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### Deforestation in Nineteenth-Century Maine: The Record of Henry David Thoreau

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GEOFFREY PAUL CARPENTER

DEFORESTATION IN NINETEENTH-CENTURY MAINE:  
THE RECORD OF HENRY DAVID THOREAU

*Thoreau's MAINE WOODS, a record of three trips made between 1846 and 1857, offers a combination of literary metaphor and precise botanical and topographical observation. Comparing Thoreau's journals with recent advances in forest ecology, author Geoffrey Paul Carpenter reveals a detailed picture of the various ways in which logging activity changed the forests, lakes, and rivers of Maine. Carpenter demonstrates that a precise understanding of forest history depends not only on traditional statistical sources, but also on the subjective personal testimony found in the literary record.*

On August 31, 1846, Henry David Thoreau left his temporary home on Walden Pond for Bangor, Maine, on a trek to Mount Katahdin, the highest peak in the state. His journey would take him to the booming mill towns of Bangor and Old Town, up the Penobscot River, and through some of Maine's most productive timber country. Over the next eleven years, Thoreau would take two more extended trips to Maine, exploring the waterways, woods, and lakes of the northern frontier. The journals he kept on these excursions provided the material for three essays and a sizable appendix, published collectively as *The Maine Woods*.<sup>1</sup>



In his literary masterpiece, *The Maine Woods*, Henry David Thoreau left an incredibly rich record of the expanding lumber industry and the ways in which it was changing the Maine woods. The image above was taken from a 1856 daguerreotype by B. D. Maxham of Worcester, Massachusetts.

Interspersed with Thoreau's philosophical musings and his accounts of the events of each trip are detailed observations on the rapidly expanding timber industry. As he and his fellow travelers explored the Maine woods, Thoreau noted the changing conditions of the forest environment, making frequent references to land-clearing techniques practiced by both loggers and farmers.

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While in the past Thoreau has been studied primarily as a literary figure, much can be gained now, in light of advances in forest ecology, by re-examining *The Maine Woods* as a resource for environmental history. Most studies of the Maine woods rely on U.S. census figures, geographical surveys, or mill ledgers to estimate the extent of anthropogenic changes in this period. These sources can provide us with valuable statistical analysis of board feet harvested, economic value of forest products, or geographical distribution of timberland and agricultural land, but they do not adequately describe the actual condition of altered forests. If we are to understand how human activities changed nineteenth-century Maine, we must make use of information available in the form of personal testimony. Although Thoreau was not primarily concerned with threats to the Maine woods, the effects of deforestation were everywhere apparent, and details of these changes found their way into his narratives.

We are now aware of a variety of factors that contribute to contemporary deforestation, including agricultural clearing, fires, and commercial lumbering. From what we can ascertain from Thoreau's journals, these same forces were beginning to effect dramatic changes on New England's forests in the mid-nineteenth century. During his travels, Thoreau constantly searched for the legendary white pine, but found that loggers had been so successful in their pursuit of these old giants that the trees were quite scarce. All along his travel routes Thoreau saw signs of civilization, and only the remote and rocky slopes of Katahdin appeared free of human presence. In *The Maine Woods*, Thoreau records images from a world in transition, giving us insight into a pivotal period in America's environmental history when anthropogenic changes were beginning to occur on such a large scale that they dramatically and permanently altered what then seemed to be a limitless and indomitable American wilderness.

### **Thoreau the Naturalist: A Competent Observer**

Best known as a man of letters and philosophy, Thoreau was also a keen observer of American flora and fauna and a studied

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naturalist. In his day, a college education was a privilege afforded to very few, yet he was fortunate enough to have attended Harvard from 1833 to 1837. In addition to taking the requisite courses in classics, math, and modern languages, he also took Latin and natural history. His interests were, even in those early years, related to nature. Thoreau's days at Harvard not only made him a better writer, but a better naturalist, and the journals he kept throughout his life are filled with detailed descriptions of plant and animal species. In 1859 he was appointed to Harvard's Committee for the Examination of Natural History, and he submitted natural history specimens to Louis Agassiz, a renowned Swiss scholar on glaciers and ichthyology who had been working on classifying North American fauna. A dedicated scholar, Thoreau read Darwin's *Origin of Species* with great interest and even tried to replicate Darwin's observations regarding the competition for space among plants by conducting his own experiment with acorns.<sup>2</sup>

Before all his journeys, Thoreau would prepare himself thoroughly by reading geographical descriptions or historical accounts of the region. Other than loggers, few whites had reason to explore Maine's interior, so relatively little had been written about the environment. But Thoreau examined much of the information then available, drawing from the earliest exploration narratives to the most contemporary government reports. He was familiar with John Josselyn's descriptions of seventeenth-century Maine and compared his predecessor's impressions of the region with his own. He also made regular use of Charles Jackson's 1838 geological survey. A surveyor himself, Thoreau paid special attention to topography during his travels and was able to identify several inaccuracies in existing maps. The subject of logging was of special interest to him. In preparing his travel journals, Thoreau fully acquainted himself with the writings of the lumberjack clergyman John S. Springer, whose book *Forest Life and Forest Trees* (1851) is one of the earliest and most comprehensive accounts of logging practices. He also referred to the works of the French naturalist F.A. Michaux for his descriptions of logging practices on the Kennebec. In addi-



Preparing for his travels to the Maine woods, Thoreau scrutinized reports by naturalists and geologists and accounts of Maine logging – including John S. Springer’s *Forest Life and Forest Trees*, published in 1851. Thoreau undoubtedly imagined that the Maine logger looked something like this image from Springer’s book.

tion, Thoreau was familiar with the works of early ecologist Alexander von Humboldt. Whereas Springer and Michaux primarily offered descriptions of the logging *process*, Humboldt was a scientist and forester who wrote about the deleterious *impacts* of deforestation. In “Chesuncook,” Thoreau mentions Humboldt’s accounts of “primitive forests” (though no one described the wild woods to Thoreau’s satisfaction). Considering the cumulative knowledge he gained from his Harvard education and his own investigative reading, Thoreau was at the time one of the most capable naturalists in New England to describe the condition of the Maine woods.

