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Materials in Early New England

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THE history of building as a result of the Great Migration from England to New England in the early seventeenth century is currently the object of renewed and modern investigations. New and precise techniques are being developed, and new relationships between the colonial buildings and their European prototypes are being explored. The following comments are intended to supplement these studies by reviewing the material situation for building in which the colonists found themselves, their sources of information, and their initial responses to the new conditions.¹

The Spanish and Portuguese dominated exploration and settlement of the New World for nearly a century after Columbus' first voyage, motivated by the search for riches and zeal for conversion of the heathen. The English were also definitely interested, as witness the letters patent issued by Henry VII to John Cabot, March 8, 1496, "to seeke out, discover and finde whatsoever isles,

countreys, regions or provinces of the heathen and infidels whatsoever they may be, and in what part of the world soever they may be, which before this time have been unknowen to all Christians."² Cabot sailed from Bristol on May 2, 1497, reached probably what is now Cape North on Cape Breton Island, and took possession in the name of Henry VII, thinking he had reached the northeast coast of Asia. This is the traditional basis of English claims to territories in America.

For many years, however, English enterprises remained mostly confined to fishing off the coast of Newfoundland, largely because England's energies were absorbed by problems over the Reformation at home and the struggles against France and Spain abroad. But the presence of the Spanish in southern Atlantic waters kept alive the desire to find a northwest passage to India, and the resources of the land itself, apart from fishing banks, gradually became known. One of the earliest accounts of the Nova

Scotia region was published by Jacques Cartier in 1545, in which he said that "on both sides of the said [St. Croix] river there are very good and faire grounds, full of as faire and mightie trees as any be in the world, and divers sorts, which are above ten fathoms higher than the rest. . . . Moreover there are great store of Okes the most excellent that ever I saw in my life, which were so laden with Mast that they cracked againe, besides this there are fairer Arables, Cedars, Beeches, and other trees then grow in France."⁸

By 1578 there was enough interest in settlement, with the support of Queen Elizabeth I, that letters patent were granted to Sir Humphrey Gilbert on June 11, 1578, "for the inhabiting and planting of our people in America . . . to goe and travell thither, to inhabite or remaine there, to build and fortifie."⁴ Gilbert and such others as Sir Martin Frobisher were still hoping to find gold and to realize a quick return on their investments, but others, particularly the Hakluyts, were thinking in more permanent terms. The elder Richard Hakluyt, a lawyer with strong commercial interests, supported the venture of Gilbert and wrote in his *Notes* for a proposed colony in 1578: "Stone to make Lyme of, Slate stone to tyle withall, or such clay as maketh tyle, Stone to wall withall, if Brycke may not bee made, Timber for building easely to be conveyed to the place, Reede to cover houses or such like, if tyle or slate be not, are to be looked for as things without which no Citie may be made nor people in civil sort be kept together."⁵ Hakluyt saw a number of reasons in favor of acquiring lands in temperate climates, including a new outlet for the then sagging woolen industry. His younger cousin, also named Richard

Hakluyt, the geographer, published these notes in *Divers Voyages* in 1582, a collection of geographical accounts which he had assembled and which provided the first report published in English from America.

Anthony Parkhurst, writing to Hakluyt from Gilbert's expedition, reported in 1578 on the *True State and Commodities of Newfoundland*, noting fir, pine, oak and thorn, birch and alder, which latter he said was the "meetest wood for cole."⁶ On the second voyage of 1583 Gilbert perished, but more resources were reported. Edward Haie spoke again of fir and pine and now cypress, "all yielding gumme and turpentine. . . . Iron very common, lead, and somewhere copper."⁷ In the same year George Peckham put a clearer case for settlement, recommending Newfoundland "to the noblemen and gentlemen, who doe chiefly seeke a temperate climate, wholesome ayre, fertile soile, and a strong place by nature whereupon they may fortifie, and there either plant themselves, or such other persons as they shall thinke good to send to bee lords of that place and cuntry . . . there may be very easily made Pitch, Tarre, Rosen, Sope ashes in great plenty, yea, as it is thought, inough to serve the whole realme of every of these kindes."⁸ He also noted the available woods: palm, cedar, fir, sassafras, oak, elm, poplar. Here were the hopes of an independent source of commodities which were then being purchased from France and Spain. Gilbert's attempt failed and was followed by Raleigh's unsuccessful efforts to colonize Virginia in 1584-1586. The war with Spain had begun, with the Armada threatening England in 1588, and colonizing and publishing activities slowed until the peace with Spain in 1604.

