (perhaps as early as 1530) is seen in an English tract of 1650 which illustrates a water-powered saw mill with the following explanation (see Fig. 2):

This Engine is very common in Norway and Mountains of Sweden, wherewith they cut great quantity of Deal-bords; which Engine is very necessary to be in a great Towne or Forrest, to cut Timber, whether into planks or otherwise.<sup>41</sup>

It is equally interesting to note that this English pamphlet was written to encourage emigration to the Carolinas by the introduction of silk-worms and saw-mills to bolster the economy.

The evidence suggests that while the hand sawyers prevented any form of power milling to become common in England, saw mills powered by wind or water like English grist mills were known by Englishmen of the first half of the seventeenth century. Whether the model sent to the Piscataqua by Thomas Eyre was based upon a Scandinavian or continental mill or upon some unrecorded English experiment may never be known. However, it would have been merchants such as those who financed the earliest Piscataqua saw mills who might be expected to have known of European developments through their trade. As equal members in the Laconia Company, it is not impossible that Eyre's model was shown to Mason and Gorges for the erection of their mills, although Gorges later claimed to have tried to have one built in New England in 1623.

In any event, English merchants such as Eyre, Mason, Gorges and Bex fore-

saw that conditions in New World were exactly the reverse of those in England. Rather than an abundant labor supply based upon traditional pitsawing, the population of the colonies had neither an organized body of sawyers nor an overabundance of labor. Reports of navigable rivers with many tributaries, each containing several waterfalls in the midst of virgin forests obviously interested these merchant capitalists. The very absence of those factors which hindered England's technological advance in sawing may have suggested the first experiments.

While financial support passed into the hands of New England merchants by mid-century, English interest in the timber resources of the Piscataqua continued. An undated map of New Hampshire and Maine drawn *c.* 1700 by an anonymous "I.B.", is entitled "A Survey of Piscataqua Riv[er]" (Fig. 3). The survey is a timber survey, locating stands of oak, pine and hemlock as well as where "Great Masts are floted Down" the river. The location of this survey map in the drawings which were deposited in the Public Records Office by the old Colonial Office suggests that the primary interest at this date would be the masts for the Royal navy. However, the careful location of several mill sites among the notations of tree woods may indicate an interest in the sawn lumber exported from the colonies. In addition, it provides (in the lower right-hand corner) the only known contemporary sketch, albeit crude, of the Newichewannock mills indicating three water wheels. These wheels may have justified the name of "Great Works" in comparison to the single-wheel mills drawn at Exeter, Dover and Portsmouth.<sup>42</sup>

Although these, and all other saw mills of the first colonial century have long dis-

