

CHANGES
IN THE
LAND

*Indians, Colonists, and the
Ecology of New England*

WILLIAM CRONON



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SEASONS OF WANT AND PLENTY

In describing New England's natural abundance so enthusiastically, the colonists were misleading in two ways; in the process, they revealed the assumptions by which they misconstrued the supposed "poverty" of the Indians. Those who sought to promote colonial enterprises tended to put the best possible face on everything they encountered in the New World. Selective reporting, exaggeration, and outright lies could all be useful tools in accomplishing this task. Captain Christopher Levett felt it necessary to inform readers of his 1628 account of New England that he would not "as some have done to my knowledge, speak more than is true." English readers must not be taken in by descriptions which made New England out to be a veritable paradise of milk and honey. "I will not tell you," Levett wrote,

that you may smell the corn fields before you see the land; neither must men think that corn doth grow naturally, (or on trees,) nor will the deer come when they are called, or stand still and look on a man until he shoot him, not knowing a man from a beast; nor the fish leap into the kettle, nor on the dry land, neither are they so plentiful, that you may dip them up in baskets, nor take cod in nets to make a voyage, which is no truer than that the fowls will present themselves to you with spits through them.

If the myths which Levett criticized had anything in common, it was their vision of a landscape in which wealth and sustenance could be achieved with little labor. Hopes for great windfall profits had fueled New World enterprises ever since the triumphs of Cortes, and were reinforced by traditions as old as the Garden of Eden. When English immigrants exaggerated the wealth of New England, they dreamed of a world in which returns to human labor were far greater than in England.¹

Because their hopes led them to expect a land of plenty, early visitors introduced a second distortion into their accounts. Even when what they wrote was literally true, they often failed to note that it was not *always* true. Just as the habitats of New England formed a patchwork quilt on the landscape, the plenty of one being matched by the poverty of another, so too did those habitats change from month to month, the abundance of one season giving few clues to what a place might be like at other

times of the year. Most early descriptions were written by spring and summer visitors, who naturally saw only the times when fish, fruit, and fowl were all too numerous to count. Would-be English settlers thus formed their vision of New England from accounts that concentrated the summer's seasonal wealth into an image of perpetual abundance. If the result was not disaster, it was at least disappointment. "When I remember the high commendations some have given of the place," wrote one chastened colonist, "I have thought the reason thereof to be this, that they wrote surely in strawberry time."²

New England's seasonal cycles were little different from those of Europe. If anything, its summers were hotter and its winters colder. Colonists were prevented from realizing this only by their own high expectations of laborless wealth: many initially seemed to believe that strawberry time would last all year. Captain Levett wrote of one early attempt at settlement in which the colonists "neither applied themselves to planting of corn nor taking of fish, more than for their present use, but went about to build castles in the air, and making of forts, neglecting the plentiful time of fishing." They did so because their myths told them that the plentiful times would never end, but their refusal to lay up stores for the winter meant that many starved to death. The pattern occurred repeatedly, whether at Sagadahoc, Plymouth, or Massachusetts Bay: colonists came without adequate food supplies and died. At Plymouth alone, half the Pilgrims were dead before the first winter was over. Those who had experienced the New England cold knew better, and warned that new arrivals who hoped to survive must bring provisions to last the year and a half before settlements could become self-sustaining. "Trust not too much on us for Corne at this time," wrote a spokesman for the Pilgrims, "for by reason of this last company that came, depending wholly upon us, we shall have little enough till harvest." This was hardly the advice one would send from a land of infinite plenty. The problem was perhaps stated most plaintively by the Massachusetts colonist John Pond, who in 1631 wrote his parents, "I pray you remember me as your child ... we do not know how long we may subsist, for we cannot live here without provisions from ould eingland."³

In New England, most colonists anticipated that they would be able to live much as they had done in England, in an artisanal and farming community with work rhythms, class relations, and a social order similar to the one they had left behind—the only difference being their own improved stature in society. There were many misconceptions involved in this vision, but the one most threatening to survival was the simple fact that establishing European relations of production in the New World was a far more complicated task than most colonists realized. Even to set up farms was a struggle. Once colonists had done this, adjusting to the New England ecosystem by re-creating the annual agricultural cycles which had sustained them in England, starving times became relatively rare. But for the first year or two, before