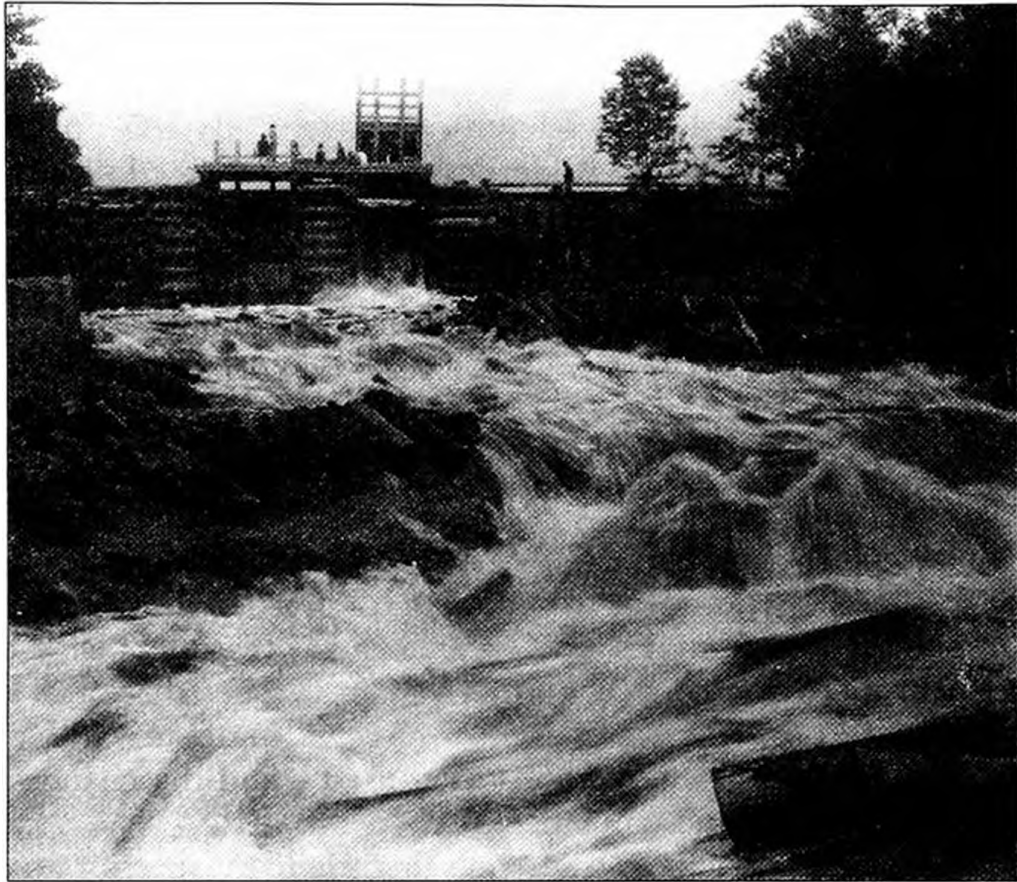
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For Thoreau, cataloging flora and fauna was not merely a hobby but an endeavor of scientific discovery. By 1857, after three trips to the Maine wilderness, he had collected such a wealth of information on the state's flora that he compiled a lengthy appendix for his *Maine Woods* in which he cataloged trees, flowers, and shrubs. His appreciation for the diversity of Maine's old-growth forest drew his attention to human alterations. Descriptions of fire damage, agricultural clearing, and logging practices – the three major causes of deforestation – comprise considerable portions of *The Maine Woods*.

### Logging Practices

While agriculture was responsible for much of the clearing in southern and central Maine, logging had a greater impact on the forest environment of northern Maine. After three treks through the northern woods over eleven years, Thoreau was able to record in detail the methods then used – and the changes brought about by these practices.

The starting point in Thoreau's first trip to the interior was the thriving town of Bangor. There, in the fall of 1846, he met his cousin George Thatcher, who, like most people in Bangor, was "engaged to the lumber trade." He and George joined "a gang of men being employed there at the time in repairing the injuries caused by the great freshet in the spring" (p. 3). These were primarily damages to the many sluices and dams constructed to control stream flows. In the company of these lumbermen, Thoreau came to appreciate the importance of the waterways to the timber industry. From standing tree to sawn timber, the river was essential to the lumber operation. In the winter, when the rivers froze over solid, teams of loggers made their way up the frozen arteries to prospective cutting sites and set up camp. Throughout late winter and early spring, crews of choppers felled the most valuable trees – white pine, spruce, or hemlock – and cut them into lengths for transport. Teamsters used oxen or horses to pull huge sleds loaded with logs down to the frozen rivers. When spring came and the rivers thawed, the logs were driven downstream to the mills. In each of Thoreau's



Driving dams held water in reserve and then released it through massive gates, or “sluices.” Thoreau found these dams to be ubiquitous in the north woods, and their impact on river banks, stream flow, and lake levels was dramatic. *Burt Call photo, courtesy Dexter Historical Society and Fogler Library, University of Maine.*

essays, he describes how the lumbermen harnessed the waterways to their advantage and discusses the impact of these modifications on the surrounding environment.

The route taken by Thoreau in 1846 gave him an excellent opportunity to observe one of Maine’s busiest river systems. From Bangor, Thoreau’s party traveled up the West Branch of the Penobscot, over Quakish Lake to the “Twin Lakes,” then to Pemaduncook Lake and on to Ambajejus Lake, finally disembarking at a point where the West Branch carried them within a dozen miles of Katahdin. All along the journey, Thoreau discovered dams erected by logging companies to control the



spring freshets and summer droughts for log driving. The dams, constructed of wood, earth, and stone, regulated floods and allowed drivers to raise or lower stream levels to suit their needs. In an effort to systematize the log drive, loggers and landowners on the West Branch founded the Penobscot Log Driving Company in 1846. This collaborative effort resulted in more dams, as lumbermen made their way deeper into the interior.<sup>3</sup> While the manipulation of stream flows greatly benefited Maine loggers, it altered shoreline habitat, often killing thousands of acres of trees. Thoreau described the Quakish lake dam: “This dam is quite important and expensive work for this country...raising the whole river ten feet, and flooding, as they say, some sixty square miles by means of the innumerable lakes with which the river connects. It is a lofty and solid structure, with sloping piers, some distance above, made of frames of logs filled with stones, to break the ice” (pp. 33-34).

Thoreau mentions the impact of dams in each of his *Maine Woods* essays but describes the conditions most extensively in “The Allegash and East Branch.” On his 1857 trip, he and his companions traveled across Moosehead lake, down the West Branch, onto Chesuncook and Chamberlain lakes, then down the East Branch. All along this route, he recounts with dismay the destruction of the forests caused by raising water levels:

They have thus dammed all the larger lakes, raising their broad surfaces many feet...thus turning the forces of Nature against herself, that they might float their spoils out of the country. They rapidly run out of these immense forests all the finer and more accessible pine timber, and then leave the bears to watch the decaying dams. Not clearing or cultivating the land, nor making roads, nor building houses, but leaving it a wilderness, as they found it....Think how much land they have flowed without asking Nature’s leave! (p. 228)

On each side of the West Branch he saw a “broad belt” of dead trees, “killed by the back water caused by the dam at the outlet of Chesuncook Lake, some twenty miles distant (p. 208).”



Driving dams caused a constant fluctuation in lake levels, leaving the shores lined with "dry-ki." As this Burt Call photo of Umbazooksus Lake suggests, a maze of bare and bleaching trees, both above and below the water, made landing a canoe a tricky proposition.

Chamberlain Lake originally drained into the St. John River and out through New Brunswick into the Bay of Fundy. In March 1841 resourceful Bangor lumbermen managed to link the lake to the Bangor mills by diverting its flow and that of the upper Allagash lakes back into the East Branch of the Penobscot River. Chamberlain Dam was a blessing to Bangor lumbermen, but it left the shoreline in an eerie state of waterlogged ruin:

For half a dozen rods in width it was a perfect maze of submerged trees, all dead and bare and bleaching, some standing half their original height, others prostrate, and criss-cross, above and be-

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neath the surface, and mingled with them were loose trees and limbs and stumps, beating about. Imagine the wharves of the largest city in the world, decayed, and the earth an planking washed away, leaving the spiles standing in loose order, but often of twice the ordinary height, and mingled with them the wreck of a thousand navies (pp. 238-39).

After a few days on Chamberlain Lake, Thoreau and his party paddled north, following the Allagash through the connecting lakes. At Heron Lake (also called Churchill Lake) the party was again confronted by dead and dying trees along the shoreline. In 1846, Ebenezer Coe, who owned townships on Heron Lake, chartered the dam in hopes of running his logs twenty miles back up the Allagash to Chamberlain Lake, and hence to Bangor. The dam once again created an extensive flood plain: "The shores were in the same ragged and unsightly condition, encumbered with dead timber, both fallen and standing, as in the last lake....Some low points or islands were almost drowned (p. 230-31). Piecing together the accounts of shoreline flooding at each major lake over a span of eleven years, we may discern a pattern of destruction that was not confined to few isolated regions, but was a regular occurrence on the waterways of the interior during this period.