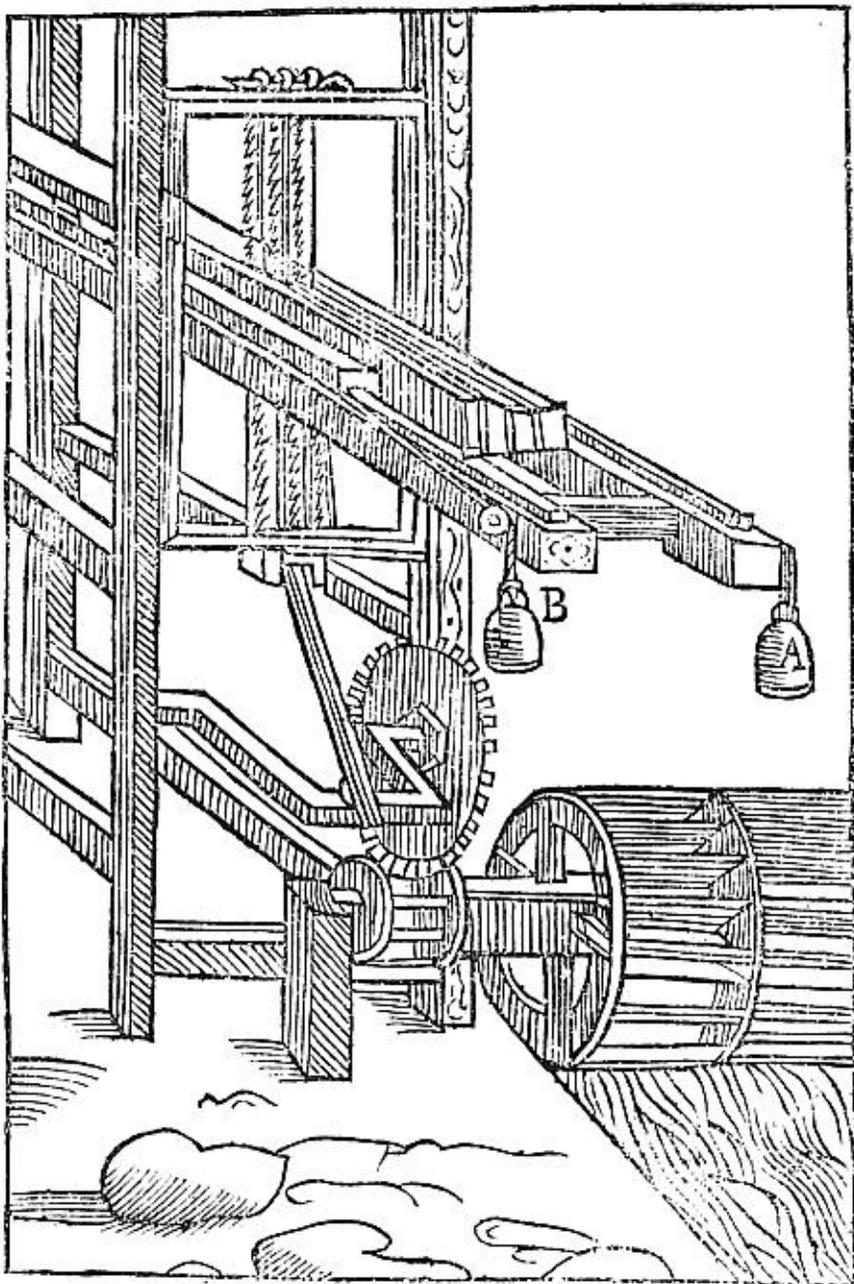


FIG. 2. WATER POWERED SAWMILL FROM E. WILLIAMS, VIRGINIA: MORE ESPECIALLY THE SOUTH PART THEREOF, RICHLY AND TRULY VALUED . . .  
(2ND EDITION) LONDON, 1650

This edition contains an appendix described as "The making of a Saw-mill, very usefull in

appeared, their construction may be inferred from a series of documents. Most important are the papers compiled during the litigation over a mill built for Captain Walter Barefoote and Robert Wadleigh of Kittery on lands along the Lamperell River between Dover and Exeter. Although Barefoote appears to have believed that he had purchased the land and timber rights from Samuel Symonds of Ipswich, it is certain that he had received no deed. Thus, Symonds' son sued to repossess the lands and mills which Wadleigh had built upon them.<sup>43</sup>

Among the supporting evidence supplied by Mr. Wadleigh in his own defence is the building contract for the construction of the mill and the list of expenditures for the years 1664 to 1668. The two owners contracted with John Woolcot of Newbury, Massachusetts, on December 16, 1664,

to build a sufficient saw mill . . . at or upon Lamperelle river . . . w<sup>ch</sup> mill is to be sixty & four foote in Length and 28 foote in bredth w<sup>th</sup> floome & water whele and all other things for the Carpinter worke there unto belonging for to saw except bordeing the sd hows. . . .

The owners agreed to

provide Iron worke for y<sup>e</sup> aforesd saw mill, & to draw the timber in place when it is hewed, and sufficient helpe to raise y<sup>e</sup> s<sup>d</sup> frame, and to finde all planks bordes and nailes as shalbe nesisary for y<sup>e</sup> sd mill, & bring small timber in place unhewed when it is Cutt . . . and to provide dyet for him and his Company while they are a building y<sup>e</sup> s<sup>d</sup> mill.<sup>44</sup>

How this Massachusetts carpenter, later identifying himself as "Millwright," came to build a mill in New Hampshire may be inferred from other contemporary records. As early as 1660 his name appeared on a deed of the Wadleighs, while a court record of September, 1664 places Woolcot in Captain Barefoote's house in June of that year.<sup>45</sup> What other business relationships may have been shared by these three men is unrecorded, but by Woolcot's own testimony he was Barefoote's guest six months before the contract to build a saw mill was drawn.

Payment for the construction of this mill was to be £40 of English or Barbadoes goods less than two months after work was to begin and another £40 in merchantable boards when the mill was completed. Woolcot was to begin the mill "at or before the 10<sup>th</sup> day of March" 1665.<sup>46</sup> On March 6 he recruited William Neph of Haverhill to help build the mill. According to later testimony, he promised Neph his diet and three pounds per month in cotton and English wool. If Neph did not like the wool, he could have his pay in boards at 40 shillings per thousand which Barefoote was to deliver as final payment. Neph accepted the offer and worked either eight or nine weeks in building the saw mill "above Poskataque."<sup>47</sup>

With Woolcot was his seven-year-old servant, William Harrison, who added one footnote to Neph's employment.

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Virginia, for cutting the Timber and Clapboard to build withall . . ." The letters "A" and "B" designate weights substituted for a rag wheel to move the wood along the carriage.

The mirror image of this illustration appears in G. A. Bockler's *Theatrum Machinarum Novum* with letters "A" through "H" designating each part of the sawmill. The text for the Bockler plate (number 63 states the mill "ist eine Frankostsche Manier," which suggests a common undiscovered French source for both the Williams and the Bockler illustrations. The added description in the Bockler text (first edition 1662, twelve years after Williams' edition) notes "The experienced craftsman however is free to improve this type and to add or subtract from it as the convenience of the place and circumstances permit."