European subsistence patterns had been reproduced, colonists found themselves forced to rely either on what little they had brought with them or on what New England's inhabitants—whether English or Indian—were willing to provide. Few colonists expected that they would have to go abegging like this. At most, they contemplated supplementing their food stores by trading with the Indians; and as one promoter argued, should the Indians be reluctant to trade, it would be easy enough “to bring them all in subjection, and make this provision.” Many colonists arrived believing that they could survive until their first harvest simply by living as the Indians supposedly did, off the unplanted bounties of nature. Colonists were assured by some that Indian men got their livelihood with “small labour but great pleasure.” Thomas Morton spoke of Indians for whom “the beasts of the forrest there doe serve to furnish them at any time when they please.” If this were true, then surely Englishmen could do no worse. John Smith told his readers that, in New England, “nature and liberty affoords us that freely which in *England* we want, or it costeth us deerly.” The willingness of colonists to believe such arguments, and hazard their lives upon them, was testimony to how little they understood both the New England environment and the ways Indians actually lived in it.⁴

A central fact of temperate ecosystems like those of New England is their periodicity: they are tied to overlapping cycles of light and dark, high and low tides, waxing and waning moons, and especially the long and short days which mean hot and cold seasons. Each plant and animal species makes its adjustments to these various cycles, so that the flowing of sap in trees, the migration of birds, the spawning of fish, the rutting of deer, and the fruiting of plants all have their special times of the year. A plant that stores most of its food energy in its roots during the winter will transfer much of that energy first to its leaves and then to its seeds as the warmer months progress. Such patterns of energy concentration are crucial to any creature which seeks to eat that plant. Because animals, including people, feed on plants and other animals, the ways they obtain their food are largely determined by the cycles in which other species lead their lives. Just as a fox's summer diet of fruit and insects shifts to rodents and birds during the winter, so too did the New England Indians seek to obtain their food wherever it was seasonally most concentrated in the New England ecosystem. Doing so required an intimate understanding of the habits and ecology of other species, and it was this knowledge that the English discovered they lacked.⁵

Indian communities had learned to exploit the seasonal diversity of their environment by practicing mobility: their communities characteristically refused to stay put. The principal social and economic grouping for precolonial New England Indians was the village, a small settlement with perhaps a few hundred inhabitants organized into extended kin networks. Villages, rather than the larger and better-known units called tribes or confederacies, were the centers around which Indian

interactions with the environment revolved. But villages were not fixed geographical entities: their size and location changed on a seasonal basis, communities breaking up and reassembling as social and ecological needs required. Wherever villagers expected to find the greatest natural food supplies, there they went. When fish were spawning, many Indian families might gather at a single waterfall to create a dense temporary settlement in which feasting and celebration were the order of the day; when it was time to hunt in the fall, the same families might be found scattered over many square miles of land. All aspects of Indian life hinged on this mobility. Houses, consisting of wooden frames covered by grass mats or bark, were designed to be taken apart and moved in a few hours. For some groups, the shape of houses changed from season to season to accommodate different densities of population: small wigwams housing one or two families in the summer became in the winter extended longhouses holding many families. When food had to be stored while a village moved elsewhere, it was left in carefully constructed underground pit-barns, where it could be retrieved when needed. Tools and other property were either light and easily carried or just as readily abandoned and remade when needed in a new location. As Thomas Morton observed, “They love not to be cumbered with many utensilles.”⁶

The seasonal cycles within which a village moved depended on the habitats available to it: Indians who had access to the seashore, for instance, could lead rather different lives than their inland counterparts. Important as habitat differences were, however, the crucial distinction between Indian communities was whether or not they had adopted agriculture. In general, Indians south of the Kennebec River in Maine raised crops as part of their annual subsistence cycles; more northern Indians, on the other hand, as Verrazzano noted in 1524, showed “no sign of cultivation.” Verrazzano quite reasonably attributed the absence of agriculture in the north to soil which would produce neither fruit nor grain “on account of its sterility”: climatic conditions in fact made grain raising an increasingly risky business the farther north an Indian people lived. Because the ability to grow crops had drastic implications for the way a village conducted the rest of its food-gathering activities, it is best to begin our description of Indian subsistence strategies in the north, where Indians were entirely dependent on the natural abundance of the ecosystem. Only in the north did Indians live entirely as hunter-gatherers, people who bore at least superficial resemblance to the creatures of English fantasy who captured nature’s bounties with “small labor but great pleasure.”⁷