Then on April 10, 1606, James I issued the First Charter of the Virginia Company of London, "our licence to make habitacion, plantacion and to deduce a colonie of sondrie of our people into that parte of America commonly called Virginia."⁹ Richard Hakluyt was among the patentees. In 1607 the London Company sent the first plantation to Jamestown, under Captain Christopher Newport, and this colony became permanent.

In the same year the Plymouth Company sent a plantation to Sagadahoc on the Kennebec River, under George Popham and Raleigh Gilbert. This, in spite of a fairly extensive building campaign, was abandoned a year later, the contemporary account ending mournfully, "and this was the end of that northern colony upon the river Sachadahoc."¹⁰ This was closer than Newfoundland to the part of New England that was about to be extensively developed. John Smith, writing his *Description of New-England* in 1614, spoke of the Massachusetts coast as consisting of "tracts of long ledges of diuers sorts, and quarries of stones in other places so strangely diuided with trinctured veines of diuers colours: as Free stone for building, Slate for tiling, smooth stone to make Fornaces and Forges for glasse or iron, and iron ore sufficient, conueniently to melt in them: but the most part so resembleth the coast of Devonshire, I thinke most of the cliffes would make such limestone." He also spoke of the "greatness of the timber . . . and the moderate temper of the air. Oke, is the chiefe wood; of which there is great difference in regard of the soyle where it groweth. Firre, pyne, walnut, chesnut, birch, ash, elme, cypresse, ceder, mulberrie, plumtree, hazell, saxefrage, and

many other sorts."¹¹ This was certainly an encouraging report.

A similar report of abundance was made promptly in 1629 at the beginning of the Great Migration by Francis Higginson in *New-Englands Plantation*. "It is thought here is good clay to make bricke and tyles and earthern-pot as need to be. At this instant we are setting a brick-kill on worke to makde bricces and tiles for the building of our houses. For stone, here is plentie of slates at the Isle of Slate in Massachusetts Bay, and limestone, free-stone, and smoothstone, and iron-stone, and marble-stone also in such store, that we have great rockes of it, and a harbour hard by. . . . For wood there is no better in the world I thinke, here being found foure sorts of oke differing both in the leafe, timber, and colour, all excellent good. There is also good ash, elme, willow, birch, beech, sasafra, juniper, cypress, cedar, spruce, pines and firre that will yield abundance of turpentine, pitch, tarre, masts, and other materials for building both of ships and houses."¹²

More detailed descriptions of resources appeared shortly. Thomas Morton's *New English Canaan* of 1632 includes listing of trees and the uses to which the wood could be put. To mention only oak, he spoke of "two sorts, white and red, excellent timber for the building, both of houses, and shipping, and they are found to be a timber that is more tough than the oak of England."¹³ Then William Wood described oak in *New Englands Prospect* in 1634: "there be three kinds, the red Oake, white, and blacke; as these are different in kinde, so are they chosen for such uses as they are most fit for, one kind being more fit for clappboard, others for sawne board, some fitter for shipping, others for houses."¹⁴ But he did not say which was which.

Knowledge of the exact woods used in seventeenth-century buildings will probably always depend more on examination of the buildings themselves than upon documentation. Dimensions are of course plentiful in contemporary records. But the kind of oak or pine used for posts or planks is rarely specified. The meeting-house records are particularly disappointing in this respect. In only half a dozen cases is any particular kind of wood specified at all, the most definite being the "white or swamp oak" ordered for "sleepers" at Sudbury, Massachusetts, in 1652.¹⁵ Cedar shingles are specified twice in the 1680s, a departure from the English custom of using oak.¹⁶ The close, straight grain of cedar was found to be easier to handle, and the shingles about as durable as those of oak.

The forests were not in an unaltered state of nature when the English settlers began to use them. The Indians were in the habit of burning the undergrowth to keep the forests open for travel and hunting, making them more parklike than jungly. Thomas Morton may again be quoted: "The burning of the grasse destroys the underwoods, and so scorseth the elder trees, that it shrinkes them, and hinders their growth very much: So that he that will look to find large trees, and good tymber, must not depend upon the help, of a wooden prospect to finde them on the upland ground; but must seeke for them, (as I and others have done) in the lower grounds where the grounds are wett when the country is fired: by reason of the snow water than remains there for a time."¹⁷

What is now New England was virtually covered by forests in the 1620s, except for lakes and bogs, an estimated total of 95 percent of the land forested. The pattern of settlement around Mas-

sachusetts Bay and along the Connecticut River is a familiar one and was accompanied by deforestation for planting and for use of the timber. By the beginning of the twentieth century the proportion of virgin forest in the whole New England area was about reversed from its original state, the estimated virgin forest area having been reduced from 95 percent to 5 percent of the total area.¹⁸ The trees now replacing those long since felled in the early communities are not necessarily the same kinds of trees that grew when some of the early houses were built.