In addition to ensuring a steady flow of water for the drive, dams mitigated against flooding and low water, both of which, ironically, were exacerbated by the practice of logging along the rivers. According to a botanical survey conducted in 1861, the banks of the Penobscot had been culled extensively as far north as Medway, where the East and West branches meet.<sup>4</sup>

Tree cover increases the capacity for the surrounding soils to retain water, both in times of heavy precipitation and in times of drought. In his study of rural milling in nineteenth-century Maine, Jamie Eves shows how denuded river valleys could contribute to the severity of both flood and drought: "[A] thick forest cover regulates the rate of runoff, spreading it out over time, mostly by controlling how much water infiltrates into the

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soil...The infiltration capacity of the soil of a pine forest is two to three times that of a pasture.”<sup>5</sup> The floods Thoreau mentions in “Ktaadn” were natural occurrences in April, but their severity increased dramatically when stream banks were denuded. In his *Collected Essays* of 1790, the American lexicographer Noah Webster complained that “when [the land] iz cleared, the water runs off suddenly into the large streams. It iz for this reason that freshe[t]s in rivers hav becume larger, more frequent, sudden and destructiv, than they were formerly.”<sup>6</sup> Similarly, in his travel memoirs of 1821, Timothy Dwight noted that the Connecticut River “was now often fuller than it probably ever was before the country above was cleared of its forests.”<sup>7</sup>

Recognizing that deforestation could cause destructive droughts and floods, nineteenth-century mill operators set out to solve the problem by controlling irregular stream flows. Millers had long known that, like dense forest cover, lakes, ponds, and bogs tended to mitigate runoff. For this reason, they frequently built below these natural water regulators. To compensate for lost water-storage capacity due to deforestation, they “artificially created the same regulating effects” by constructing water-storage dams. As Eves points out, “an environmental problem caused by human activity (deforestation) was at least partially ameliorated by further human manipulation of the environment (outlet dams).”<sup>8</sup> Ultimately, the dams allowed the loggers to continue the destructive practice of denuding the riverbanks.

Once the logs made it to the larger lakes, they were corralled in booms – logs chained together – and hauled to stream outlets where they continued their journey to the mills. In the spring, the flow of logs down the waterways could be prodigious; a raft on Moosehead Lake in 1849 as twenty-one acres in extent.<sup>9</sup> At the mills, lumbermen stretched booms across the river to collect the floating harvest of logs. On the return leg of his Chesuncook trip, Thoreau was able to witness firsthand a mill operation on the lower Penobscot: “We visited Veazie’s mills, just below the Island, where there were sixteen sets of saws, – some gang saws, sixteen in a gang, not to mention circular saws.

On one side, they were hauling the logs up an inclined plane by water-power; on the other, passing out the boards, planks, and sawed timber, and forming them into rafts. The trees were literally drawn and quartered there” (p. 150).

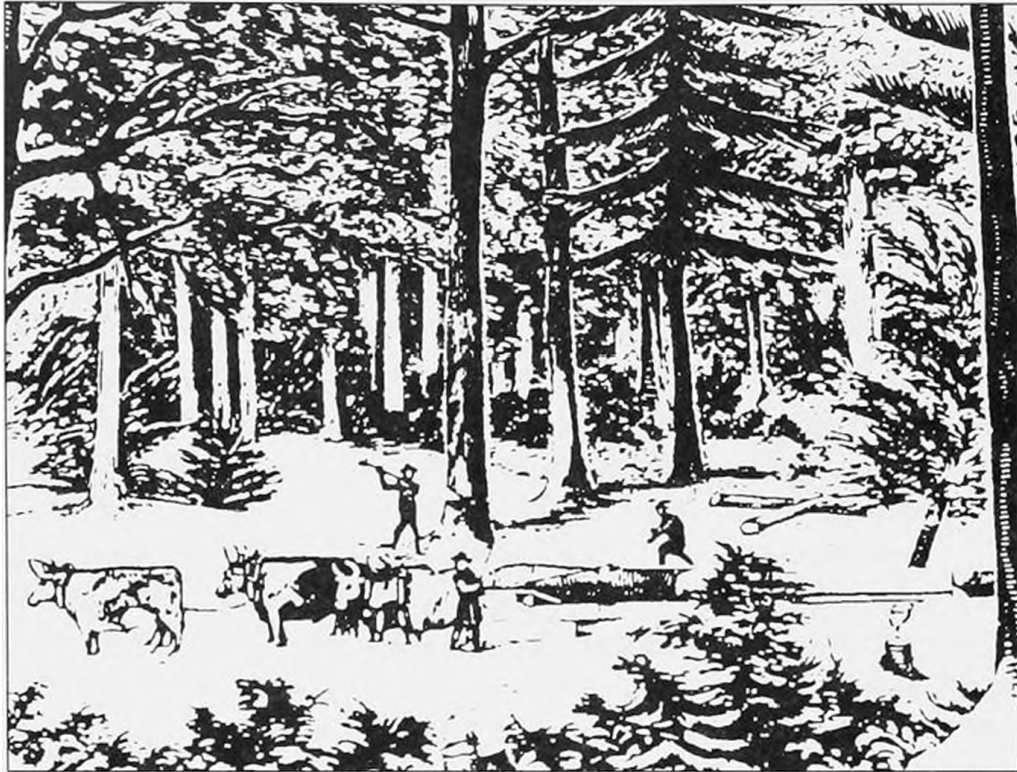
As the number and size of mills along the Penobscot grew, they turned out enormous volumes of lumber. Because wood was so abundant, millers did not concern themselves with utilizing the whole log, but only used those portions that could be most expediently turned into a merchantable product. Early saws were wasteful, grinding much of the logs to dust and leaving great quantities of scraps and tailings.

Before logs could be passed through the flat gang saw, slabs had to be trimmed from two sides so the log could lie flat on the saw bed. Sometimes these slabs and other scraps were burned to power steam mills, but more often they ended up in the rivers. “The waste from the sawmills created a real problem,” writes the forest historian Philip Coolidge; it accumulated on sandbars, narrowing the channels, smothering fish spawning beds, and killing the fish themselves.<sup>11</sup>

Debris was not limited to edgings and sawdust. Frequently, raw logs and even cut timbers drifted loose on the waterways. On occasion, booms happened to break, and many of the free-floating logs drifted past the mills and out to sea before they could be recovered. Timbers milled in Old Town or Orono were often floated downstream to Bangor by means of inefficient rafts; boards became warped, split, soiled, or simply lost. Thoreau says that some residents of the mill towns made their living entirely off selling timbers that washed up on the banks; one resourceful builder “got all the material of his outbuildings and fences from the river” (p. 151).

### **Market Forces and the Chosen Tree**

While traveling the carry from Umbazooksus Lake to Mud Pond in 1857, Thoreau commented on how selective logging had altered the composition of species within the Maine woods: “Here commences what was called twenty years ago, the best timber land in the State. This very spot was described as covered



*Springer, FOREST LIFE AND FOREST TREES (1851).*

with the greatest abundance of pine but now has this appeared to me, comparatively, an uncommon tree there, – and yet you did not see where any more could have stood, amid the dense growth of cedar, fir, &c.” (pp. 212-13). In 1857, white pine was still the tree of choice for the Maine lumberman. Prized for its even grain, its straight and relatively knot-free trunk, the pine was scouted out and selectively cut from New England’s forests for almost two centuries. Traveling along the lower reaches of the West Branch in 1846, Thoreau reported that few pines had been spared the ax. “The woods hereabouts abounded in beech and yellow birch,...also spruce, cedar, fir and hemlock; but we saw only the stumps of the white pine here, some of them of great size, these having been already culled out, being the only tree much sought after, even as low down as this” (p. 21).