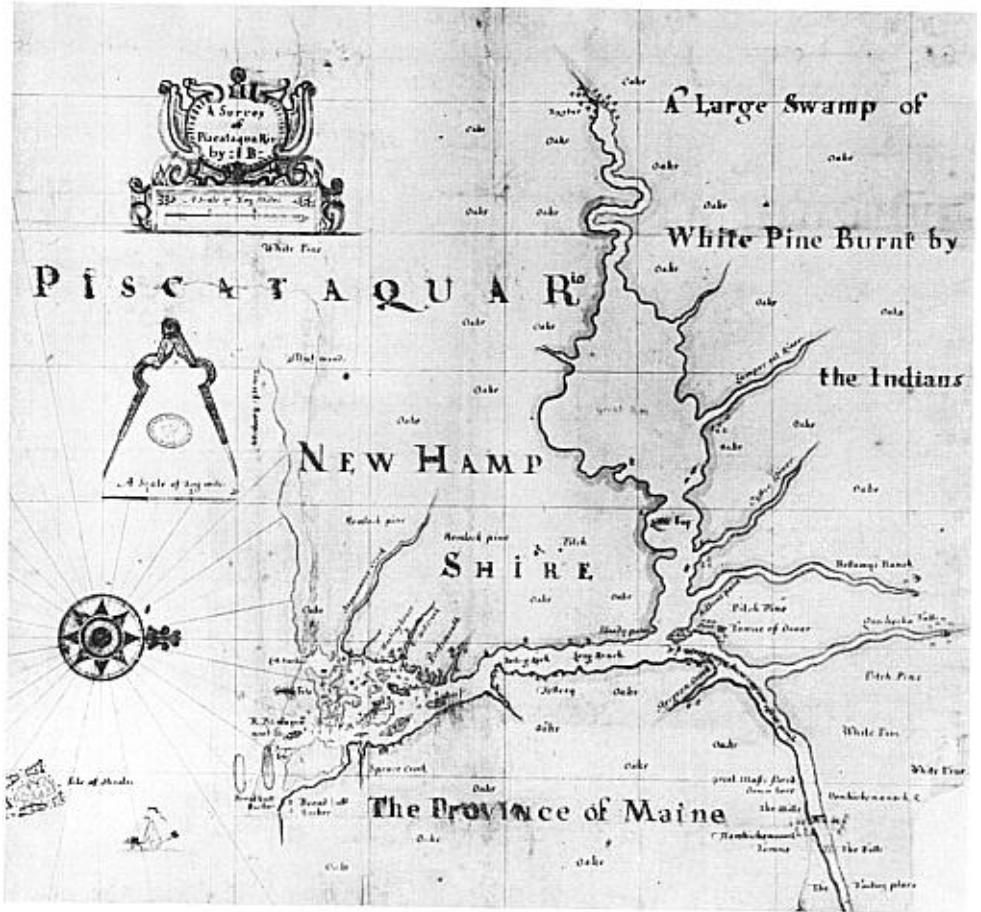


FIG. 3. "A SURVEY OF PISCATAQUA RIV[ER] BY: I B.", ABOUT 1700

This map of Maine and New Hampshire indicates the varieties of timber located about the Piscataqua, as well as the location of several sawmills, including Great Works sawmill (lower right).

Courtesy of the Public Record Office, London.

Harrison testified one year later that Woolcot was paid two yards of broadcloth at 14 shillings per yard and offered cotton wool and sugar. However, as he could not have his whole pay in cotton wool, Neph "went his way" and sued Woolcot for debt the next year.<sup>48</sup>

It is apparent that Woolcot received the first portion of his compensation in May, undoubtedly the broadcloth, cotton and sugar he offered Neph. According to Wadleigh's account for the three years before the ownership of the mills went into court, Woolcot was paid "for wages [£] 40-15-6." Besides this, several other entries indicate Wadleigh's expenses in fulfilling his part of the contract:

for bords and drawing them to y <sup>e</sup> place	03-18-00
To 2 gall <sup>s</sup> liquor for y <sup>e</sup> work- men	00-16-00
for time & charges in transport- ing of goods to y <sup>e</sup> place & ex- pences	01-10-00
To one pair of hinges	00-03-00
To 5 dayes time of 12 oxen & 2 men	05-00-00
To 200 <sup>l</sup> bord nailes	00-08-00
...	
More for other helpe to rayse y <sup>e</sup> mill	01-10-00 <sup>49</sup>

Much of the account for the next few years consists of "wages & dyet" for loggers, sawyers and carpenters. Other expenses indicate the components of the mill itself, as well as an extension made to the original 64-foot building:

for making y <sup>e</sup> running gear for one frame	8-00-00
...	
for planks & bords & nails aboute y <sup>e</sup> dam and ffoome	17-00-00
To my owne p <sup>t</sup> of Ireon worke for drawing of timber for y <sup>e</sup> dam	27-00-00
	01-18-00
for drawing of timber for y <sup>e</sup> floome and to lengthen the mill	03-05-00

To y <sup>e</sup> Ireon worke for y <sup>e</sup> other frame	30-00-00
To the running geares of y <sup>e</sup> other frame	17-10-00 <sup>50</sup>