The first sawmill seems to have been near York, Maine, about 1633, and several others are known to have been operating in various towns by the 1650s.¹⁹ The origin of these mills is an interesting question. According to tradition, a Mr. Francis Webb brought a sawmill with him on the *Lyons Whelp* from Dorset in 1629 to set up in Massachusetts. The Massachusetts Bay Company *Records* do indicate the sailing of the *Lyons Whelp* from Dorchester in March of 1628/1629.²⁰ At the General Court of May 7, 1629, it was decided that "letters are to be written about Mr. Francis Webb's business for a mill."²¹ Then the Second Letter from Governor Cradock in London to Governor Winthrop in Massachusetts, May 28, 1629, gave instructions "to give approbation and furtherance to Francis Webb in setting up his saw mill."²² This is in a paragraph in which emigrants from Dorset are mentioned. But nowhere is the statement clearly made that Webb actually brought the pieces of the mill with him from England. He was not a colonist, but an adventurer in London, and he shortly after this disappears from the records.

The matter is further complicated by the belief that sawmills were unknown

in England until about 1663.²³ Yet saw-mills were in use in Norway from the sixteenth century, and Richard Hakluyt the Elder, in his *Notes of 1578*, had said matter-of-factly, "If you find great plentie of tyMBER on the shore side or upon any portable river, you were best to cut downe of the same the first winter, to be seasoned for ships, barks, boates and houses. And if neere such wood there be any river or brooke upon the which a sawing mill may be placed, it would doe a great service, and therefore consideration would be had of such a place."²⁴ In 1650 Edward Williams published a drawing of a sawmill in his *Virginia Richly and Truly Valued*, with an "Explication" and the comment that "This engine is very common in Norway, and mountains of Sweden."²⁵ Recent studies indicate the importation of such mills to New England by Scottish emigrants.²⁶ This route of timber technique was probably the result of the trade between Scotland and Norway in the sixteenth century.

Awareness of the rapidity of deforestation prompted a remarkable early speculation on its effects on climate which was communicated to the Royal Society of London in 1676: "That in America (at least as far as the English plantations are extended) there is an extraordinary alteration as to temperature, since the Europeans began to Plant there first, is the Joynt assertion of them all; neither hath it near so many admirers, as witnesses; in regard that this change of temperature is, and not without some reason, generally attributed to the cutting down of vast woods, together with the clearing and cultivating of the Country."²⁷ Unfortunately the nature of the alleged change is not given.

That the other natural material, stone, was rarely used in early New England

is well known. In cost, under the circumstances, stone could hardly compete with wood, and then there was the problem of mortar. In the case of limestone the early reports had been more optimistic than accurate, and there was in fact little limestone available for the making of mortar except in Rhode Island near Providence, though more was later discovered in western Massachusetts. Shells were substituted, as clay mortar could not withstand the severe climate.

In 1631, on October 30, "the governor having erected a building of stone at Mistick, there came so violent a storm of rain, for twenty-four hours, from the N.E. and S.E. as (it being not finished and laid with clay for want of lime) two sides of it were washed down to the ground, and much harm was done to other houses by that storm."²⁸ This was probably a great disappointment, for three days later the governor's wife Margaret and son John, Jr., arrived aboard the *Lyon*, only to hear news of the disaster. An appeal for help was evidently sent back to England, for a letter in the following March to John Winthrop, Jr., from his friend Edward Howes in England, gives a recipe: "2 loads of waste soap-ashes, one load of lime, one load of loam, and one load of Woolwich sand, tempered together. Another man used only loame and soap ashes tempered together instead of mortar, whereby he laid the foundations, chimnies and their tunnels, etc., of above threescore houses in London and the suburbs. . . . I am credible informed that clay, otherwise called loam and horse or cow dung tempered together will make an exceeding strong binding mortar."²⁹

