

"no tech is good nor bad, nor neutral" - essay

People assume one tech or another is inherently better or worse, However there's no objective good/bad. Instead:

- Some are good for group A and bad for group B. (Often the cause of WWI, etc)
- Some are good b/c first mover advantage or the network effect.
- Some are good b/c people think it will be good, so investment, etc.



As far as I know, no one has argued that the development of the tomato harvester was the result of a plot. Two students of the controversy, William Friedland and Amy Barton, specifically exonerate both the original developers of the machine and the hard tomato from any desire to facilitate economic concentration in that industry. What we see here instead is an ongoing social process in which scientific knowledge, technological invention, and corporate profit reinforce each other in deeply entrenched patterns that bear the unmistakable stamp of political and economic power. Over many decades agricultural research and development in American land-grant colleges and universities has tended to favor the interests of large agribusiness concerns. It is in the face of such subtly ingrained patterns that opponents of innovations like the tomato harvester are made to seem "antitechnology" or "antiprogess." For the harvester is not merely the symbol of a social order that rewards some while punishing others: it is in a true sense an embodiment of that order.

Within a given category of technological change there are, roughly speaking, two kinds of choices that can affect the relative distribution of power, authority, and privilege in a community. Often the crucial decision is a simple "yes or no" choice—are we going to develop and adopt the thing or not? In recent years many local, national, and international disputes about technology have centered on "yes or no" judgments about such things as food additives, pesticides, the building of highways, nuclear reactors, and dam projects. The fundamental choice about an ABM or an SST is whether or not the thing is going to join society as a piece of its operating equipment. Reasons for and against are frequently as important as those concerning the adoption of an important new law.

A second range of choices, equally critical in many instances, has to do with specific features in the design or arrangement of a technical system after the decision to go ahead with it has already been made. Even after a utility company wins permission to build a large electric power line, important controversies can remain with respect to the placement of its route and the design of its towers; even after an organization has decided to institute a system of computers, controversies can still arise with regard to the kinds of components, programs, modes of access, and other specific features the system will include. Once the mechanical tomato harvester had been developed in its basic form, design alteration of critical social significance—the addition of electronic sorters, for example—changed the character of the machine's effects on the balance of wealth and power in California agriculture. Some of the most interesting research on technology and politics at present focuses on the attempt to demonstrate in a detailed, concrete fashion how seemingly innocuous design features in mass transit systems, water projects, industrial machinery, and other technologies actually mask social choices of profound significance. . . .

From such examples I would offer the following general conclusions. The things we call "technologies" are ways of building order in our world. Many technical devices and systems important in everyday life contain possibilities for many different ways of ordering human activity. Consciously or not, deliberately or inadvertently, societies choose structures for technologies that influence how people are going to work, communicate, travel, consume, and so forth over a very long time. In the processes by which structuring decisions are made, different people are differently situated and possess unequal degrees of power as well as unequal levels of awareness. By far the greatest latitude of choice exists the very first time a particular

instrument, system, or technique is introduced. Because choices tend to become strongly fixed in material equipment, economic investment, and social habit, the original flexibility vanishes for all practical purposes once the initial commitments are made. In that sense technological innovations are similar to legislative acts or political foundations that establish a framework for public order that will endure over many generations. For that reason, the same careful attention one would give to the rules, roles, and relationships of politics must also be given to such things as the building of highways, the creation of television networks, and the tailoring of seemingly insignificant features on new machines. The issues that divide or unite people in society are settled not only in the institutions and practices of politics proper, but also, and less obviously, in tangible arrangements of steel and concrete, wires and transistors, nuts and bolts.

The Social Shaping of Technology

DONALD MACKENZIE

... The idea that technological change is just "progress," and that certain technologies triumph simply because they are the best or the most efficient, is still widespread. A weaker but more sophisticated version of technological determinism—the idea that there are "natural trajectories" of technological change—remains popular among economists who study technology.

In my experience, the idea of unilinear progress does not survive serious engagement with the detail of the history of technology. For what is perhaps most striking about that history is its wealth, complexity, and variety. Instead of one predetermined path of advance, there is typically a constant turmoil of concepts, plans, and projects. From that turmoil, order (sometimes) emerges, and its emergence is of course what lends credibility to notions of "progress" or "natural trajectory." With hindsight, the technology that succeeds usually does look like the best or the most natural next step.

However . . . we must always ask "Best for whom?" Different people may see a technology in different ways, attach different meanings to it, want different things from it, assess it differently. Women and men, for example, may view the same artifact quite differently. Workers and their employers may not agree on the desirable features of a production technology.