In the north, spring commenced “when the leaves begin to sprout, when the wild geese appear, when the fawns of moose attain to a certain size in the bellies of their mothers, and when the seals bear their young.” Most especially, the northern spring began when the ice broke up; then inland populations moved to coastal sites where they repaired fishing gear—nets, tackle, weirs, birchbark canoes—in anticipation of

the spawning runs. For Maine Indians who had access to the coast, probably well over half the yearly food supply came from the rivers and seashore. In late March, the smelt arrived in streams and rivers in such quantities that one could not put a “hand into the water, without encountering them.” They were followed in April by the alewives, sturgeon, and salmon, so that spawning runs furnished a major share of the food supply from March through May. By early May, nonspawning fish were also providing food. Offshore were cod which had to be caught with hook and line. Closer to land were tidewater and ground fish, such as brook trout, smelt, striped bass, and flounder, all of which could be caught with weirs and nets, and the larger sturgeon and salmon, which were usually harpooned. In the tidal zone were the scallops, clams, mussels, and crabs which women and children gathered as a steady base for the village diet. As described by the Jesuit Pierre Biard, this phase of the northern Indians’ subsistence cycle was especially flush: “From the month of May up to the middle of September, they are free from all anxiety about their food; for the cod are upon the coast, and all kinds of fish and shellfish.”⁸

The arrival of the alewives also heralded the coming of the migratory birds, including the large ducks which Biard called bustards, whose eggs were over twice as large as ordinary European hens’ eggs. Not only could women and children gather birds’ eggs while men fished; they could capture the birds themselves with snares or clubs. Bird migrations made their biggest contribution to Indian food supplies in April, May, September, and October, when Canada geese, brants, mourning doves, and miscellaneous ducks passed through; other birds, albeit in fewer numbers, could be caught during the summer as well. By July and August, strawberries, raspberries, and blueberries were ripening, providing food not only for Indians but for flocks of passenger pigeons and other birds which nested in the area. In addition to birds, various coastal mammals—whales, porpoises, walruses, and seals—were hunted and eaten. Nuts, berries, and other wild plants were gathered as they became available. In all ways, the summer was a time of plenty.

Things changed in September. Toward the middle of the month, Indian populations moved inland to the smaller creeks, where eels could be caught as they returned from their spawning in the sea. From October through March, villages broke into small family bands that subsisted on beaver, caribou, moose, deer, and bear. Men were responsible for killing these animals, while women maintained the campsite and did all hauling and processing of the slaughtered meat. If snows were heavy and animals could be easily tracked, hunting provided an adequate food supply; if the snow failed to stay on the ground, on the other hand, it was easy to starve. Northern Indians accepted as a matter of course that the months of February and March, when the animals they hunted were lean and relatively scarce, would be times of little food.⁹

European visitors had trouble comprehending this Indian willingness to go hungry

in the late winter months. They were struck by the northern Indians' apparent refusal to store more than a small amount of the summer's plenty for winter use. As the Jesuit Chrétien Le Clercq remarked:

They are convinced that fifteen to twenty lumps of meat, or of fish dried or cured in the smoke, are more than enough to support them for the space of five to six months. Since, however, they are a people of good appetite, they consume their provisions very much sooner than they expect. This exposes them often to the danger of dying from hunger, through lack of the provision which they could easily possess in abundance if they would only take the trouble to gather it.

Here again was the paradox of want in a land of plenty. To a European sensibility, it made no sense to go hungry if one knew in advance that there would be little food in winter. Colonists who starved did so because they learned too late how ill informed they had been about the New World's perpetual abundance. Although the myth died hard, those who survived it were reasonably quick to revise their expectations. When Europeans inquired why nonagricultural Indians did not do the same, the Indians replied, "It is all the same to us, we shall stand it well enough; we spend seven and eight days, even ten sometimes, without eating anything, yet we do not die." What they said was true: Indians died from starvation much less frequently than did early colonists, so there was a certain irony in European criticisms of Indians on this score. Whatever the contradictions of their own position, however, the colonists could not understand Indian attitudes toward winter food shortages. Consciously choosing hunger, rather than working harder in the leisurely times of summer, seemed a fool's decision.¹⁰

One effect of that choice, however, was to hold northern Indians to low population densities. The ecological principle known as Liebig's Law states that biological populations are limited not by the total annual resources available to them but by the minimum amount that can be found at the scarcest time of the year. Different species meet this restriction in different ways, and the mechanism—conscious or unconscious—whereby northern Indians restrained their fertility is not clear. However they accomplished this feat, its effects were self-evident: the low Indian populations of the precolonial northern forests had relatively little impact on the ecosystems they inhabited. The very abundance which so impressed the Europeans was testimony to this fact. By keeping population densities low, the food scarcities of winter guaranteed the abundance of spring, and contributed to the overall stability

of human relationships to the ecosystem. In this, northern New England Indians were typical of hunting and gathering peoples around the world.¹¹