That other mills in the region were essentially constructed of similar parts is attested to in those deeds which describe their main features. John Wincoll received a Kittery saw mill grant on the Salmon River in 1659. By 1673 he and his partners released the property to George and John Broughton, Boston merchants, for debts they had paid carrying the mills. According to this deed Wincoll had

built & Erected Two saw Mills, & made dams, flumes, & all other necessary Towles, & Utensills, with running Gears for the same. . . .<sup>51</sup>

The illustration based upon Scandinavian saw mills published in 1650 by Edward Williams in *Virginia . . . Truly Valued . . .* shows how their American counterparts may have operated (Fig. 2). Here the saws are worked by a special undershot wheel which became common to later saw mills known as a flutter wheel. Whether this form of wheel was used in saw mills other than tidal mills in York and Portsmouth is difficult to say. Where mills were powered directly from waterfalls, it may have been used, but nearly all deeds for saw mills located on grants near a falls indicate a dam and flumes. This suggests that either overshot or breast wheels may have been more common in the Piscataqua region. Certainly, without written documentation, the "I.B." map of c. 1700 (Fig. 3) indicates large wheels nearly as tall as the buildings in their diameter. These sketches, taken in conjunction with the fact of milldams and flumes found in each of the saw mills for which there are building records suggest that the smaller and longer flutter wheel was not

as common here as it later became. The only physical evidence of a New England water wheel of the seventeenth century which has survived is that discovered in the excavation of the Saugus ironworks. This was a six-spoked overshot wheel between sixteen and seventeen feet in diameter and two feet wide. As the furnace powered by this wheel was erected while Richard Leader was running the ironworks, one might wonder whether he did not employ similar wheels in his "Great Works" saw mill a few years later.<sup>52</sup>

The wheels were fed by flumes from a dam. Two workers who helped in "ye building of a Saw Mill & Gristmill" in 1716 stated:

we proceeded in ye work till ye Mills were both raised the floodgate made & ready to hang ye Sawmills going Gears put in the Aprons laid . . . and as far as we understood Could not proceed any further for want of ye Dam. . . .<sup>53</sup>

Thus, a floodgate from the wooden dam led through wooden flumes to a water wheel. The wheel connected to the "running gears" which transformed the circular motion into vertical movement by means of a crank shaft. Connected to the rising shaft, as seen in the 1650 illustration was a "frame" which held the iron saws.

John Goddard's inventory of 1666 included "2 Saws 4 doggs 2 Small rings [and] 3 small buttons to hang the Saws with . . ." <sup>54</sup> These were used to provide the proper angle in hanging the saw. When John Hill, a former military commander at Saco, went into partnership with a millwright there, it was agreed:

sd John Hill shall after he hath had a convenient Oppertunity of being Instructed by a workman how to Kilter ye saws and keep them in Due order, he s<sup>d</sup> Hill is hereby Ingaged to whet & keep them in good order. . . .<sup>55</sup>

While more than one saw might be ganged within a single frame, such as the "one Saw viz<sup>t</sup> the hithermost Saw in the old Saw Mill" described in the will of Ichabod Plaisted, it seems that a second frame of saws might also be built. Wadleigh's accounts for the building of his mill, previously quoted, show that the original mill was lengthened and "ye other frame" with its own ironwork and running gears were added.<sup>56</sup>

Mills with one to four saws, producing hundreds of thousand feet of sawn lumber annually, could not help but affect the building trades of the region. In Kittery, when Nicholas Shapleigh dammed Sturgeon Creek for a saw mill in 1652, he signed an agreement with the inhabitants of that Creek promising to raise the "wast gates" upon their request. Furthermore,

what boards the sd inhabitants of sturcion Cricke shall want for their necessary building, I promise them and theires to deliver them at Three shillings per hundred. . . .<sup>57</sup>

Other agreements and deeds indicate the variety of sawn timber available to the inhabitants of the region as well as the merchants who would export building materials. The price of one half of a saw mill in Wells which Thomas Paty sold to Henry Sayword in 1670 was the right to bring logs to be sawn for one year and free boards of these logs. Paty was also granted the right to cut pine logs

for all tyme afterwards . . . & the sd Sayword to saw them or cause them bee sawn . . . & the boards soe sawn of such Loggs or planke or slit worke, to be equally divided. . . .<sup>58</sup>

The variety of tools involved in transforming the logs into sawn "boards plank or Joce [joists]" can be seen in the inventory of Valentine Hill's estate, taken in 1661. Listed beneath the "Houses and

Lands att y<sup>e</sup> Mills” were the implements used to transport the hewn logs:

two Mast Chaines	010:00:-
two p <sup>r</sup> Mast wheels, w <sup>th</sup> Iron Workes, 3 p <sup>r</sup> logg wheels one p <sup>r</sup> Carte wheels	040:00:-

About the saw mill at Oyster River were the hand tools and ironwork of the mill which fashioned the timber:

4 Iron Crowes, two Eligers, one sledg, 5 sawes	008:05:-
2 Catt blocks . . . 13 old sawes . . . 14 Iron doggs . . .	004: --:-
9 beetle . . . olde Iron, 11 filles, five axes for wheles [?]	003:10:-
6 barres of steell . . . a Canoe . . .	005:00:-