For two centuries before Thoreau’s visits, the forests of New Hampshire and Maine had been a principal supplier of white pine, the most valuable tree in the New England forest. “One

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connected with lumbering operations in Bangor told me,” says Thoreau, “that the largest pine belonging to his firm, cut the previous winter,...was worth ninety dollars in the log at the Bangor boom in Old Town. They cut a road three and a half miles long for this tree alone” (p. 145). Loggers and woodworkers called these trees “pumpkin pines” because the soft, workable wood had an orangish color. On his trips, Thoreau was ever on the watch for “veins” of white pine, but to no avail: “I would have liked to come across a large community of pines, which had never been invaded by the lumbering army” (p. 210).

In his history of the Baskahegan Timber Company, Roger Milliken describes how the pine’s high visibility within the forest canopy made this valuable tree an easy target for timber cruisers: “A mature white pine stands taller than any other tree in the Maine woods, overtopping the rest by as much as 50 feet.... Timber cruisers climbed pine trees...[and] from these crows’ nests they gazed across the tops of the neighboring forest to where another, a vein, or a glade of pine stretched its feathering limbs against the sky.”<sup>12</sup> Because pine was so easily detected, woodcutters had, over decades of selective cutting, thinned out all but the young and unsalable. Between Moosehead and Chesuncook Lakes, Thoreau came upon a few white pines, “the only collection of pines that I saw on this voyage” (p. 108). Talking to a logger he met on the Moosehead ferry, Thoreau was informed that operators had adapted to harvesting even second-rate pine: “What was considered a “tip-top” tree was not looked at twenty years ago, when he first went into the business; but they succeeded very well now with what was considered quite inferior timber then. The explorer used to cut into a tree higher and higher up, to see if it was false-hearted, and if there was a rotten heart as big as his arm, he let it alone; but now they cut such a tree, and sawed all around the rot, and it made the very best of boards” (p. 144). The loggers were so successful at tracking their quarry that eventually even the remotest stands of white pine were gone, forcing the industry to gear its production to other species.

Following the gradual depletion of the white pine, a more diversified lumber industry developed to meet the growing

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demands of an expanding and wood-hungry economy. Penobscot lumber operators began cutting spruce in the mid-nineteenth century.<sup>13</sup> But when Thoreau made his travels, pine was still king – “the only tree much sought after” (p. 21). By 1861 spruce had replaced white pine as the most heavily cut species.<sup>14</sup>

Between 1846 and 1857, when Thoreau made his trips, the Penobscot basin produced more lumber than any other river system in the state. Thoreau notes that in Bangor and the surrounding towns, mills were ubiquitous: “Within a dozen miles of Bangor we passed through the villages of Stillwater and Oldtown, built at the falls of the Penobscot, which furnish the principal power by which the Maine woods are converted into lumber...There were in 1837, as I read, two hundred and fifty saw mills on the Penobscot and its tributaries above Bangor, the greater part of them in this immediate neighborhood, and they sawed two hundred millions of feet of boards annually” (pp. 4-5). In 1846, Bangor surveyed a total of 140 million board feet; production would continue to increase, peaking in 1872 at nearly 250 million board feet.<sup>15</sup>

The prodigious flow of logs from the forests to the mills troubled Thoreau, and he commented prophetically that the very existence of the native forests was threatened: “Think how stood the white pines on the shore of Chesuncook, its branches soughing with the four winds, and every individual needle trembling in the sunlight – think how it stands with it now – sold, perchance, to the New England Friction Match Company!...The mission of men there seems to be, like so many busy demons, to drive the forest all out of the country” (p. 5). Thoreau’s concerns turned out to be well-founded. By 1900 an estimated 75 percent of the original pine had been removed.<sup>16</sup>

Prosperity followed the mills, as more and more trees were cut to feed the growing appetites of urban centers like Boston and New York. Where there were loggers, there was a demand for the tools of the trade and a host of industries to service their needs. Loggers needed teams of oxen and horses to haul the sleds, as well as the hay to feed them. They required dry goods, boats, tools, and clothes to carry them through the winter. All





Lumbering operations employing thousands of choppers and teamsters brought demand for all sorts of supporting activity – farming, trading, guiding, transporting, maintaining livestock. What Thoreau saw as a wilderness in 1846 by 1857 appeared to be a forestland civilization. *Burt Call photo.*

along the river, little farms and businesses sprang up to support the needs of so many loggers. In “Ktaadn,” Thoreau notes with surprise that even fifty miles upstream from Bangor small trading posts were gaining a foothold in the wilderness. While waiting for the rest of the party to join them in Mattawamkeag, Thoreau and Thatcher made a brief excursion to the small frontier town of Molunkus. Here, Thoreau saw “the puny beginnings of trade” – a general store and newly cleared fields “planted with potatoes, where the logs were still burning between the hills” (p. 14).

### **Agriculture and Deforestation**

As lumbering operations pushed into the northern frontier, settlers followed close behind. In Maine, the timber industry and agriculture “developed in tandem” and were “mutually dependent” through most of the nineteenth century.<sup>17</sup> Farmers sold their surplus produce in the logging camps, and when not working on their farms, they provided much needed labor for the timber industry. Often, settlers moved from farm to forest in a seasonal cycle.<sup>18</sup> In exchange for their produce or labor, settlers were paid in cash or notes, which then went to support the local provisions merchants.

Thoreau met several of these farmer-lumbermen on his excursions into the Maine woods. On their trek to Katahdin, Thoreau and his cousin met up with a riverman turned farmer, George McCauslin, at his farm near the confluence of the Little Schoodic and West Penobscot. “Uncle George,” as they called him, “had driven on the lakes and headwaters of the Penobscot five or six springs in succession, but was now settled here to raise supplies for the lumberers and for himself.” Like others who made a living feeding the loggers and their livestock, McCauslin made “an extensive clearing” in the forest. Here he raised oats, grass, potatoes, and some livestock. Characteristic of most settlers in Maine’s interior, McCauslin was “tempted by the cheapness of the land” and the relatively comfortable living to be earned by supplying the loggers (p. 22).

While farming was the leading cause of deforestation in southern and central Maine, it was not a major factor in the northern reaches. Still, some of the farms established in the north woods were sizable operations, employing several men and producing supplies for many crews in the woods. During his 1853 trip to the Maine woods, Thoreau stopped by Ansell Smith’s large and busy farm on the shores of Chesuncook Lake. Smith’s place was, as Thoreau describes it, “the oldest and principal clearing about this lake,” extending two miles along the shoreline: “There were about one hundred acres cleared here. [Smith] cut seventy tons of hay this year on this ground, and twenty more on another clearing, and he uses it all himself on



Farms, while not a major cause of deforestation in northwestern Maine, encroached on the wilderness qualities of the region. Most, such as the Pittston Farm pictured here in 1914, provided produce, fodder, and lodging for woods operators. *Burt Call photo.*

lumbering operations....There was a large garden full of roots, turnips, beets, carrots, potatoes, etc., all of great size” (p. 127) The farm was a popular stopover for lumbermen on their way to and from the timber frontier. “Twenty or thirty lumberers, Yankee and Canadian, were coming and going,” says Thoreau; “in the winter there [were] sometimes a hundred men lodged here at once” (p. 128).