The farming Indians of southern New England, among whom the earliest English colonists made their settlements, also engaged in hunting and gathering, but their ability to raise crops put them in a fundamentally different relationship with their environment. The very decision to engage in agriculture requires the creation of at least enough seed surplus to assure that planting can be done the following year, and opens the possibility of growing and storing enough food to carry a population through the winter with much less dependence on the vagaries of the hunt. Grain made up perhaps one-half to two-thirds of the southern New England diet, thereby reducing southern reliance on other foodstuffs; in comparison, northern Indians who raised no grain at all had to obtain two to three times more food energy from hunting and fishing. More importantly, nothing in the northern diet could be stored through the scarce times of winter as effectively as grain, making starvation a much less serious threat in the south than in the north.¹²

The ability of agriculture to smooth out the seasonal scarcities of wild foodstuffs had major consequences for the sizes of Indian populations in New England. The nonagricultural Indians of Maine sustained population densities, on average, of perhaps 41 persons per hundred square miles. The crop-raising Indians of southern New England, on the other hand, probably maintained 287 persons on an identical amount of land, a sevenfold difference. When these two broad groups were combined, the total Indian population of New England probably numbered somewhere between 70,000 and 100,000 people in 1600. (Lest this seem unimpressive, one should remember that the *English* population of New England was smaller than this even at the beginning of the eighteenth century, having reached only 93,000 people by 1700.) The crucial role of agriculture in maintaining so large an Indian population in precolonial New England is clear: although agricultural and nonagricultural peoples inhabited roughly equal areas of southern and northern New England respectively, those who raised crops contributed over 80 percent of the total population.¹³

Although southern Indians engaged in many of the same annual hunting and fishing activities as northern ones, their concentration on the raising of crops can be seen even in the names they gave their months. Northern Indians named their lunar months in terms of seasonal changes in animal populations, referring to the egg laying of birds, the running of salmon, the molting of geese, the hibernation of bears, and so on. By contrast, southern Indians chose the names of their months with an entirely different emphasis. The fur trader John Pynchon recorded that the Agawam Indian village near Springfield, Massachusetts, began its year with the month of Squannikesos, which included part of April and part of May, and whose name meant “when they set Indian corn.” This was followed by various months whose names

indicated the weeding of corn, the hilling of corn, the ripening of corn, the coming of the frost, the middle of winter, the thawing of ice, and the catching of fish. The southern cycle of months was thus remarkable in having only a single reference to the animals which so dominated the northern calendar, an indication of how much agriculture had transformed Indian lives there.¹⁴

As the Agawam calendar shows, southern Indians began their annual subsistence cycles by moving to their summer fields and preparing the ground by working it with clamshell hoes. According to the Dutch traveler Isaack de Rasieres, the Indians “make heaps like molehills, each about two and a half feet from the others, which they sow or plant in April with maize, in each heap five or six grains.” Because the earth was not stirred deeply by this method, much of the soil was left intact and erosion was thereby held to a minimum. As the young plants grew, soil was raised around them to create low mounds which strengthened their roots against the attacks of birds. Maize was not an easy crop to raise: as de Rasieres noted, it was “a grain to which much labor must be given, with weeding and earthing-up, or it does not thrive.” Perhaps partly for this reason, Indian farmers, unlike European ones, used their cornfields to raise more than just corn. When Champlain observed Indian fields near the mouth of the Saco River, he noted that

with the corn they put in each hill three or four Brazilian beans [kidney beans], which are of different colors. When they grow up, they interlace with the corn, which reaches to the height of from five to six feet; and they keep the ground very free from weeds. We saw there many squashes, and pumpkins, and tobacco, which they likewise cultivate.

It was not an agriculture that looked very orderly to a European eye accustomed to monocultural fields. Cornstalks served as beanpoles, squashes sent their tendrils everywhere, and the entire surface of the field became a dense tangle of food plants. But, orderly or not, such gardens had the effect, as John Winthrop, Jr., said, of “loading the Ground with as much as it will beare,” creating very high yields per acre, discouraging weed growth, and preserving soil moisture. Moreover, although Indians may or may not have realized it, the resulting harvest of beans and corn provided the amino acids necessary for a balanced diet of vegetable protein.¹⁵