Such discrepant meanings and interests are often at the heart of what is too readily dismissed as irrational resistance to technological change, such as that of the much-disparaged Luddite machine breakers. We must also ask "Best for whom?" even when we are discussing such apparently "technical" decisions as the best way to automate machine tools or typesetting. These two technologies were the subjects of now-classic studies of Cynthia Cockburn (who focused on the shaping of technology by gender relations) and David Noble (who focused on its shaping of relations of social class). . . .

From Donald MacKenzie, "The Social Shaping of Technology" originally appeared as "Underpinnings" in *Knowing Machines: Essays on Technical Change* (Cambridge, MA: MIT Press, 1996), pp. 5-8.

Resistance to Tech = Diff Values
"Best for whom?"

Nor is this issue—the different meanings of a technology for different “relevant social groups,” and the consequently different criteria of what it means for one technology to be better than another—restricted to situations of class conflict or other overt social division. The customers for . . . supercomputers . . . for example, were all members of what one might loosely think of as the “establishment”: nuclear weapons laboratories, the code breakers of the National Security Agency, large corporations, elite universities, and weather bureaus. Responding to their needs, but far from subservient, were the developers of supercomputers, most famously Seymour Cray. All were agreed that a supercomputer should be fast, but there were subtle differences among them as to what “fast” meant. As a consequence, the technical history of supercomputing can be seen, in one light, as a negotiation—which is still continuing—of the meaning of speed.

We also need to delve deeper even where there is agreement as to what characteristics make a technology the best. . . . Technologies, as Brian Arthur and Paul David point out, typically manifest increasing returns to adoption. The more they are adopted, the more experience is gained in their use, the more research and development effort is devoted to them, and the better they become. This effect is particularly dramatic in the case of “network” technologies such as telephones or the worldwide computer network called the Internet, where the utility of the technology to one user depends strongly on how many other users there are. But the effect can be also be found in “stand-alone” technologies. . . .

This means that early adoptions—achieved for whatever reasons—may give a particular technology an overwhelming lead over actual or potential rivals, as that technology enjoys a virtuous circle in which adoptions lead to improvements, which then spawn more adoptions and further improvements, while its rivals stagnate. Technologies, in other words, may be best because they have triumphed, rather than triumphing because they are best. . . .

Hindsight often makes it appear that the successful technology is simply intrinsically superior, but hindsight—here and elsewhere—can be a misleading form of vision. Historians and sociologists of technology would do well to avoid explaining the success of a technology by its assumed intrinsic technical superiority to its rivals. Instead, they should seek, even-handedly, to understand how its actual superiority came into being, while suspending judgment as to whether it is intrinsic. . . .

. . . [E]xpectations about the future are often integral to technological success or failure. Most obviously, a belief in the future success of a technology can be a vital component of that success, because it encourages inventors to focus their efforts on the technology, investors to invest in it, and users to adopt it. These outcomes, if they then bear fruit, can reinforce the original belief by providing evidence for its correctness.

Self-validating belief—“self-fulfilling prophecy”—has sometimes been regarded by social scientists as pathological, as permitting false beliefs to become true. The classic example is the way an initially arbitrary belief in the unsoundness of a particular bank can produce a run on that bank and thus cause it to fail. Nevertheless, self-referential, self-reinforcing belief is pervasive in social life, as Barry Barnes has argued eloquently. The most obvious case is money, which can function as a medium of exchange only when enough people believe it will continue to do so; but all social institutions arguably have something of the character of the self-fulfilling prophecy. Some of the most striking phenomena of technological change are of this

kind. One example . . . is “Moore’s Law”: the annual doubling of the number of components on state-of-the-art microchips. Moore’s Law is not merely an after-the-fact empirical description of processes of change in microelectronics: it is a belief that has become self-fulfilling by guiding the technological and investment decisions of those involved.

Of course, I would not suggest that self-reinforcing belief is all there is to phenomena such as Moore’s Law. Expectations, however widespread, can be dashed as technologies encounter the obduracy of both the physical and the social world. As a result, many technological prophecies fail to be self-validating—for example, the prophecy, widespread in the 1960s, that the speed of airliners would continue to increase, as it had in previous decades. In recent years even Moore’s Law seems to have lost some of its apparently inexorable certainty, although belief in it is still a factor in the justification of the enormous capital expenditures (of the order of \$1 billion for each of the world’s twenty state-of-the-art chip fabrication facilities) needed to keep component density growing. . . .