Thoreau had occasion to visit another large operation, the Chamberlain Farm, on his trip along the Allagash and East Branch. This farm was established in 1846 by David Pingree and Ebenezer Coe, who owned townships near Chamberlain and Churchill lakes.<sup>19</sup> Large timber operations such as Coe’s sometimes maintained extensive farms in order to ensure a steady

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supply of food for the loggers and their livestock. The farm was a welcome sight to Thoreau and his companions in 1857. Tired and low on supplies, they stopped to purchase a few pounds of sugar and to gossip with the woodsmen. "Here was a clearing extending back from the lake to the hill-top, with some dark-colored log buildings and a storehouse in it, and half a dozen men...greedy for news" (p. 239). At its peak, Chamberlain Farm consisted of 600 cleared acres, employed seven men, and produced 700 bushels of oats and 75 tons of hay (p. 23). These larger farms were the exception, however, since most settlers in the frontier region cleared just enough to provide for subsistence and a small surplus to be sold in the lumbering woods.

The expansion of agriculture in northern Maine was slowed by inhospitable weather, adverse soil conditions, and the availability of more fertile land in the West. Nevertheless, tempted by low prices and liberal land policies, settlers continued to move into the Penobscot basin throughout the nineteenth century. Transforming the woodlands into farmland presented considerable difficulties. A dense tree cover prevented light from reaching the forest floor, and the soils were acidic, thin, and poor in nutrients. Consequently, settlers resorted to destructive slash-and-burn clearing methods in an effort to open the land and generate a ready supply of fertile ash.

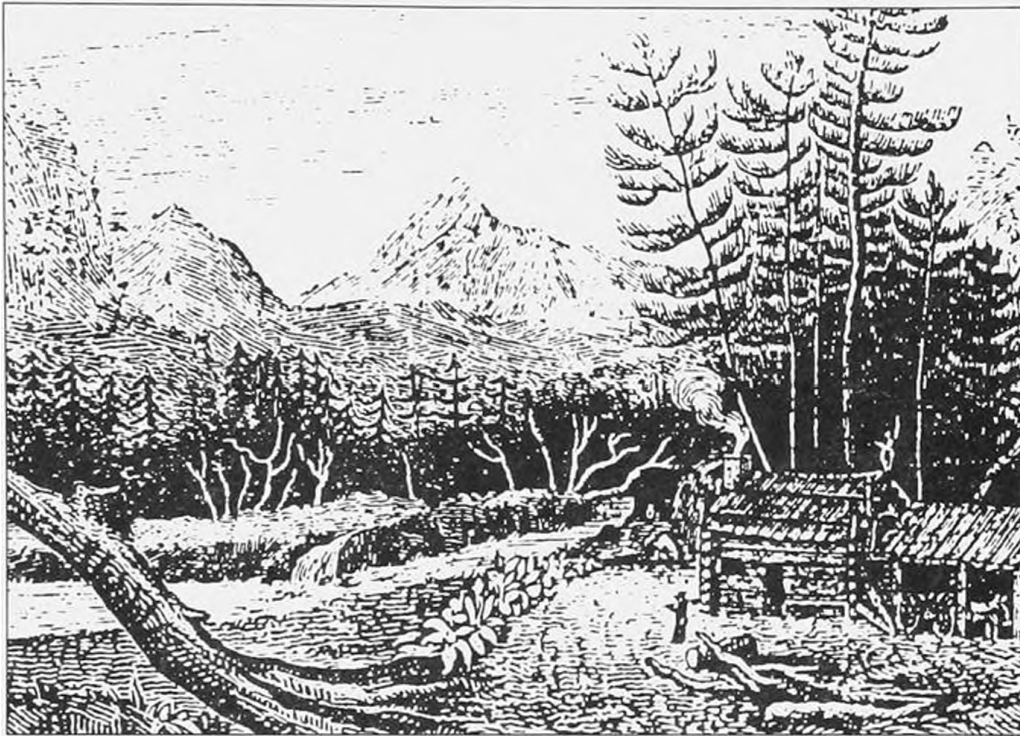
In his study of early American forestry, geographer Michael Williams described clearing practices employed by settlers: "The pioneer could use either of two methods of removing the timber. He could...chop down the trees or girdle them, that is to say, hack around them deeply enough to cut off the flow of sap, causing the leaves and ultimately the branches to fall, so that the surrounding land, no longer shaded, would dry out and crops could be planted."<sup>20</sup> Clear-cutting (called the "Yankee method") was more common in New England, but both methods were used, according to individual preferences. On his trip to Katahdin, Thoreau reports seeing a field that had been prepared by cutting:

The mode of clearing and planting, is, to fell the trees, and burn once what will burn, then cut them up into suitable lengths, roll into heaps, and

burn again; then, with a hoe, plant potatoes where you can come at the ground between stumps and charred logs, for a first crop, the ashes sufficing for manure, and no hoeing being necessary the first year. In the fall, cut, roll, and burn again, and so on, till the land is cleared; and soon it is ready for grain, and to be laid down (p. 14).

The burn Thoreau describes here occurred on a small farm near Molunkus, but was common throughout New England from the time of the first settlements. According to Carolyn Merchant, who has written about environmental conditions in early New England, the ashes "supplied potassium which helped to neutralize the acidity of forest soils, providing adequate fertilizer for the first year, while brush burning accomplished the same in the second year."<sup>21</sup> In general, subsistence farming allowed soils time to recover before they were replanted or converted to pasture. As Williams points out, "Unless [the farmer] had a market for his produce, there was little point in clearing more ground than he needed to raise the foodstuffs for his family."<sup>22</sup>

In the mid-nineteenth century, however, the timber boom generated new markets for both produce and wood-lot timber. Subsistence farmers responded to a growing market economy by clearing more acreage, shortening fallow periods, and selling the timber from their lands.<sup>23</sup> Since land was cheap and plentiful, farming practices were often geared to extract the greatest bounty from the most land without expending much effort in time-consuming and costly soil maintenance. Inefficient farmers "were less likely to pursue a regular schedule of crop rotation; they were careless in handling manure; and they seemed slow to take up new crops or otherwise diversify from their principal reliance on Indian corn."<sup>24</sup> Consequently, when one plot of land could no longer support agriculture, farmers abandoned these fields and cleared another stand of trees. The soil chemistry of abandoned lands was usually altered to such an extent that pre-existing species of trees could not return, and second-growth stands rarely resembled those that preceded them. From the



*Springer, FOREST LIFE AND FOREST TREES.*

perspective of the settlers, trees were in such plenty that they constituted an obstacle to progress; thus slash-and-burn practices were the norm well into the twentieth century.

Destructive farming practices were complicated by legislation that encouraged landowners to clear the forests. The tradition of state-sponsored clearing can be traced back to the earliest European settlements, where farmers were granted tracts of land with the stipulation that they clear and plant a portion of the plot. New Hampshire settlers were required “to clear and cultivate a minimum acreage within five years and pay a tax of a few ears of corn as evidence that agriculture was

progressing.”<sup>25</sup> Disposal of public lands in Maine was guided by the philosophy that they were to be “placed in the hands of private citizens as quickly as possible and that agricultural developments would be, and should be, the ultimate goal of disposal.”<sup>26</sup> Under Massachusetts administration, a plan was devised in 1784 to offer each settler in Maine “a lot of 150 acres at one dollar per acre, on any Maine river, or to give him 100 acres elsewhere, if he would but clear sixteen acres in four years.”<sup>27</sup> Similar incentives gave preference to agricultural settlement through the middle of the nineteenth century.