Hill also owned many tools in the hands of the mill laborers, including, “One timber Chaine . . . five Axes . . . one spade; one broad Ax . . . [and] 2 Crosse Cut sawes.” In the hands of William Pitman, the mill’s blacksmith, were “A p<sup>r</sup> of smiths bellowes, an anvill, a beckorne [?] a vice, a sledg” valued at seven pounds.<sup>59</sup>

From this and other contemporary accounts, a composite mill settlement can be drawn. Located near a waterfall on one of the many tributaries of the Piscataqua or nearby rivers a dam fed the waters to a mill wheel through flumes constructed of wood. Logs were hauled or floated to the mill site, pulled by chains and wheels to the long rectangular shed of the mill itself. A series of saws, kept in working

order by the mill’s blacksmith cut the logs into lumber.

As most of the mills were up smaller tributaries, perhaps above other falls, the newly cut lumber had to be transported to a point of distribution. In 1669 one saw mill owner agreed to run

a covenient high way, for carting of boards or any manner of Sawn worke from y<sup>e</sup> sd Falls or mill . . . to some convenient place, for boates y<sup>t</sup> come from sea to take them in. . . .<sup>60</sup>

In this way the union between merchant and millwright formed a complete cycle. Together they often shared ownership of the means of production as well as the means of distribution, providing the two northern colonies with an expanding economy based upon the building needs of other colonies. A survey of the inventories of Maine and New Hampshire saw mill owners indicates that those who maintained major interests in one or more of these mills died with an estate in the upper five percent of their colony’s wealthiest men. Even individuals with smaller part interests in local saw mills left estates valued above the norm, usually in the upper twenty-five percent of recorded inventories. The success of the mills, which placed several merchant-owners among the elite of provincial society, fully justified the earliest interest shown by the original proprietors of the colonies in the 1630’s.

## APPENDIX

### A Checklist of Sawmills in Maine and New Hampshire, 1633 to 1700

Bishop’s 1868 list (I, 97-102) is so inaccurate as to be irrelevant to the fore-going study, which attempts to correct the most glaring errors. A serious effort has been made to eliminate references to the same mills under different owners, by

concentrating upon original town grants and the earliest deeds of sale. Later replacements and additional mills on the same sites have, however, been included.

Although an attempt has been made to be comprehensive, this checklist is un-

doubtedly incomplete. The loss of town records, court records, and other manuscripts especially for the area north of York, Maine, common to all studies of this period makes this list of value as a suggestion of the scope of the lumbering industry throughout the century.

The mills have been arranged within the six towns which granted the mill-right or in which the site was located. For this reason many mill sites are not described by the present town in which the site may fall, and in a few cases may be represented by two citations when two towns laid claim to a common river boundary.

**DOVER, N. H.:** Unless otherwise noted, each of the sawmills listed below are recorded as sawmill grants in the Dover Town Records under the dates cited. The original manuscript exists on microfilm, while the references below are published in H. Hurd's *History of Rockingham and Strafford Counties* (Phila., 1882).

July 1, 1642; Aug. 30, 1643 grants to Richard Walderne on the south side of Cochecho lower falls. The mill is called "old" in 1649, the year James Wall was building a new saw mill there (see text).

Dec. 27, 1647 grant to Nutter and Starbuck on Lamprey River (see text).

Oct. 23, 1649 grant to Wm. Pomfrett, T. Layton and John Dam on the Bellamy River.

Nov. 19, 1649 grant to V. Hill and T. Beard on Oyster River. Saw mill erected by 1651 (see text).

July 1, 1650 grant to T. Wiggin & S. Bradstreet on Quamphegan. Erected by 1659 (see "I. S." map).

July 4, 1650 grant to Wiggin and Bradstreet on the second falls at Cochecho.

July 7, 1652 grant to V. Hill on Lamprey River. Erected by 1657 (see text).

Dec. 5, 1652 grant to R. Walderne for north side, second falls at Cochecho.

Dec. 5, 1652 grant to W. Furbur, W. Wentworth, H. Langley, T. Canney, to Fresh Creek.

Dec. 5, 1652 grant to Ambrose Gibbons on Johnson's Creek.

Dec. 5, 1652 grant to J. Austin on Little John's Creek.

May 3, 1669 grant to R. Wadleigh at "Ileland Falls" on Lamprey River (see text).

**EXETER, N. H.:** Unless otherwise stated, dates are cited from the first volume of the *Exeter Town Records*. Asterisks (\*) indicate identical grants made by Dover and Exeter on the Lamprey River claimed by both towns.

Nov. 4, 1647 grant to erect saw mills on any river in Exeter, made to Edward Gilman and Anthony Stanyon.

\*Nov. 19, 1647 grant to Nutter and Starbuck on Lamprey River (see text).

March 22, 1649 grant to E. Hilton, James Wall, and others for a saw mill at Pascocke, running into Lamprey River. Erected by 1652.

March 22, 1649 grant at the falls "above the wigwams" on Lamprey River to N. Lissen, G. Barlow and others. Erected by 1652.