Problems with “Skill”

NINA LERMAN

Machines and tools have been described, discussed, and classified, and the processes of their invention and manufacture carefully examined. By contrast, the words for the human side of technological activity—skill, know-how, technical knowledge, technological knowledge—evoke a range of associations, but offer little of the precision and subtlety applied to investigations of hardware. The term “skill,” a favorite of labor historians and historians of technology alike, implies a coarse skilled/unskilled dichotomy, which is occasionally expanded, but hardly refined, by the problematic term “semi-skilled.” Using these terms is comparable to describing “sophisticated” as opposed to “unsophisticated” or “semi-sophisticated” hardware. In addition to the coarseness of the classification, “unskilled” often connotes low “intelligence,” ambition, or social status, which silently superimposes other hierarchies, clouding the issues at hand. “Know-how” is useful for its simplicity, but its ingenious mechanical connotations make it an unlikely description of either knitting or nuclear engineering.

Using the term “knowledge,” on the other hand, elevates all interactions with hardware, from churning butter to building locomotives, into the realm of other cognitive activities. The choice of adjective, at this stage, seems largely arbitrary, but recent authors have used “technical” to apply to the more elite or “cutting edge” domains of science, medicine, and new technologies. In general, “technological knowledge,” when broadly defined parallel to current usage of “technology,” is—at least connotationally—more inclusive. Such a term also provides an effective means of shedding old assumptions; for example, labor historians have not written about the unionization of

From Nina Lerman, “The Problem with ‘Skill,’” in “From ‘Useful Knowledge’ to ‘Habits of Industry’: Gender, Race, and Class in Nineteenth-Century Technical Education” (unpublished Ph.D. dissertation, University of Pennsylvania, 1993), pp. 3–7.

Moore's Law is self-fulfilling ish

2nd mover advantage



CHAPTER
2New Worlds of Technique:
Native Americans and
Europeans, ca 1600–1770

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During the European conquest and colonization of the Americas, artifacts like horses, books, and guns did not always function as they did in Europe. In Cortes's campaign against the Aztecs, his horses "worked" much like the legendary Trojan horse, helping to foster enough wonder and confusion for a small group of Spaniards to penetrate and wreck havoc in the Aztec inner circle. In New France, the unfamiliarity of paper and print helped "convert" Algonquians to belief in French religion. English matchlock guns that worked perfectly well against massed European armies were useless against Native American warriors using the forest as a shield. European skills and objects sometimes accumulated new powers in the New World and were other times struck impotent.

Cultural perceptions often mediated how artifacts were received and used. Europeans admired Native American ways of making and doing things, even as they cultivated feelings of superiority through observation and description. Yet countless Europeans perished in the New World because their skills and tools no longer worked here. The survivability of the colonists increased as they adopted or confiscated Native American skills and local knowledge, much as they did land and natural resources. Native Americans also observed and adopted European tools, sometimes using them in new ways, sometimes turning them against their would-be conquerors. Numerous translations were possible, many of them perverse, many of them lost to us because of failures of communication and description.

The European conquest of the Americas was not a unified project or process; different European and Native American peoples faced each other in diverse places over a very long time. The bulk of the essays and documents in this chapter describe encounters in the seventeenth century, of various Algonquian peoples with the colonists of New England and New France. Even this "early" contact has a complex prehistory. Some peoples, such as the Massachusets, had been decimated by European diseases (passed to them by more easterly tribes) even before Europeans actually arrived in human form. The surviving Massachusets were prominent

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recruits in John Eliot's "praying towns." Not only European diseases, but European trade goods—often bartered far into the interior—may have triggered political upheaval even before colonization began. European tools were never applied deftly and unproblematically, to a "virgin wilderness."

Economists write of technology "transfer" or "exchange" across boundaries, while some sociologists and anthropologists discuss the "translation" of technologies, and, still others, the creation of a "technological creole" (a third language) at boundaries themselves. What are the implications of each of these metaphors, and which, if any, best fits what occurred in the Eastern Woodlands?

44 DOCUMENTS

The first selection, by William Bradford, governor and first historian of Plymouth, describes how the colonists encountered Squanto, "a special instrument sent of God." Second is a description of Micmac culture by Nicolas Denys, governor of what is now Nova Scotia, published in Paris in 1672. Third are selections from various works by John Eliot, a Puritan missionary who resettled Indian converts ("praying Indians") in fourteen English-style villages ("praying towns") around the periphery of the Massachusetts Bay colony in the mid-seventeenth century. Although Indian conversion was a stated goal of the Puritan "errand into the wilderness," the praying towns were brutally dispersed during King Philip's War 1675–1676. The fourth selection is from William Wood's *New England's Prospect* (1634). What cultural and political assumptions lie behind Wood's account? What are its ironies? The final selections come from Peter Kalm's *Travels in North America* (1770), which describe journeys he made through the mid-Atlantic colonies in the 1750s, more than a century after initial settlement. Kalm, a Swede, traveled along a colonial seaboard bereft not only of Native Americans but of important strands of memory.