Still, most of Maine’s public lands ended up in the hands of lumbermen. After Maine gained statehood, public lands were divided up into large townships for sale to companies or individuals. In the 1830s, the Land Office, which administered the disposal of public lands, attempted to revise its policy to facilitate the sale of land in smaller parcels. This plan to “favor the poorer class of people” was largely unsuccessful because, as historian Richard Judd notes, “smaller timber chances...could not be lumbered profitably where pine was scattered.”<sup>28</sup> Consequently, in 1843 the Land Office reverted to the practice of selling timber lands in larger tracts. Because only wealthier individuals and companies could afford to purchase these parcels, Land Office policy ultimately encouraged large-scale commercial cutting.<sup>29</sup> These and other policies accelerated deforestation in the Penobscot basin at the time of Thoreau’s travels through the area.

International policies also accelerated deforestation in northern Maine. The ambiguous terms of the Treaty of Paris, signed in 1783, left the northeastern border in dispute until the question was finally settled with the Webster-Ashburton Treaty of 1842. The contested territory, generally described as the upper waters of the Penobscot and St. John Rivers, was settled and logged by both nations. In 1857 Thoreau’s travels took him to Mud Pond Carry, which had been the southern edge of the disputed territory:

I remembered hearing a good deal about the  
“highlands” dividing the waters of the Penobscot

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from those of the St. John...at the time of the northeast boundary dispute....These then, according to *her* interpretation of the treaty of '83, were the "highlands which divide those rivers and empty themselves into the St. Lawrence from those which fall into the Atlantic Ocean." Truly an interesting spot to stand on, – if that were it, – though you could not sit down there. I thought that if the commissioners themselves...had spent a few days here, with their packs upon their backs, looking for that "highland," they would have had an interesting time, and perhaps it would have modified their views of the question somewhat (p. 216).

After much debate, state and provincial officials attempted to stop the illegal trade flowing out of the disputed territory and down the St. John River, but the promise of profits encouraged lumbermen of both nationalities to harvest the timber.<sup>30</sup> Threats to legally restrict the trade only accelerated the pace of logging and encouraged wasteful cutting practices. "In the woods, trespassers cut everything accessible but left wood showing even small amounts of rot on the ground, since only the best pine was worth the risk of driving past the land agents to market. William Parrot [a state land agent] judged that between 15 and 30 percent of the timber cut during these years remained in the woods."<sup>31</sup>

Officials hoped that by placing timberlands in private hands they might prevent trespassers from cutting timber. Under liberal land policies, the state deeded thousands of acres to settlers, deputized the backwoods farmers, and charged them with assessing fines against criminal lumbermen and confiscating their teams and equipment. As Thoreau pointed out, there was little logic in the state's policy of entrusting the trees to settlers:

Much timber has been stolen from the public lands. (Pray, what kind of forest-warden is the Public itself?) I heard of one man who, having discovered some particularly fine trees just within



the boundaries of the public lands, and not daring to employ an accomplice, cut them down, and by means of block and tackle, without cattle, tumbled them into a stream, and so succeeded in getting off with them without the least assistance. Surely stealing pine-trees in this way is not so mean as robbing hen-roosts (p. 145).

It is difficult to determine just how much timber was removed from the disputed territory, but in the spring of 1838 George Buckmore, in the services of the Land Office, reported that the northern woods were filled with "violent and lawless men," cutting with complete disregard for the state's efforts to deter them."<sup>32</sup>

### **Fire and Deforestation: Crossing the Burnt Land**

The combination of logging, which left enormous accumulations of slash on the ground, and agricultural clearing, which was dependent upon fire, was disastrous for the north woods. In his history of wildland fires in America, Stephen J. Pyne asserts that logging magnified the scope of the disastrous 1825 fires in Maine and New Brunswick. Nineteenth-century cutting methods left behind a great deal of fallen timber, limbs, bark, and debris; consequently, forest fires were more frequent and severe in cut-over areas than in standing forests. On his trips to Katahdin in 1846, Thoreau described crossing the tangled and overgrown region known as the "Burnt Lands." He and his companions were making their way to Quakish Lake, where they had arranged to join the rest of their party and proceed by batteau. Carrying "provision enough for six men," the travelers followed the rough trail that led to the lake. Thoreau describes the terrain: "The obscure trail...which even the woodsman is sometimes puzzled to discern, ere long crossed a narrow open strip in the woods overrun with weeds...where a fire had raged formerly, stretching northward nine or ten miles, to Millinocket Lake" (p. 27). Since there were so many fires along Maine's settlement frontier, it is difficult to determine with certainty which caused the damage Thoreau describes. But the region

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between McCauslin's farm and Quakish Land had burned in a fire in 1803 that extended for some sixty miles from the Penobscot to just south of current-day Baxter State Park.

Thoreau noted that careless maintenance of campfires was responsible for a great many conflagrations. (Thoreau himself mistakenly set fire to the Concord woods when his campfire got out of control.) After spending the night on the trail next to a roaring fire, Thoreau and his companions abandoned their campsite with the embers still burning: "The lumberers rarely trouble themselves to put out their fires, such is the dampness of the primitive forest; and this is one cause, no doubt, of the frequent fires in Maine, of which we hear so much on smokey days in Massachusetts" (p. 41). Thoreau's comment on the great clouds of smoke serves as testimony to the severity of the fires. Not only could the smoke be seen states away, but it seems to have been a rather common occurrence. Contemporary Maine writers told "lurid tales of flames that roared like thunder and could be heard a dozen miles, and of smoke so thick that Penobscot ferrymen were obliged to use compasses."<sup>33</sup> The year 1825 was noted for the Great Fire that began in the Piscataquis Valley near Moosehead Lake and raged eastward all the way to the Penobscot River, scorching an estimated 829,000 acres.<sup>34</sup>

Fires drastically alter forest composition. Those of northern Maine are primarily composed of spruce and hardwoods, conifers being more susceptible to fire damage. Once a forest has been burned over, bush, saplings, and grasses colonize the area, affecting not only the rate of reforestation but also the distribution of species. Northern coniferous forests are generally colonized by aspen, striped maple, pin cherry, and yellow birch before returning to northern hardwoods and conifers.

*Maine Woods* provides us with an accurate account of how fires altered the Maine woods: Portions of the woods south of Katahdin had been burned, "though they showed no recent marks of fire." The recovering meadow "looked rather like a natural pasture...with occasional strips of timber crossing them, and low poplars springing up, and patches of blueberries here and there" (p. 70). Thoreau took a special interest in plant

succession, and when he came across a burn he was careful to note what sorts of species had replaced the original forests. At a burned area near Telos Lake, Thoreau described stumps intermixed with “great fields of fireweed (*Epilobium angustifolium*) [and]...blueberry and raspberry bushes” (pp. 255-56).

In his 1860 essay, “The Succession of Forest Trees,” Thoreau outlined his notions of regenerative cycles. He believed that hardwoods like oak or hickory were the first to recover after the pines were cut. The seeds of various hardwoods were deposited in pine stands, he argued, by wind, water, or animals, taking root and sprouting in the shade of the sheltering pines. Dispelling popular notions that seeds lie dormant for centuries, Thoreau recognized that seedlings were constantly sprouting and dying under the shady forest canopy. “When the pines were cleared off, the oaks, having got just the start they want, and now having secured favorable conditions, immediately spring up to trees.”<sup>35</sup> By examining the species and ages of trees at a Telos Lake burn, Thoreau was able to estimate the date of the fire.