May 10, 1652 grant "by the bridge" on Lamprey River to the Gilmans, E. Colcord, and H. Wilson. Erected by 1653.

\*Aug. 7, 1652 grant to Valentine Hill for south side of Lamprey River.

By 1656 "saw-mills in Piscataqua River" of Capt. Thomas Wiggin, perhaps those in Dover. (Fitts, J., *History of Newfields, N. H.* [Concord, 1912], p. 197.)

May 11, 1657 grant on Exeter Falls to Edward Hilton, Jr.

\*June 3, 1669 grant to R. Wadleigh at "Ileland Falls" on Lamprey River (see text).

**PORTSMOUTH, N. H.:** Recorded in Volume I of the *Portsmouth Town Records*.

April 7, 1651 grant to Ambrose Lane on Sagamore Creek. Saw mill erected by 1655.

Feb. 21, 1658 grant to John Cutt and others on Fresh Marsh Creek.

HAMPTON, N. H.: Recorded in Volume I, Hampton *Town Records*.

Dec. 26, 1656 grant to Robert Page on Taylor's Creek. Saw mill erected by 1658.

KITTERY, MAINE: References to Maine saw mills are published in the early volumes of the *York County Deeds* unless otherwise cited. Double asterisks (\*\*) indicate grants made along the disputed Dover-Kittery boundaries by both towns.

1633-34 building contract for a sawmill at Asbenbedick Falls, Little Newichwannock River, erected for Capt. John Mason in 1634/5 (see text).

c. 1648 grant to H. Gayle and W. Ellingham, sawmill erected by 1651. (Deeds, I, 15)

1649 grant to N. Shapleigh, saw mill erected after 1651 (see text, Deeds, I, 13).

1651 Great Works River grant to Richard Leader (see text).

\*\*1652 Grant at Quamphegan to Wiggin and Bradstreet. (Deeds, I, 18)

By 1654 Saw mill below Great Works, erected by H. Chadborn (see text).

1659 Grant at Salmon Falls to John Wincoll, who has two saw mills there by 1671. (Deeds, III, 1)

By 1681 Saw mill at Spruce Creek, sold in 1681. (Deeds, III, 127)

YORK, MAINE: References to York *Deeds*, unless otherwise noted.

1634 F. Gorges erected a mill on what became "Old Mill Creek" (see text).

1651 grant on Cape Neddick River to E. Rishworth; sawmill erected by 1652. (Deeds, I, 15)

1652 grant to H. Gayle and W. Ellingham on Gorges Creek. (Deeds, I, 14 f)

1652 Two mills erected by Gayle, Ellingham, T. Clark, H. Webb and Rishworth; one on Old Mill Creek, another on Gorges Creek by 1653. (Deeds, I, 35, 36)

1655 grant to Henry Sayward on New Mill Creek; three mills erected, including that burned in 1669. (Deeds, I, 59)

1669 rebuilding on 1655 grant above (see text).

1669 grant on Cape Neddick; saw mill erected by 1672. (Deeds, II, 67)

1700 building contract for J. Pickering to build a saw mill "where the old saw mill stood" (see text).

WELLS, MAINE:

1650 grant to Rev. John Wheelwright to the Ogunquit Falls. (Deeds, I, 12)

1660 Little River grant sold to F. Littlefield, mills erected by 1663. (Deeds, I, 126)

c. 1670 H. Sayword grant on Cape Porpoise; erects Mousam Mills (see text).

c. 1680 Gilbert Endicott has mill on Cape Porpoise River by 1682. (Me. Ct. Records, III, 163)

By 1682 Wm. Frost's mill (Me. Ct. Records, III, 163)

By 1682 Kenebunk mill (Me. Ct. Records, III, 163)

SACO, MAINE:

Sept. 27, 1653 grant to Roger Spence; sawmill erected by 1659. (Town Rec., v. I)

1653 grant to John Davis for forge and saw mill. (Town Rec., v. I)

1661 grant to W. Phillips. (Deeds, I, 123)

By 1682 Mr. Blackman's saw mill (Me. Ct. Records, III, 163)

By 1682 Thomas Doughty's saw mill (Me. Ct. Records, III, 163)

By 1685 Robert Booth's saw mill (Me. Ct. Records, III, 214)

1686 mill grant to F. Backhouse and J. Hill. (Deeds, IV, 161)

CASCO:

c. 1675 Wescustogo, Casco Bay, grant to H. Sayword and Benj.<sup>a</sup> Gedney; saw mill erected by 1676. (Deeds, II, 188)

c. 1680 Walter Gyndall's saw mill, erected by 1682. (Me. Ct. Records, III, 163)

c. 1680 Samuel Webber's saw mill, erected by 1682. (Me. Ct. Records, III, 163)

FALMOUTH:

1680 grant to J. and G. Ingersol "where the old sawmills were," erected by 1683. (Deeds, III, 125)