This is the same time period as the next, so he just couldn't spell

William Bradford on Squanto, 1620–1621

... [ye] Indians came skulking about them [the colonists], and would sometimes show them selves aloofe of, but when any approached near them, they would run away. And once they stole away their tools wher they had been at worke, & were gone to diner. But about ye 16. of March a certaine Indian came boldly amongst them, and spoke to them in broken English, which they could well understand, but marvelled at it. At length they understood by discourse with him, that he was not of these parts, but belonged to ye eastrene parts, wher some English-ships came to fish, with whom he was aquainted, & could name sundrie of them by their names, amongst whom he had gott his language. He became profitable to them in aquainting them with many things concerning ye state of ye cuntry in ye east-parts wher he lived, which was afterwards profitable unto them; as also of ye people hear, of their names, number, & strength; of their situation & distance from this place, and who was cheefe amongst them. His name was *Samuset*; he told them also of another Indian whos name was *Squanto*, a native of this place, who had been in England & could

From William Bradford, *Bradford's History "Of Plymouth Plantation"* (Boston: Wright & Potter, 1898), pp. 114–116, 121.

speake better English then him selfe Being, after some time of entertainmente & gifts, dis mist, a while after he came againe, & 5. more with him, & they brought againe all ye tooles that were stolen away before, and made way for ye coming of their great Sachem, called *Massawoy*; who, about 4. or 5. *days after*, came with the cheefe of his friends & other attendance, with the aforesaid *Squanto*. With whom, after friendly entertainment, & some gifts given him, they made a peace with him (which hath now continued this 24. years) . . .

After these things he returned to his place caled *Sowams*, some 40. mile from this place, but *Squanto* continued with them, and was their interpreter, and was a spetiall instrument sent of God for their good beyond their expectation. He directed them how to set their corne, wher to take fist, and to procure other comodities, and was also their pilot to bring them to unknowne places for their profit, and never left them till he dyed. He was a *native of this place*, & scarce any left alive besides him selfe. He was caried away with *diverse* others by one *Hunt*, a mr. of a ship, who thought to sell them for slaves in Spaine; but he got away for England, and was entertained by a marchante in London, & employed to New-found-land & other parts, & lastly brought hither into these parts by one Mr. *Derner*, a gentle-man employed by Sr. Ferdinando Gorges & others, for discovery, & other designs in these parts. . . .

[After the bad weather and illness of early spring 1621] they (as many as were able) began to plant ther corne, in which servise *Squanto* stood them in great stead, showing them both ye maner how to set it, and after how to dress & tend it. Also he tould them excepte they gott fish & set with it (in these old grounds) it would come to nothing, and he showed them yt in ye middle of Aprill they should have store enough come up ye brooke, by which they begane to build, and taught them how to take it, and wher to get other provisions necessary for them; all which they found true by triall & experience. Some English seed they saw, as wheat & pease, but it came not to good, eather by ye badnes of ye seed, or litenesse of ye season, or both, or some other defeete.

Governor Nicolas Denys on the Micmac, 1672

All that I have said so far about the customs of the Indians, and of their diverse ways of doing things, *ought to be understood only as the way in which they did them in old times*. To this I shall add their burials, and the ancient ceremonies of their funerals. When some one of them died, there was great weeping in his wigwam. . . .

After this it was necessary to make great tabagie, that is to say festival, and to re-joice in the great gratification the deceased will have in going to see all his ancestors, his relatives and good friends, and in the joy that each of them will have in seeing him, and the great feasts they will make for him. They believed that, being dead, they went into another land where everything abounded plentifully, and where they never had to work. The festival of joy being finished it was necessary to do some work for the dead.

The women went to fetch fute pieces of bark from which they made a kind of *bier* on which they placed him well enwrapped. Then he was carried to a place where they had a staging built on purpose, and elevated eight or ten feet. On this they

From Nicolas Denys, *The Description and Natural History of the Coasts of North America* (Toronto: The Champlain Society, 1908), pp. 437-444.

placed the bier, and there they left it about a year, until the time when the sun had entirely dried the body. . . .

The end of the year having passed, and the body [being] dry, it was taken thence and carried to a new place, which is their cemetery. There it was placed in a new coffin or bier, also of Birch bark, and immediately after in a deep grave which they had made in the ground. Into this all his relatives and friends threw bows, arrows, snow-shoes, spears, robes of Moose, Otter, and Beaver, stockings, moccasins, and everything that was needful for him in hunting and in clothing himself. All the friends of the deceased made him each his present, of the finest and best that they had. They competed as to who would make the most beautiful gift. *At a time when they were not yet disabused of their errors*, I have seen them give to the dead man, guns, axes, iron arrowheads, and kettles, for they held all these to be much more convenient for their use than would have been their kettles of wood, their axes of stone, and their knives of bone, for their use in the other world.