Except for tobacco, crops were primarily the responsibility of women. Roger Williams wrote that Indian women “constantly beat all their corne with hand: they plant it, dresse it, gather it, barne it, beat it, and take as much paines as any people in

the world” with it. As with the hunting Indians of northern New England, the sexual division of labor for the agricultural peoples of southern New England was very well defined, women performing those jobs which were most compatible with simultaneous child-care. This meant tasks which were generally repetitive, which could be easily interrupted, which did not require travel too far from home, and which did not suffer if one performed them while giving most of one’s attention to the children. In the nonagricultural north, women’s work involved gathering shellfish and birds on the shore, collecting wild plants, trapping small rodents, making garments, keeping camp, and the whole range of food-processing activities; but meat gathered by men probably supplied half or more of a village’s food. In the south, on the other hand, agriculture changed this sexual division and made women much more important than men in providing food. A single Indian woman could raise anywhere from twenty-five to sixty bushels of corn by working an acre or two, enough to provide half or more of the annual caloric requirements for a family of five. When corn was combined with the other foods for which they were responsible, women may have contributed as much as three-fourths of a family’s total subsistence needs.¹⁶

Crops were planted between March and late June, the event often being timed by the leafing of certain trees or the arrival of the alewives. While women worked the fields, men erected weirs on the rivers and fished the spring spawning runs. By March, most beans and corn remaining from the previous harvest were probably needed as seed for planting, so that fish and migratory birds became the chief sources of food from late winter through midsummer. Contrary to what American myth has long held, it is quite unlikely that alewives or other fish were used as fertilizer in Indian fields, notwithstanding the legendary role of the Pilgrims’ friend Squanto in teaching colonists this practice. Squanto probably learned the technique while being held captive in Europe, and if any Indians used it in New England, they did so in an extremely limited area. Having no easy way to transport large quantities of fish from river to field, and preferring quite sensibly to avoid such back-breaking work, Indians simply abandoned their fields when the soil lost its fertility. As William Wood wrote, “The Indians who are too lazy to catch fish plant corn eight or ten years in one place without it, having very good crops.” Fertilizing fields with fish, as the English eventually did, seemed to Indians a wholly unnecessary labor.¹⁷

Once crops were planted and weeded, they needed less attention for two or three months, until the ripening corn had to be guarded against marauding birds before being harvested. (De Rasieres explained how some birds, probably passenger pigeons, were known as “maize thieves” because “they flatten the corn in any place where they alight, just as if cattle had lain there.”) During these months, villages tended to disperse and families moved their individual wigwams to other planting and gathering sites. Women, who owned the wigwams and most household goods,

moved their camps from field to field as necessary, and then to points along the coast where they gathered seafood and the cattails used in making mats for wigwams. Camps occasionally had to be moved in the summer simply to escape the fleas which tended to breed around human habitations. Wigwams were also moved if a death occurred in one, or if a settlement was threatened by war.¹⁸

Men fanned out from these bases for extended fishing and hunting trips. They might disappear into the woods for ten days at a time to build a dugout canoe that would allow them to fish deep water with harpoon or hook and line. Southern New England boats were made from decay-resistant chestnut and were heavy enough to require several hands to launch; in the north, paper birch, which did not grow in southeastern New England, was used to create the much lighter and more familiar birchbark canoes. Whether birch or chestnut, these tippy boats might be taken a mile or more offshore at night to hunt sturgeon by torchlight, or be run down the rapids of rivers in search of salmon or eels. Used for these purposes, canoes could be very dangerous indeed. Roger Williams spoke from personal experience when he said, "It is wonderfull to see how they will venture in those Canoes, and how (being oft overset as I have myself been with them) they will swim a mile, yea two or more safe to Land." Such danger was typical of male work. Whereas the relatively steady labor of agriculture and gathering allowed women to provide the largest share of a village's food without moving far from home, the hunting and fishing of animal protein had much different requirements. These activities took men far from the main camp for many days at a time, and exposed them to much greater risk of injury or death. Hunting and fishing both had irregular work rhythms which sometimes required many intense hours of labor under hard conditions, and sometimes long hours of idleness. Times in camp were often periods of relative leisure and recuperation for men.¹⁹

As summer drew to a close, female food production reached a climax and male hunting activities began to contribute a greater share of the village's food. Autumn saw the harvesting of corn in addition to the gathering of acorns, chestnuts, groundnuts, and other wild plants. It was a time of extensive festivals when many hundreds of people gathered in dense settlements and consumed much of this surplus food. Gambling, dancing, and eating were combined with rituals—similar to the potlatch ceremonies of the Pacific Northwest—in which wealthy individuals gave away much of what they owned to establish reciprocal relations of obligation with potential followers or allies. The harvest saw greater surplus than any other time of year, and so was often the preferred season for going to war, when food stores both at home and in enemy territory would be at their peak. But once the harvest celebrations were over, Indian households struck their wigwams, stored the bulk of their corn and beans, and moved to campsites to conduct the fall hunt.²⁰