### **Fuel Wood**

While forest fires were far more devastating to the Maine woods than hearth fires, a strong market for cord wood did contribute to deforestation. Wood was America’s basic source of fuel well into the mid-nineteenth century. Michael Williams estimates that by 1810 approximately 1.08 billion cords had been cut and burned nationally<sup>36</sup> By the mid-eighteenth century, urban centers like Boston and New York had exhausted their most accessible supplies of firewood. Using figures from the U.S. census, Williams calculates that in 1839 coastal Maine alone produced 104,974 cords of fuel wood, sold mostly to Boston and other eastern urban centers.<sup>37</sup>

Towards the conclusion of his 1853 trek to Chesuncook, Thoreau speculated that the continuous destruction of the woods from fuel cutting and other clearing practices would transform Maine into a barren pasture. Conscious of the pace of cutting in Massachusetts, Thoreau thought that eventually even town shade trees would be hacked down for firewood:

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Maine, perhaps, will soon be where Massachusetts is. A good part of her territory is already as bare and common-place as much of our neighborhood, and her villages generally are not so well shaded as ours. We seem to think that the earth must go through the ordeal of sheep-pasturage before it is habitable by man....And what are we coming to in our Middlesex towns? – a bald, staring townhouse, or meeting-house, and a bare liberty-pole, as leafless as it is fruitless, for all I can see. We shall be obliged to import the timber for the last, hereafter, or splice such sticks as we have; – and our ideas of liberty are equally mean with these.

Cordwood cutting could be even more destructive than lumbering practices, since trees of almost any species or size could be cut and marketed as fuel. The settlers' rapacious appetite for fuel prompted comment from Thoreau: "They have lately, as I hear, invented a machine for chopping up huckleberry-bushes fine, and so converting them into fuel! – bushes which, for fruit alone, are worth all the pear-trees in the country many times over....At this rate we shall be obliged to let our beards grow at least, if only to hide the nakedness of the land and make a sylvan appearance (p. 154).

On average, a nineteenth-century family burned around fifteen cords of wood each year.<sup>38</sup> Because wood was plentiful on the frontier, settlers were often extremely wasteful. Before leaving McCauslin's farm for Quakish Lake, Thoreau spent a long restful night in front of an enormous fire. "Supper was got before our eyes in the ample kitchen, by a fire which would have roasted an ox; many whole logs, four feet long, were consumed to boil our tea-kettle" (p. 23). Much of Thoreau's beloved Maine woods literally went up in smoke.



It was only from the top of Katahdin, peering between clouds across a distant forest landscape, that the Concord naturalist seemed to be in the midst of a Maine wilderness – a “Vast Titanic, inhuman Nature.” *Burt Call photo.*

### **Conclusion: A View from the Summit**

Only within the shadow of Katahdin did the forest appear untouched by logger or farmer. After a few days of paddling over Quakish lake, across the Twin Lakes, over Pemaduncook and Ambajejus, and up the Penobscot River, Thoreau and his party came within a dozen miles or so of the mountain. Here they stowed the boat and set up camp at the mouth of “Murch Brook.” In the morning, refreshed by a meal of trout, the men set out on foot for the mountain’s summit. They followed the banks of a river which, like “a dark seam in the forest,” afforded a passage-way through the thick trees that crowded around the base of the rocky mountain. At the foot of the remote mountain there were few signs of humanity, and life in the woods was much the way it had been for centuries. “We soon began to meet with traces

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of bears and moose, and those of rabbits were everywhere visible.” (p. 57). Here wildlife seemed to find final refuge, “being driven into this wilderness from all sides by the settlements.” On the trail, the hikers snacked on wild blueberries from bushes “drooping with the weight of the fruit.” After a full day of hiking through this wooded terrain, the group set up camp near a stream bed at the base of Katahdin.

On the second day, eager to reach the summit, Thoreau hiked on ahead of his friends and ascended the mountain alone. The climb was difficult, as Thoreau made his way up the rocky ravines and past scraggly, frost-stunted trees. The mountain summit was shrouded in clouds that day, and Thoreau felt like a trespasser in a “Vast Titanic, inhuman Nature.” Sitting on the bald dome of solemn Katahdin, Thoreau concluded that this was not a place for humanity, that there were sacred places in Nature which we have no right to occupy. On the plains, Nature smiled on him, but here “she seems to say sternly, why came ye here before your time? This ground was not prepared for you.” Descending below the cloud-line for a better view, Thoreau looked over the forests below and was struck by the wild, unspoiled beauty of the place: “There it was, the State of Maine, which we had seen on the map, but not so much like that. Immeasurable forest for the sun to shine on...No clearing, no house. It did not look as if a solitary traveller had cut so much as a walking-stick there” (p. 66).

Thoreau, who up to this point had been very perceptive in recognizing humanity’s power to alter nature, was overcome by the seemingly limitless and indomitable scope of the American wilderness. With visions of majestic Katahdin lingering in his mind, he declared the rocky, forbidding mountain a pristine wilderness, proof of the immutable nature of the forests: “Perhaps I most fully realized that this was primeval, untamed, and forever untameable *Nature*” (p. 69). Despite crossing miles of burned forests and cutover lands, and witnessing rivers of wood pouring into the hungry mill towns, Thoreau felt confident in 1846 that the forests were safe, because places like Katahdin remained unaffected by civilization.

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By his final trip up the Allagash and East Branch in 1857, it appears that Thoreau was no longer so sure. Settlement progressed rapidly during the boom years, as farmers, millers, and tradesmen followed the lumbermen to the frontier. Between 1830 and 1860, Aroostook County – Maine’s northernmost frontier – grew from 3,700 people to a population of 22,400.<sup>39</sup> In 1846 Thoreau described the region near Nickatow, where the East and West Branch meet, as relatively uninhabited (pp. 17-18). When he returned in 1857, Nickatow was a busy little settlement, characteristic of the towns that flourished during the robust timber trade: “Things are quite changed since I was here eleven years ago. Where there were but one or two houses, I now found quite a village, with saw-mills and a store...and there was a stage road to Mattawamkeag, and there was rumor of a stage. Indeed, a steamer had ascended thus far once, when the water was very high.” Paddling past the growing little settlement, Thoreau realized this was no longer the edge of the wilderness. Where he might have expected to hear the mournful song of the loon or catch a fleeting glimpse of a moose, he heard the tinkle of cow bells, saw huts and clearings, and “even saw an infant held up to a small square window to see us pass” (p. 287).

Thoreau’s “Allegash and East Branch” chapter might have been entitled “The Allegash and St. John” had not Thoreau insisted on returning via the wildest route. In planning his trip, Thoreau wanted to stay as far away from civilization as possible and thus rejected traveling down the more settled St. John River. When his guide, Joe Polis, suggested that the usual practice was to stop by every house along the way, Thoreau and Thatcher explained that they “had had enough of houses for the present, and had come here partly to avoid them” (p. 234). But Thoreau found it difficult to find any place in the Maine woods that had not, in some way, been altered by human intervention. Camped on the remote headwaters of the East Branch, just below the outlet of Grand Lake, Thoreau commented on how the loggers seemed to have infiltrated every distant waterway and wood: “It is surprising on stepping ashore anywhere into this unbroken wilderness to see so often, at least within a few rods of the river,

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the marks of the axe, made by lumberers who either camped there, or had driven logs past in previous springs” (p. 273).