There have been dead men in my time who have taken away more than two thousand pounds of peltries. This aroused pity in the French, and perhaps envy with it; but nevertheless one did not dare to go take the things, for this would have caused hatred and everlasting war, which it was not prudent to risk, since it would have ruined entirely the trade we had with them. All the burials of the women, boys, girls, and children were made in the same fashion, but the weeping did not last so long. They never omitted to place with each one that which was fitting for his use, nor to bury it with him.

It has been troublesome to disabuse them of that practice, although they have been told that all these things perished in the earth, and that if they would look there they would see that nothing had gone with the dead man. That was emphasised so much that finally they consented to open a grave, in which they were made to see that all was decayed. There was there among other things a kettle, all perforated with veridigris. An Indian having struck against it and found that it no longer sounded, began to make a great cry, and said that some one wished to deceive them. "We see indeed," said he, "the robes and all the rest, and if they are still there it is a sign that the dead man has not had need of them in the other world, where they have enough of them because of the length of time that they have been furnished them."

"But with respect to the kettle," said he, "they have need of it, since it is among us a utensil of new introduction, and with which the other world cannot [yet] be furnished. Do you not indeed see," said he, rapping again upon the kettle, "that it has no longer any sound, and that it no longer says a word, because its spirit has abandoned it to go to be of use in the other world to the dead man to whom we have given it?"

It was indeed difficult to keep from laughing, but much more difficult to disabuse him. For being shown another which was worn out from use, and being made to hear that it spoke no word more than the other,—"ha," said he, "that is because it is dead, and its soul has gone to the land where the souls of kettles are accustomed to go." And no other reason could be given at that time. Nevertheless, they have been disabused of that in the end, though with much difficulty, some by religion, [some by] the example of our own customs, and *early all by the need for the things which come from us*, the use of which has become to them an indispensable necessity. They have abandoned all their own utensils, whether because of the trouble they had as well to make as to use them, or because of the facility of obtaining from us, in exchange for skins which cost them almost nothing, the things which seemed to them invaluable, not so much

dark & patronizing
Men put out
to empty
just as
of things

Totally
inhumane

Interesting
Sam/diff
in Christian
Heaven
stayed that
had been in

for their novelty as for the convenience they derived therefrom. Above everything the kettle has always seemed to them, and seems still, the most valuable article they can obtain from us. This was rather pleasantly exemplified by an Indian whom the late Monsieur de Razilly sent from Acadia to Paris: for, passing by the Rue Aubry-bouché, where there were then many coppersmiths, he asked of his interpreter if they were not relatives of the King, and if this was not the trade of the grandest Seigniors of the Kingdom. This little digression must not make me forget to say here, before finishing this chapter on funerals, that to express a thing such as it is when it can be no longer of use, they say that it is dead. For example, when their canoe is broken, they say that it is dead, and thus with all other things out of service.

... The Indians to-day practise still their ancient form of burial in every respect, except that they no longer place anything in their graves, for of this they are entirely disabused. They have abandoned also those offerings, so frequent and usual, which they made as homage to their *manitou* in passing by places in which there was some risk to be taken, or where indeed there had happened some misfortune [or other]. They are also cured of other little superstitions which they had, such as giving the bones to the Dogs, roasting Eels, and many others of that sort which are entirely abolished. [This is] as much through a spirit of self-interest as through any other reason; for they gave there often the most beautiful and rarest objects they had. But since they cannot now obtain the things which come from us with such ease as they had in obtaining robes of Marten, of Otter, or of Beaver, [or] bows and arrows, and since they have realised that guns and other things were not found in their woods or in their rivers, they have become less devout. Or, it would be better to say, [they have become] less superstitious since the time when their offerings have cost them so much. But they practise still all the same methods of hunting, with this difference, however, that in place of arming their arrows and spears with the bones of animals, pointed and sharpened, they arm them to-day with iron, which is made expressly for sale to them. Their spears now are made of a sword fixed at the end of a shaft of seven to eight feet in length. These they use in winter, when there is snow, to spear the Moose, or for fishing Salmon, Trout, and Beaver. They are also furnished with iron harpoons, of the use of which we have spoken before.

... The axes, the kettles, the knives, and everything that is supplied them, is much more convenient and portable than those which they had in former times, when they were obliged to go to camp near their grotesque kettles, in place of which to-day they are free to go camp where they wish. One can say that in those times the immovable kettles were the chief regulators of their lives, since they were able to live only in places where these were. . . .

As for their festivals, they make these as they did formerly. The women do not take part in them; and those who have their monthlies are always separate. They always make speeches there, and dances; but the outcome is not the same. Since they have taken to drinking wine and brandy they are subject to fighting. Their quarrelling comes ordinarily from their condition; for, being drunk, they say they are all great chiefs, which engenders quarrels between them. At first it needed little wine or brandy to make them drunk.