## NOTES

- <sup>1</sup> N. H. *Provincial Records*, I, 1; the original MS. is lost, but was first published by Jeremy Belknap in *The History of New Hampshire*, vol. I, Appendix II (Phila., 1784).
- <sup>2</sup> John S. Jenness, ed., *Transcripts of Original Documents in English Archives Relating to the Early History of the State of New Hampshire* (N. Y., 1876), p. 18.
- <sup>3</sup> Mass. Archives, III, 437.
- <sup>4</sup> Mass. Archives, III, 444.
- <sup>5</sup> Libby, Noyes, Davis (eds.), *Genealogical Dictionary of Maine and New Hampshire* (Portland, 1928-1938), pp. 133-134; George F. Dow, *Records and Files of the Quarterly Courts of Essex County, Massachusetts* (Salem, 1911-1921), I, 281, 202.
- <sup>6</sup> Ferdinando Gorges, *Briefe Narration . . .* (London, 1658), quoted in J. P. Baxter, *Sir Ferdinando Gorges and His Province of Maine* (Boston, 1890), II, 58.
- <sup>7</sup> John Winthrop, *Journal* (Savage ed.), I, 129.
- <sup>8</sup> N. H. *Provincial Deeds*, I, 3-6.
- <sup>9</sup> N. H. *State Papers* (Concord, 1867- ), XL, 124 f.
- <sup>10</sup> Suffolk Co. (Mass.) *Deeds*, I, 109.
- <sup>11</sup> *Ibid.*, I, 109.
- <sup>12</sup> Arthur Gilman, *The Gilman Family* (Albany, 1869), pp. 35-37; Norfolk Co. *Deeds* (Salem, Mass.), I, 17-18.
- <sup>13</sup> Norfolk Co. *Deeds*, I, 41a.
- <sup>14</sup> Essex Co. *Deeds*, I, 18; quoted in E. N. Hartley, *Ironworks on the Saugus* (Norman, Okla., 1957), p. 134.
- <sup>15</sup> Winthrop Papers, MSS., Mass. Historical Soc., II, 39.
- <sup>16</sup> *Province and Court Records of Maine* (Portland, 1932), Vol. I, p. 161.
- <sup>17</sup> Hartley, *op. cit.*, pp. 65-66, 135; N. B. Shurtleff (ed.), *Records of the Governor and Company of Massachusetts Bay* (Boston, 1853), III, 227, 257.
- <sup>18</sup> Dow, *op. cit.*, I, 251.
- <sup>19</sup> *Ibid.*, I, 251; York (Me.) *Deeds*, IV, 153.
- <sup>20</sup> York *Deeds*, I, 57, 74.
- <sup>21</sup> *Ibid.*, I, 103.
- <sup>22</sup> *Ibid.*, X, 113.
- <sup>23</sup> *Ibid.*, II, 69.
- <sup>24</sup> "Pascatway [*sic*] River in New England by I. S.," MS. map c. 1655, British Museum, Crown Collection, Topography, CXX, 27.
- <sup>25</sup> Suffolk *Deeds*, I, 106.
- <sup>26</sup> *Ibid.*, I, 182.
- <sup>27</sup> *Ibid.*
- <sup>28</sup> Mass. Historical Soc., Misc. Bound MSS., Vol. 2, MS. p. 5.
- <sup>29</sup> Libby, *et al.*, *op. cit.*, p. 610; York *Deeds*, III, 40; Curwin Family MSS., Essex Institute, Vol. 4, Confirmation of Town Grant March 25, 1679; Articles of Agreement July 16, 1680.
- <sup>30</sup> "Wells Ledger," Curwin Family MSS., Vol. 2, MS. p. 5.
- <sup>31</sup> *Ibid.*, pp. 13, 38; "Account of all the boards that hath ben sawn . . ." June 3, 1682, Curwin Family MSS., Vol. 2 (n.p.)
- <sup>32</sup> York *Deeds*, II, 114.
- <sup>33</sup> N. H. *Provincial Records*, I, 358.
- <sup>34</sup> *Ibid.*, I, 57.
- <sup>35</sup> *Ibid.*, I, 358.
- <sup>36</sup> N. H. Probates, No. 15; Libby, *et al.*, *op. cit.*, pp. 714, 133-134.
- <sup>37</sup> *Ibid.*, pp. 610, 262-264, 437, 551; see also Charles E. Banks, *Topographical Dictionary of 2885 English Emigrants to New England*. 3rd ed. (Baltimore, 1963), pp. 46, 63, 117, 174.
- <sup>38</sup> I am indebted to Dr. A. L. Cummings for lending me his notes on power saw mills provided by G. J. Eltringham of the Univ. of Nottingham, who has studied the subject of English powered sawing. Also the correspondence between Dr. Cummings and Mr. L. J. Turner of Hertfordshire has indicated the known sources of English and Dutch wind-driven "Paltrok" mills. The first English wind-powered saw mill of 1633 is noted in Rex Wailes, *The English Windmill* (London, 1954), p. 144. The 1592 Dutch invention of Cornelius Cornelioz is described in F. Stokhuyzen, *The Dutch Windmill* Eng. ed. (London, 1963), p. 53. Mr. Turner notes that Schenk's view of London may be seen in K. G. Farries and M. T. Mason, *The Windmills of Surry and Inner London* (London, 1966), Plates 55 and 57.
- <sup>39</sup> Mr. Turner notes the opposition of sawyers to power saw mills in Farries and Mason, *op. cit.*, p. 234.
- <sup>40</sup> The construction of sub-medieval windmills in Essex, dating up to 1683, is to be seen in Cecil Hewett, "Some Developments in Car-