From October to December, when animals like bear and deer were at their fattest,

southern villages, much like their counterparts in the north, broke into small bands to assure maximum coverage of the hunting territory. Again the sexual division of labor came into play. Men hunted steadily, using a variety of techniques. Game might be stalked with bow and arrow by a lone hunter or by groups of two or three hundred men working together. It might be snared with traps specially designed to capture a single species; William Bradford, for instance, accidentally walked into a trap strong enough to hold a full-grown deer. Or game might be run between specially planted hedges more than a mile in length until it was finally driven onto the weapons of waiting hunters. Nothing required a greater knowledge of animal behavior than the winter hunt. While men remained in the field, women hauled dead game back to camp. There they butchered and processed it, preparing the hides for clothing, cooking the meat, and smoking some of it for use later in the winter.²¹

By late December, when the snows finally came, the village had probably reassembled in heavily wooded valleys well protected from the weather, where fuel for campfires was easy to obtain. For the rest of the winter, men continued to hunt and fish the surrounding area on snowshoes, while women remained in camp making garments and living on meat and stored grain. Especially for men away from camp, winter was a time of occasional hunger between kills; most carried only a small store of parched corn flour called *nocake* as traveling fare. Like their hunting kindred to the north, they accepted such hunger as inevitable and bore it with stoicism. As Samuel Lee reported, the Indians were “very patient in fasting, & will gird in their bellies till they meet with food; but then none more gluttons or drunk on occasion. Theyle eat 10 times in 24 houres, when they have a beare or a deere.”²²

The hunt provided a crucial source of protein and vitamins during the winter. A single season’s catch for a southern New England village of about 400 inhabitants might bring in over 8,500 pounds of edible deer meat and over 7,000 pounds of bear, the two animals which together contributed more than three-fourths of an inland village’s winter meat supply. (Coastal Indians who relied more heavily on seafood killed smaller amounts of large game.) Whether or not this meat was essential to a community’s survival—given the availability of stored beans and grain—the skins of these and other furbearing animals would furnish the village’s clothing for the following year. Simple measurements of caloric content thus tend to undervalue the importance of the fall and winter hunt to an agricultural village’s subsistence cycle. Hundreds of square miles had to be stalked to obtain skins for the skirts, leggings, shirts, moccasins, and other articles of clothing Indians would need in the months ahead.²³

The relationship of the southern New England Indians to their environment was thus, if anything, even more complicated than that of the northern Indians. To the seasons of hunting and fishing shared by both groups were added the agricultural cycles which increased the available food surplus and so enabled denser populations

to sustain themselves. In both areas, the mobility of village sites and the shift between various subsistence bases reduced potential strains on any particular segment of the ecosystem, keeping the overall human burden low. But in clearing land for planting and thus concentrating the food base, southern Indians were taking a most important step in reshaping and manipulating the ecosystem.

Clearing fields was relatively easy. By setting fire to wood piled around the base of standing trees, Indian women destroyed the bark and so killed the trees; the women could then plant corn amid the leafless skeletons that were left. During the next several years, many of the trees would topple and could be entirely removed by burning. As one Indian remembered, “An industrious woman, when great many dry logs are fallen, could burn off as many logs in one day as a smart man can chop in two or three days time with an axe.” However efficient they were at such clearing, Indian women were frugal with their own labor, and sought to avoid even this much work for as long as they could. That meant returning to the same field site for as long as possible, usually eight to ten years. In time, the soil gradually lost its fertility and eventually necessitated movement to a new field. (Soil exhaustion was to some extent delayed by the action of the nitrogen-fixing beans which Indian women planted with the corn; whether they were aware of it or not, this was one of the side benefits of planting multicrop fields.)²⁴

The annual reoccupation of fixed village and planting sites meant that the area around field and camp experienced heavy human use: intensive food gathering, the accumulation of garbage, and, most importantly, the consumption of firewood. One of the main reasons Indians moved to winter camps was that their summer sites had been stripped of the fuel essential for winter fires. Indians believed in big fires—one colonist said that “their Fire is instead of our bed cloaths”—and burned wood heavily all night long, both summer and winter. Such practices could not long be maintained on a single site. As Morton said, “They use not to winter and summer in one place, for that would be a reason to make fuell scarce.” The Indians were thus no strangers to the fuel shortages so familiar to the English, even if Indian scarcities were more local. When Verrazzano found twenty-five to thirty leagues of treeless land in Narragansett Bay, or Higginson spoke of thousands of acres in a similar state near Boston, they were observing the effects of agricultural Indians returning to fixed village sites and so consuming their forest energy supply. Indeed, when the Indians wondered why English colonists were coming to their land, the first explanation that occurred to them was a fuel shortage. Roger Williams recounted:

This question they oft put to me: Why come the *Englishmen* hither? and measuring others by themselves; they say, It is because you want *firing*: for they, having burnt up the *wood* in one place, (wanting

draughts [animals] to bring *wood* to them) they are faine to follow the *wood*; and so to remove to a fresh new place for the *woods* sake.