But at present, and since they have frequented the fishing vessels, they drink in quite another fashion. They no longer have any regard for wine, and wish nothing but brandy. They do not call it drinking unless they become drunk, and do not think

they have been drinking unless they fight and are hurt. However when they set about drinking, their wives remove from their wigwams the guns, axes, the mounted swords [spears], the bows, the arrows, and [every weapon] even their knives, which the Indians carry hung from the neck. They leave nothing with which they can kill one another. They permit that without saying a word, if it is before they commence to drink; otherwise the women do not dare enter the wigwams. Immediately after taking everything with which they can injure themselves, the women carry it into the woods, afar off, where they go to hide with all their children. After that they have a fine time, beating, injuring, and killing one another. Their wives do not return until the next day, when they are sober. At that time the fighting can be done only with the poles of their wigwams, which they pull to pieces to allow this use. Afterwards their poor wives must go fetch other poles, and other pieces of bark to repair their lodging. And they must not grumble, otherwise they would be beaten.

The Reverend John Eliot on the "Praying Indians," 1647-1677

... God stirred up in some of them a desire to come into the English fashions, and live after their manner, but knew not how to attain unto it, yea despaired that ever it should come to passe in their dayes, but thought that in 40. yeers more, some Indians would be all one English, and in an hundred yeers, all Indians here about, would so bee: which when I heard, (for some of them told me they thought so, and that some wise Indians said so) my heart moved within mee, abhorring that wee should sit still and let that work alone, and hoping that this motion in them was of the Lord, and that this mind in them was a preparative to embrace the Law and Word of God; and therefore I told them that they and wee were already all one save in two things, which make the only difference betwixt them and us: First, we know, serve, and pray unto God, and they doe not; Secondly, we labour and work in building, planting, clothing our selves, &c. and they doe not; and would they but doe as wee doe in these things, they would be all one with English men: they said they did not know God, and therefore could not tell how to pray to him, nor serve him. I told them if they would learn to know God, I would teach them. . . .

You know likewise that wee exhorted them to fence their ground with ditches, stone walls, upon the banks, and promised to helpe them with Shovels, Mattocks, Crows of iron; and they are very desirous to follow that counsell, and call upon me to help them with tooles faster then I can get them, though I have now bought pretty store, and they (I hope) are at work. The women are desirous to learn to spin, and I have procured Wheels for sundry of them, and they can spin pretty well. They begin to grow industrious, and find something to sell at Market all the yeer long: all winter they sell Brooms, Staves, Elepots, Baskets, Turkeys. In the Spring, Craneberries, Fish, Strawberries; in the Summer Hurtleberries, Grapes, Fish; in the Autumn they sell Craneberries, Fish, Venison, &c. and they find a good benefit by the Market, and grow more and more to make use thereof; besides sundry of them work with the

From *Collections of the Massachusetts Historical Society*, Vol. III of the Third Series (Cambridge, MA: E. W. Metcalf, 1833), pp. 50, 59, 138, 178-179.

Supernatural
being controls
nature
Not sure
if Euro take
is correct
(every callas
& monitory)

Festivals

Errors
sell Inds
on talk

English in Hay time, and Harvest, but yet it's not comparable to what they might do, if they were industrious, and old boughs must be bent a little at once; if we can set the young twigs in a better bent, it will bee Gods mercy. . . .

... We must also of necessity have a house to lodge in, meet in, and lay up our provisions and clothes, which cannot be in *Wigwams*. I set them therefore to fell and square timber for an house, and when it was ready, I went, and many of them with me, and on their shoulders carried all the timber together, &c. These things they cheerfully do, but this also I do, I pay them wages carefully for all such works I set them about, which is a good encouragement to labour. . . . There is a great river which divideth between their planting grounds and dwelling place, through which, though they easily wade in Summer, yet in the Spring its deep, and unfit for daily passing over, especially of women and children; therefore I thought it necessary, that this Autumne we should make a foot Bridge over, against such time in the Spring as they shall have daily use of it; I told them my purpose and reason of it, wished them to go with me to do that work, which they cheerfully did, and their own hands did build a Bridge eighty foot long, and nine foot high in the midst, that it might stand above the floods; when we had done, I cald them together, prayed, and gave thanks to God, and taught them out of a portion of Scripture, and at parting I told them, I was glad of their readiness to labour, when I advised them therunto; and in as much as it hath been hard and tedious labour in the wafer, if any of them desired wages for their work, I would give it them; yet being it is for their owne use, if they should do all this labour in love, I should take it well, and as I may have occasion, remember it. . . .