To turn to the manufactured materials, the difficulties in finding lime and making mortar did not rule out the mak-

ing and use of brick at this time. The famous "10 thousand of bricks" in a ship going to New England, one of the earliest entries of the Massachusetts Bay Company *Records*, in 1628-1629, was probably intended for use in chimneys.³⁰ And then Francis Higginson has already been cited as reporting a brick works in progress in 1629. Very few entire buildings appear to have been built of brick until the end of the seventeenth century. There appear to have been some brick houses in Boston by 1654, and then in the 1670s, '80s and '90s perhaps nine houses in Boston, Medford and Haverhill, plus one or two buildings at Harvard.³¹ Perhaps there were others, but these buildings are mentioned in order to draw attention to the concentration of the early entire brick buildings in the Boston-Medford-Haverhill area. In other parts of New England at this time bricks were used for chimneys or for fill. The prosperity and development of the Boston area may be reflected in this pattern. The necessary materials were at hand, however, the Merrimack valley being especially rich in fine clays from the post-glacial lakes. Marine clays were deposited by the post-glacial seas, supplying even now brickyards in such towns as Rochester, Epping and Exeter in New Hampshire. The other principal deposits of clays are in the Connecticut River valley, where buildings entirely of brick seem to have come later, in the middle of the eighteenth century.

Another material which was manufactured from early years of settlement was iron. John Smith had mentioned the presence of iron ore in 1614, as noted. The deposits of bog ore in peat bogs around Lynn, Massachusetts, were used in the development of the iron industry at Braintree and Saugus in the 1640s.

The history of these works has been well studied and needs no further elaboration here.³²

The history of glassmaking in the New England colonies has been less carefully investigated. In December of 1641 there was discussion of lending money to the glassmen at Salem. But in 1645 their works were apparently not functioning, since they are referred to as those "which the undertakers have for these three years neglected."³³ Little more seems to be known about glassmaking efforts until the eighteenth century. Several factors may have contributed to the ineffectiveness of this industry in New England: the limited use of glass in building and furnishing, the current vigor of the industry in England with export of glass to the colonies and, as a result of this active industry in England, the lack of incentive for the few and highly specialized glassworkers to migrate.³⁴

The kinds of tools used in early New England have also been extensively studied, but there is one other matter which it seems appropriate to mention in connection with materials, the question of standard measurements. The need for standards for purposes of price control, to say nothing of convenience, was recognized almost immediately in Massachusetts Bay. It was ordered on May 18, 1631, that common weights and measures were to be established by June 30.³⁵

We don't know whether this was accomplished so quickly, but on June 3, 1635, it was "ordered that every towne within this jurisdiction shall provide a pecke and a bushel, as also for weights as quarter, halfe a pound, 1, 2, 3, 4, 7, and 14 pounds, as also a meate yard, all to be made by the standard at Boston, and sealed by James Penny, the marshall, before the General Court, in September,

under the penalty of forty shillings for every defect."³⁶ This applied to the Boston area only and did not mean that there were then standard measures throughout New England. Nationwide standards were not, as it happened, adopted until the 1830s.

These various manufacturing enterprises are of course included in the later descriptions of historians and travelers, from which may be chosen Samuel Maverick's mention of Malden, Massachusetts, in his *Briefe Description of New England*, c. 1660, which speaks of the inhabitants of Malden as employing themselves "much in furnishing the Towne of Boston and Charles Towne with wood, Timber and other Materials to build withall,"³⁷ brick probably being among them. Oak and pine particularly were also exported to England and France in the seventeenth century.

Studies of English and French buildings of this period do not seem to be much concerned with the use of woods imported from New England. More careful attention to such imports might prove useful in these studies.

In 1614 John Smith had concluded about New England, "And of all the foure parts of the world that I haue yet seene not inhabited, could I haue but meanes to transport a Colonie, I would rather liue here than any where."³⁸ Nearly forty years later the success of such a colony was hailed by Edward Johnson in his *Wonder-Working Providence*: "Thus hath the Lord been pleased to turn one of the most hideous, boundless and unknown wildernesses in the world in an instant, as 'twere (in comparison of other work) to a well-ordered Commonwealth."³⁹

NOTES

¹ This paper was presented at the annual meeting of the Society of Architectural Historians, January 28–February 2, 1969, in Boston, Mass.

² "The letters patent of K. Henry the 7. granted unto John Cabot and his 3. sonnes, Lewis, Sebastian, and Sancius, for the discovery of new and unknowen lands, Anno 1495," in Richard Hakluyt, *The Principal Navigations, Voyages Traffiques & Discoveries of the English Nation* (Edinburgh, 1914), VII, 143.