Williams regarded this merely as a quaint instance of Indian provincialism, but in one ironic sense, given what we know of the English forests of the seventeenth century, the Indians were perhaps shrewder than he knew.²⁵

The effect of southern New England Indian villages on their environment was not limited to clearing fields or stripping forests for firewood. What most impressed English visitors was the Indians' burning of extensive sections of the surrounding forest once or twice a year. "The Salvages," wrote Thomas Morton, "are accustomed to set fire of the Country in all places where they come, and to burne it twize a yeare, viz: at the Spring, and the fall of the leafe." Here was the reason that the southern forests were so open and parklike; not because the trees naturally grew thus, but because the Indians preferred them so. As William Wood observed, the fire "consumes all the underwood and rubbish which otherwise would overgrow the country, making it unpassable, and spoil their much affected hunting." The result was a forest of large, widely spaced trees, few shrubs, and much grass and herbage. "In those places where the Indians inhabit," said Wood, "there is scarce a bush or bramble or any cumbersome underwood to be seen in the more champion ground." By removing underwood and fallen trees, the Indians reduced the total accumulated fuel at ground level. With only small nonwoody plants to consume, the annual fires moved quickly, burned with relatively low temperatures, and soon extinguished themselves. They were more ground fires than forest fires, not usually involving larger trees, and so they rarely grew out of control. Fires of this kind could be used to drive game for hunting, to clear fields for planting, and, on at least one occasion, to fend off European invaders.²⁶

Northern Indians do not appear to have engaged in such burning. Because they did not practice agriculture and so were less tied to particular sites, they had less incentive to alter the environment of a given spot. Their chief mode of transportation was the canoe, so that they had less need of an open forest for traveling. Moreover, many of the northern tree species were not well adapted to repeated burning, and northern forests tended to accumulate enough fuel at ground level that, once a fire got started, it usually reached the canopy and burned out of control. Conditions in southern New England were quite different. Denser, fixed settlements encouraged heavy use of more limited forest areas, and most inland travel was by land. The trees of the southern forest, once fully grown, suffered little more than charred bark if subjected to ground fires of short duration. If destroyed, they regenerated themselves by sprouting from their roots: chestnuts, oaks, and hickories, the chief constituents of the southern upland forests, are in fact sometimes known as "sprout hardwoods."

Repeated fires tended to destroy trees and shrubs which lacked this ability, including hemlock, beech, and juniper. Even the white pine, which often sprang up after large forest fires, tended to be killed off if subjected to regular burning because of its inability to sprout, and so was uncommon in the vicinity of active Indian settlements.²⁷

Colonial observers understood burning as being part of Indian efforts to simplify hunting and facilitate travel; most failed to see its subtler ecological effects. In the first place, it increased the rate at which forest nutrients were recycled into the soil, so that grasses, shrubs, and nonwoody plants tended to grow more luxuriantly following a fire than they had before. Especially on old Indian fields, fire created conditions favorable to strawberries, blackberries, raspberries, and other gatherable foods. Grasses like the little bluestem were rare in a mature forest, but in a forest burned by Indians they became abundant. The thinning of the forest canopy, which resulted from the elimination of smaller trees, allowed more light to reach the forest floor and further aided such growth. The soil became warmer and drier, discouraging tree species which preferred moister conditions—beech, sugar maple, red maple, black birch—and favoring drier species like oaks when regular burning was allowed to lapse. Burning also tended to destroy plant diseases and pests, not to mention the fleas which inevitably became abundant around Indian settlements. Roger Williams summed up these effects by commenting that “this burning of the Wood to them they count a Benefit, both for destroying of vermin, and keeping downe the Weeds and thickets.”²⁸