... [T]he *Sachems* of the Country are generally set against us, and counter-work the Lord by keeping off their men from praying to God as much as they can; And the reason of it is this, They plainly see that Religion will make a great change among them, and cut them off from their former tyranny. . . .

... In our first war with the Indians, God pleased to shew us the vanity of our military skill, in managing our arms, after the European mode. Now we are glad to learn the skulking way of war. And what God's end is, in teaching us such a way of discipline, I know not. By our late eastern war it hath pleased God to shew us our weakness by sea, as formerly by land. The Indians took many of our fishing vessels and the men that belonged to them, and forced them to sail whither they desired: many of the men delivered themselves and their vessels; many Indians were slain, some English.

William Wood, "... much good might they receive from the English," 1634

These Indians being strangers to arts and sciences, and being unacquainted with the interventions that are common to a civilized people, are ravished with admiration at the first view of any such sight. They took the first ship they saw for a walking island, the mast to be a tree, the sail white clouds, and the discharging of ordinance for lightning and thunder. . . .

From William Wood, *New England's Prospect* (Amherst, MA: University of Massachusetts Press, 1977), pp. 96, 108–109.

They do much extol and wonder at the English for their strange inventions, especially for a windmill which in their esteem was little less than the world's wonder, for the strangeness of his whisking motion and the sharp teeth biting the corn (as they term it) into such small pieces, they were loath at the first to come near to his long arms, or to abide in so tottering a tabernacle, though now they dare go anywhere so far as they have an English guide. The first plowman was counted little better than a juggler: the Indians, seeing the plow tear up more ground in a day than their clamshells could scrape up in a month, desired to see the workmanship of it, and viewing well the coultter and share, perceiving it to be iron, told the plowman he was almost Abamacho, almost as cunning as the Devil. But the fresh supplies of new and strange objects hath lessened their admiration and quickened their inventions and desire of practising such things as they see; wherein they express no small ingenuity and dexterity of wit, being neither furthered by art [n]or long experience.

It is thought they would soon learn any mechanical trades, having quick wits, understanding apprehensions, strong memories, with nimble inventions, and a quick hand in using of the ax or hatchet or such like tools. Much good might they receive from the English, and much might they benefit themselves, if they were not strong fettered in the chains of idleness; so as that they had rather starve than work, following no employments saving such as are sweetened with more pleasures and profit than pains or care, and this is indeed one of the greatest accusations that can be laid against them which lies but upon the men (the women being very industrious). But it may be hoped that good example and good instructions may bring them to a more industrious and provident course of life, for already, as they have learned much subtlety and cunning by bargaining with the English, so have they a little degenerated from some of their lazy customs and show themselves more industrious. . . .

... Their canoes be made either of pine trees, which before they were acquainted with English tools they burned hollow, scraping them smooth with clam shells and oyster shells, cutting their outside with stone hatchets. These boats be not above a foot and a half or two feet wide and twenty foot long. Their other canoes be made of thin birch rinds, close ribbed on the inside with broad, thin hoops like the hoops of a tub. These are made very light. A man may carry one of them a mile, being made purposely to carry from river to river and bay to bay, to shorten land passages. In these cockling fly-boats, wherein an Englishman can scarce sit without a fearful tottering, they will venture to sea when an English shallon dare not bear a knot of sail, scudding over the overgrown waves as fast as a wind-driven ship, being driven by their paddles, being much like battledores. If a cross wave (as is seldom) turn her keel upside down, they by swimming free her and scramble into her again.

Peter Kalm, "... contempt of useful arts," 1750

North America abounds in iron mines, and the Indians lived all about the country before the arrival of the Europeans, so that several places can be shown in this country where at present there are iron mines, and where, not a hundred years ago, stood great towns or villages of the Indians. It is therefore very remarkable that the Indians did

From Peter Kalm, *Travels in North America* (New York: Dover, 1966), pp. 232–233, 363.

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not know how to make use of a metal or ore which was always under their eyes, and on which they could not avoid treading every day. They even lived upon the very spots where iron ores were afterwards found, and yet they often went many miles in order to get a wretched hatchet, knife, or the like, as above described. **They were forced to employ several days in order to sharpen their tools, by rubbing them against a rock, or other stones, though the advantage was far from being equal to the labor.** They could never cut down a thick tree with their hatchets, and only with difficulty could they fell a small one. They could not hollow out a tree with their hatchets, or do a hundredth part of the work which we can perform with ease by the help of our iron tools. Thus we see how disadvantageous the ignorance and inconsiderate contempt of useful arts is. Happy is the country which knows their full value! . . .