This final expedition to Maine inspired Thoreau’s most impassioned criticism of the loggers and their insatiable appetite for wood. After considering the cumulative damage he had witnessed, Thoreau describes the loggers as a plague upon the forest: “The wilderness experiences a sudden rise of all her streams and lakes, she feels 10,000 vermin gnawing at the base of her noblest trees. Many combining drag them off jarring over the roots of the survivors, and tumble them into the nearest stream, till, the fairest having fallen, they scamper off to ransack some new wilderness, and all is still again. It is as when a migrating army of mice girdle a forest of pines” (p. 228).

The primary focus of Thoreau’s criticism was not the loggers’ destructive cutting practices, but rather the distorted values that engendered such devastation in the first place. Thoreau attributed the steady demise of the forest to a pervasive judgment that a cord of wood or a stack of timber was of greater value than a living tree. Writing a few years earlier in “Chesuncook,” he argued that treating the forest merely as a material resource prevents us from realizing all the benefits we may derive from a tree as a living organism:

Strange that so few ever come to the woods to see how the pine lives and grows and spires, lifting its evergreen arms to the light – to see its perfect success, but most are content to behold it in the shape of many broad boards brought to market, and deem *that* its true success! But the pine is no more lumber than man is, and to be made into boards and houses is no more its true and highest use than the truest use of man is to be cut down and made into manure....A pine cut down, a dead pine, is no more a pine than a dead human carcass is a man (p. 121).

As a naturalist and a philosopher, Thoreau’s interests inevitably led him to examine humanity’s moral obligation to the natural world. While his catalog of species and his records of



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changing forest conditions are of great value to environmental historians, Thoreau's pioneering philosophies on nature are perhaps his greatest legacy. More than just a travel memoir, *The Maine Woods* represents an important moment in America's intellectual history, in which Thoreau gives voice to an emerging wilderness ethic. For the first time in the nation's experience, the American wilderness – traditionally seen as “vast, Titanic,” and “forever untameable” – had proven to be fragile and finite. As Thoreau points out, we need places like the Maine woods to remain wild, if not for the sake of the existing flora and fauna, then for our own benefit. In destroying the forests, he argues, we not only despoil the natural world, but we also wipe out “the mystic lore of the wilderness” that is our cultural heritage: “The Anglo American can indeed cut down and grub up all this waving forest and make a stump speech and vote for Buchanan on his ruins, but he cannot converse with the spirit of the tree he fells – he cannot read the poetry and mythology which retire as he advances” (p. 229).

The poet, says Thoreau, and not the lumberman, truly appreciates the value of the Maine woods. And it is as a poet that Thoreau appeals to the conscience of his fellow Americans and, implicitly, to future generations. “There is,” asserted Thoreau, “a higher law affecting our relation to pines as well as to men....Every creature is better alive than dead, men and moose and pine-trees, and he who understands it aright will rather preserve its life than destroy it.”

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### NOTES

<sup>1</sup>Unless stated otherwise, all parenthetical notations for Thoreau refer to *The Maine Woods*, edited by Joseph J. Moldenhauer (Princeton: Princeton University Press, 1972).

<sup>2</sup>Robert D. Richardson, Jr., *Henry Thoreau: A Life of the Mind* (Los Angeles: University of California Press, 1986), p. 378.

<sup>3</sup>John W. Hakola, *Legacy of a Lifetime: The Story of Baxter State Park* (Woolwich, Maine: TBW Books, 1981), p. 30.

<sup>4</sup>Richard G. Wood, *A History of Lumbering in Maine, 1820-1861* (Orono: University of Maine Press, 1971), p. 29.

<sup>5</sup>Jamie H. Eves, "Shrunk to a Comparative Rivulet': Deforestation, Stream Flow, and Rural Milling in 19th-Century Maine," *Technology and Culture* 33 (January 1992): 42.

<sup>6</sup>Noah Webster, *A Collection of Essays and Fugitive Writings*, compiled by Robert K. Peters (Delmar, New York: Scholars' Facsimiles & Reprints, 1977 [c. 1790]), pp. 371-72.

<sup>7</sup>Timothy Dwight, cited in William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983), p. 124.

<sup>8</sup>Eves, "Deforestation, Stream Flow, and Rural Milling," p. 64.

<sup>9</sup>Wood, *History of Lumbering in Maine*, p. 98.

<sup>10</sup>*Ibid.*, p. 162.

<sup>11</sup>Philip T. Coolidge, *History of the Maine Woods* (Bangor: Furbush-Roberts Printing, 1963), p. 80.

<sup>12</sup>Roger Milliken, Jr., *Forest for the Trees: A History of the Baskahegan Company* (by the author, 1983), p. 22.

<sup>13</sup>Wood, *History of Lumbering in Maine*, p. 23.

<sup>14</sup>Milliken, *Forest for the Trees*, pp. 31-32.

<sup>15</sup>David C. Smith, *A History of Lumbering in Maine, 1861-1960* (Orono: University of Maine Press, 1972), pp. 12-13.

<sup>16</sup>Coolidge, *History of the Maine Woods*, p. 136.

<sup>17</sup>Richard W. Judd, *Aroostook: A Century of Logging in Northern Maine* (Orono: University of Maine Press, 1989), p. 82.

<sup>18</sup>*Ibid.*, p. 84.

<sup>19</sup>Smith, *History of Lumbering in Maine*, p. 23.

<sup>20</sup>Michael Williams, *Americans and Their Forests: A Historical Geography* (New York: Cambridge University Press, 1989), p. 60.

<sup>21</sup>Carolyn Merchant, *Ecological Revolutions: Nature, Gender, and Science in New England* (Chapel Hill: University of North Carolina Press, 1989), p. 156.

<sup>22</sup>Williams, *Americans and Their Forests*, p. 63.

<sup>23</sup>Merchant, *Ecological Revolutions*, pp. 162-63.

<sup>24</sup>Benjamin W. Labaree, "An Historical Perspective," in *New England Prospects: Critical Choices in a Time of Change*, edited by Carl H. Reidel (Hanover: University Press of New England, 1982), p. 40.

<sup>25</sup>Michael Frome, *The Forest Service* (New York: Praeger Publishers, 1971), p. 6.

<sup>26</sup>Judd, *Aroostook*, p. 72.

<sup>27</sup>Coolidge, *History of the Maine Woods*, p. 554.

<sup>28</sup>Judd, *Aroostook*, p. 74.

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<sup>29</sup>Wood, *History of Lumbering in Maine*, pp. 156-57.

<sup>30</sup>Judd, *Aroostook*, p. 22.

<sup>31</sup>*Ibid.*, p. 38.

<sup>32</sup>*Ibid.*, p. 32.

<sup>33</sup>Wood, *History of Lumbering in Maine*, p. 73.

<sup>34</sup>Coolidge, *History of the Maine Woods*, p. 129.

<sup>35</sup>Thoreau, "The Succession of Forest Trees," in *Thoreau's Complete Works*, vol. 15 (New York: AMS Press, 1968), p. 189.

<sup>36</sup>Williams, *Americans and Their Forests*, p. 81.

<sup>37</sup>*Ibid.*, p. 134.

<sup>38</sup>Eves, "Shrunk to a Comparative Rivulet," p. 49.

<sup>39</sup>Judd, *Aroostook*, p. 82.