³ Jacques Cartier, "The Third Voyage of Discovery made by Captaine Jaques Cartier," Hakluyt, *op. cit.*, VIII, 267.

⁴ "The Letters Patents graunted by her Majestie to Sir Humfrey Gilbert knight, for the inhabiting and planting of our people in America," Hakluyt, *op. cit.*, VIII, 17.

⁵ Richard Hakluyt the Elder, "Notes," Hakluyt, *op. cit.*, VII, 244.

⁶ Anthony Parkhurst, "A letter written to M. Richard Hakluyt of the middle Temple, containing a report of the true state and com-

modities of Newfoundland," Hakluyt, *op. cit.*, VIII, 11.

⁷ Edward Haie, "A report of the voyage and successe thereof, attempted in the yeere of our Lord 1583 by sir Humfrey Gilbert knight," Hakluyt, *op. cit.*, VIII, 58-60.

⁸ George Peckham, "A true Report of the late discoveries," Hakluyt, *op. cit.*, VIII, 113-117.

⁹ *The Three Charters of the Virginia Company of London* (Williamsburg, Va., 1957), p. 1.

¹⁰ James Davies, attr., "Relation of a Voyage to Sagadehoc," in Henry S. Burrage, ed., *Early English and French Voyages* (New York, 1932), p. 419.

¹¹ John Smith, "Description of New-England," in Peter Force, *Tracts* (New York, 1947), II, No. 1, pp. 5-6.

¹² Francis Higginson, "New-England's Plantation," *Collections of the Massachusetts Historical Society*, Series 1, Vol. 1 (1792), 118-119.

- ¹³ Thomas Morton, "New English Canaan," Force, *op. cit.*, Vol. II, No. 5, p. 43.
- ¹⁴ William Wood, *New England's Prospect* (Boston, 1865), p. 18.
- ¹⁵ Town Records, Sudbury, Mass., p. 293, November 27, 1652.
- ¹⁶ Alec Clifton-Taylor, *The Pattern of English Building* (London, 1962), p. 54.
- ¹⁷ Morton, *op. cit.*, p. 37.
- ¹⁸ E. Lucy Braun, *Deciduous Forests of Eastern North America* (New York and London, 1964), p. 424.
- ¹⁹ J. Leander Bishop, *History of American Manufactures* (Philadelphia, 1868), I, 93-99.
- ²⁰ *The Records of the Governor and Company of the Massachusetts Bay in New England* (Boston, 1853), I, 36.
- ²¹ *M.B.C. Records*, I, 39.
- ²² *M.B.C. Records*, I, 401.
- ²³ Bishop, *op. cit.*, I, 93.
- ²⁴ Hakluyt the Elder, *op. cit.*, p. 248.
- ²⁵ Edward Williams, *Virginia Richly and Truly Valued* (London, 1650), quoted in Bishop, *op. cit.*, I, 112-113.
- ²⁶ Paper by Richard M. Candee, "Immediate Sources of 17th-Century Vernacular Houses in New England: Maine and New Hampshire," presented at the annual meeting of the Society of Architectural Historians, January 28-February 2, 1969, in Boston, Mass.
- ²⁷ *Philosophical Transactions*, Vol. XI No. 127 (July 13, 1676), p. 648.
- ²⁸ John Winthrop, *Winthrop's Journal* (New York, 1908), I, 69.
- ²⁹ John Winthrop, Jr., *The Winthrop Papers* (Boston, 1929-1947), III, 73.
- ³⁰ *M.B.C. Records*, I, 23.
- ³¹ Hugh Morrison, *Early American Architecture* (New York, 1952), p. 72.
- ³² E. N. Hartley, *Ironworks on the Saugus* (Norman, 1957).
- ³³ *M.B.C. Records*, I, 137.
- ³⁴ Pearce Davis, *The Development of the American Glass Industry* (Cambridge, Mass., 1949), pp. 21-23.
- ³⁵ *M.B.C. Records*, I, 87.
- ³⁶ *Ibid.*, p. 148.
- ³⁷ Samuel Maverick, "A Briefe Description of New England," in *Proceedings of the Massachusetts Historical Society*, Series 2, Vol. I (1885), p. 236.
- ³⁸ John Smith, *op. cit.*, p. 6.
- ³⁹ Edward Johnson, *Johnson's Wonder-Working Providence* (New York, 1910), p. 248.