penry, Illustrated by Essex Millwrighting," *The Art Bulletin*, L (1968), 70-74; water-powered gristmills are noted throughout Medieval England, such as the "duo molendina aquatica" (two water mills) listed in the "Extent of the Manor of Chaddesley . . ." (Worc.), 1290 A.D., translated in J. W. Willis-Bund, *Inquisitiones Post Mortem for Worcestershire* (Worc. Historical Soc., 1894), XX, 30.

<sup>41</sup> [E. Williams], *Virginia: . . . Richly and truly valued . . .*, 2nd ed. (London, 1650), Appendix (n.p.).

I am gratefully indebted to Mr. Edwin Battison, Assistant Curator of the Division of Civil and Mechanical Engineering at the Smithsonian Institution, for pointing out early published sources for saw mills. There were two hand and pendulum powered saw mills illustrated in F. Beroald, *Theatre Des Instrumens Mathematiques & Mechaniques de Iaques Beson Dauphinois . . .* (Lyon, 1578). Mr. Battison's own research indicates that this French work was known in England during the seventeenth century.

Works such as this could easily have been the "model" used in the 1630's to provide construction information to English carpenters unfamiliar with building saw mills.

<sup>42</sup> Public Record Office, London, Document No. CO 700/N.Hamps. 7.

<sup>43</sup> Mass. Archives, LIX, 95; N. H. Court Papers, I, 231-252.

<sup>44</sup> N. H. Court Papers, I, 237.

<sup>45</sup> York Deeds, I, 126; Dow, *op. cit.*, III, 196 n.

<sup>46</sup> N. H. Court Papers, I, 237.

<sup>47</sup> Dow, *op. cit.*, III, 347 n.

<sup>48</sup> *Ibid.*, III, 348 n.

<sup>49</sup> N. H. Court Papers, I, 249.

<sup>50</sup> *Ibid.*, I, 249.

<sup>51</sup> York Deeds, III, 1.

<sup>52</sup> Hartley, *op. cit.*, p. 183. Also, see deeds for the full or partial role of saw mills as cited in other footnotes for reference to dams and flumes.

<sup>53</sup> York Deeds, VIII, 223.

<sup>54</sup> N. H. Probates, No. 15.

<sup>55</sup> York Deeds, IV, 161.

<sup>56</sup> N. H. *State Papers, op. cit.*, XXXI, 759; N. H. Court Papers, I, 249.

<sup>57</sup> York Deeds, I, 17.

<sup>58</sup> *Ibid.*, II, 164.

<sup>59</sup> Inventory of Valentine Hill, Mass. Archives, Vol. 15B, pp. 16-18; York Deeds, VI, 127.

<sup>60</sup> York Deeds, III, 103.

*Continued from page 130*

head of water," which means that their estimate represented a maximum output, and suggests that during the "season," a mill might indeed operate 24 hours a day. Richard Currier, who "had a mill upon the same river," as the one about which Greeley and Allen gave testimony, deposed at the same time that his mill had "sawed the past spring about five or six thousand feet of boards a week for three months." (*Q C R*, VIII, 374.)

<sup>55</sup> The author is greatly indebted to Mr. Gordon Saltar, wood anatomist at the Henry Francis duPont Winterthur Museum, for the precise identification of the woods discussed in this article.

<sup>56</sup> *History of Hadley, Massachusetts* (Springfield, 1905), pp. 430-431, 295.

<sup>57</sup> Ellicott/Evans, Pt. V, p. 90.

<sup>58</sup> This principle is acknowledged in Jacques Besson, *Theatrum Instrumentorum et Machinarum* (Lyon, 1582), Plate XIV, where an unbelievably handsome crosscut blade is illustrated.

<sup>59</sup> *The Records of the Town of Cambridge, Massachusetts, 1630-1703* (Cambridge, 1901), p. 201.

<sup>60</sup> Quoted in John Robinson, *The Flora of Essex County, Massachusetts* (Salem, 1880), pp. 95-96.

<sup>61</sup> *Q C R*, VIII, 253.

<sup>62</sup> Research conducted by Charles F. Hummel, in the files of the curator of the Winterthur Museum, would suggest a date of construction of the Seth Story house as 1684. A room from the house has been installed in that museum.

<sup>63</sup> See the unpubl. Account Book of Hananiah Parker, second signature, p. 32, in the MS. collections of The New England Historic Genealogical Society.

<sup>64</sup> See Ralph Edwards, *The Shorter Dictionary of English Furniture* (London, 1964), p. 403.

<sup>65</sup> Douglass, II, 55.

<sup>66</sup> Douglass, II, 69.

<sup>67</sup> *Manual of the Trees of North America*, 2 Vols. (New York, 1961), I, 255-256.