Selective Indian burning thus promoted the mosaic quality of New England ecosystems, creating forests in many different states of ecological succession. In particular, regular fires promoted what ecologists call the “edge effect.” By encouraging the growth of extensive regions which resembled the boundary areas between forests and grasslands, Indians created ideal habitats for a host of wildlife species. Of all early American observers, only the astute Timothy Dwight seems to have commented on this phenomenon. “The object of these conflagrations,” he wrote, “was to produce fresh and sweet pasture for the purpose of alluring the deer to the spots on which they had been kindled.” The effect was even subtler than Dwight realized: because the enlarged edge areas actually raised the total herbivorous food supply, they not merely attracted game but helped create much larger populations of it. Indian burning promoted the increase of exactly those species whose abundance so impressed English colonists: elk, deer, beaver, hare, porcupine, turkey, quail, ruffed grouse, and so on. When these populations increased, so did the carnivorous eagles, hawks, lynxes, foxes, and wolves. In short, Indians who hunted game animals were not just taking the “unplanted bounties of nature”; in an important sense, they were harvesting a foodstuff which they had consciously been instrumental in cremating.²⁹

Few English observers could have realized this. People accustomed to keeping domesticated animals lacked the conceptual tools to realize that Indians were practicing a more distant kind of husbandry of their own. To the colonists, only Indian women appeared to do legitimate work; the men idled away their time in hunting, fishing, and wantonly burning the woods, none of which seemed like genuinely productive activities to Europeans. English observers often commented about how hard Indian women worked. “It is almost incredible,” Williams wrote, “what burthens the poore women carry of *Corne*, of *Fish*, of *Beanes*, of *Mats*, and a childe besides.” The criticism of Indian males in such remarks was usually explicit. “Their wives are their slaves,” wrote Christopher Levett, “and do all the work; the men will do nothing but kill beasts, fish, etc.” For their part, Indian men seemed to acknowledge that their wives were a principal source of wealth and mocked Englishmen for not working their wives harder. According to the lawyer Thomas Lechford, “They say, *Englishman* much foole, for spoiling good working creatures, meaning women: And when they see any of our *English* women sewing with their needles, or working coifes, or such things, they will cry out, Lazie squaes.”³⁰

Part of the problem with these cross-cultural criticisms was the inability or refusal by either side to observe fully how much each sex was contributing to the total food supply. Indian men, seeing Englishmen working in the fields, could not understand why English *women* were not doing such work. At the same time, they failed to see the contributions colonial women were actually making: gardening, cooking, spinning and weaving textiles, sewing clothing, tending milch cows, making butter and cheese, caring for children, and so on. The English, for their part, had trouble seeing hunting and fishing—which most regarded as leisure activities—as involving real labor, and so tended to brand Indian men as lazy. “The Men,” wrote Francis Higginson, “for the most part live idely, they doe nothing but hunt and fish: their wives set their *Corne* and doe all their other worke.” It is quite possible that Indian women—like women in many cultures—did indeed bear a disproportionate share of the work burden. But even if the advent of agriculture in southern New England had shifted the balance between meat and vegetables in the Indian diet—lowering the importance of meat and incidentally changing the significance of each sex’s role in acquiring food—the annual subsistence cycle still saw Indian communities giving considerable attention to hunting meat, the traditionally more masculine activity. As we shall see, the English used this Indian reliance on hunting not only to condemn Indian men as lazy savages but to deny that Indians had a rightful claim to the land they hunted. European perceptions of what constituted a proper use of the environment thus reinforced what became a European ideology of conquest.³¹

The relationships of the New England Indians to their environment, whether in the north or the south, revolved around the wheel of the seasons: throughout New England, Indians held their demands on the ecosystem to a minimum by moving

their settlements from habitat to habitat. As one of the earliest European visitors noted, “They move ... from one place to another according to the richness of the site and the season.” By using other species when they were most plentiful, Indians made sure that no single species became overused. It was a way of life to match the patchwork of the landscape. On the coast were fish and shellfish, and in the salt marshes were migratory birds. In the forests and lowland thickets were deer and beaver; in cleared upland fields were corn and beans; and everywhere were the wild plants whose uses were too numerous to catalog. For New England Indians, ecological diversity, whether natural or artificial, meant abundance, stability, and a regular supply of the things that kept them alive.³²

The ecological relationships which the English sought to reproduce in New England were no less cyclical than those of the Indians; they were only simpler and more concentrated. The English too had their seasons of want and plenty, and rapidly adjusted their false expectations of perpetual natural wealth to match New World realities. But whereas Indian villages moved from habitat to habitat to find maximum abundance through minimal work, and so reduce their impact on the land, the English believed in and required permanent settlements. Once a village was established, its improvements—cleared fields, pastures, buildings, fences, and so on—were regarded as more or less fixed features of the landscape. English fixity sought to replace Indian mobility; here was the central conflict in the ways Indians and colonists interacted with their environments. The struggle was over two ways of living and using the seasons of the year, and it expressed itself in how two peoples conceived of property, wealth, and boundaries on the landscape.