Canoes are boats made of one piece of wood and are much in use among the farmers and other people upon the Delaware and some little rivers. For that purpose a very thick trunk of a tree is hollowed out; the red juniper or cedar (*Juniperus Virginiana*), the white cedar, the chestnut, the white oak and the tulip tree are commonly used. . . . The size of the canoes varies with the purposes for which they are destined. They can carry six persons, who, however must in no way be unruly, but sit at the bottom of the canoe in the quietest manner possible, lest the boat capsize. The Swedes in Pennsylvania and New Jersey, near the rivers, seldom have any other boats in which to go to Philadelphia, which they commonly do twice a week on market days, though they be several miles distant from the town, and meet sometimes with severe storms. Yet misfortunes from the overturning etc. of these canoes are seldom heard of, though they might well be expected on account of the small size of the boats. . . .

. . . The making of the boat took up half our time yesterday and all to-day. To make such a boat they pick out a thick tall elm, with a smooth bark, and with as few branches as possible. This tree is cut down, and great care is taken to prevent the bark from being hurt by falling against other trees or against the ground. With this view some people do not fell the trees, but climb to the top of them, split the bark and strip it off, which was the method our carpenter took. The bark is split on one side, in a straight line along the tree, as long as the boat it intends to be. At the same time the bark is carefully cut from the trunk a little way on both sides of the slit, that it may more easily separate. It is then peeled off very carefully, and particular care is taken not to make any holes in it. This is easy when the sap is in the trees, and at other seasons they are heated by fire for that purposes. The bark thus stripped off is spread on the ground in a level place, [with the smooth side down, later] turning the inside upwards. To stretch better, some logs of wood or stones are carefully put on it, which press it down. Then the sides of the bark are gently bent upwards in order to form the sides of the boat. Some sticks are then fixed into the ground, at the distance of three or four feet from each other, in a curved line, which the sides of the boat are intended to follow, supporting the bark intended for them. The sides are then bent in the form which the boat is to have, and according to that the sticks are either put nearer or further off. The ribs of the boat are made of thick branches of hickory, these being tough and pliable. . . .

4-1 E S S A Y S

The first selection, from Karen Kupperman's *Settling with the Indians*, discusses the often detailed observations European travelers made of Native American technologies. Although American artifacts and methods were openly admired and their advantages recognized, the same authors often insisted on the overall superiority of European arts. How were both positions sustained?

In the second essay, from *The Skulking Way of War*, Patrick Malone illustrates how Englishmen and Native Americans borrowed and sometimes transformed each other's tools and skills as they struggled for position in seventeenth-century New England. Drawing on both contemporary writing and recent archaeological evidence, Malone challenges assumptions about the "European" and "Native American" essence of specific technologies.

The third selection, from Richard White's *The Middle Ground*, considers the French and Native American fur trade, long framed as the classic case of Native American integration with—and ultimate dependence on—a European economy. He argues that the Algonquians had a different conception of the fur trade than the French and did not trade away their own technologies for a dependence on French goods.

Do Kupperman, Malone, and White reach the same conclusions about the character of technological exchange across cultural lines? To what extent are they addressing different historical problems, different regions and peoples, and using different types of evidence? Do the appended historical documents support the arguments of the essayists or suggest further problems?

Native American Technology

KAREN KUPPERMAN

John Smith was stung by the "worlds blind ignorant censure" which fell on the heads of the Jamestown colonists because they had not sent back rich commodities. Because their colonies on the coast of North America lay in the same latitudes as southern Europe, early English writers believed that all the minerals and crops found in those latitudes in other parts of the world would also be found in their America. Gold and silver, wines, oils, silk, and pearls were some of the commodities originally expected. When the expected wealth did not materialize, it was the Indians, not the faulty geographical lore of the English, who were blamed. Smith explained that the Spanish conquerors of Latin America had happened, through no virtue of their own, on a land in which the natives were numerous and technologically advanced, both in agriculture and in precious metal processing. All the Spanish had to do was to pick up what they wanted.

But had those fruitful Countries, beene as Salvage as barbarous, as ill peopled, as little planted, laboured and manured as Virginia, their proper labours (it is likely) would have produced as small profit as ours.

What Smith is saying is that the technological level of the inhabitants is more important than any other factor in determining what a country will produce. North America

From Karen Kupperman, "Indian Technology," in *Settling with the Indians* (Totowa, NJ: Rowman and Littlefield, 1980), pp. 80–91, 102–103.

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had little to offer, not because the potential of the ores were not there, but because the people had not developed that potential. James Rosier said the same thing writing of New England. He calls the Indians a "purling generation, whose understanding it hath pleased God so to darken, as they can neither discern, use, or rightly esteeme the unvaluable riches in midst whereof they live sensually content with the burke and outward rinde . . ." It quickly became a commonplace that the land needed nothing but "industrious men" and "engines" to make it among the most fruitful in the world.

There are two issues here which are of interest to us. One is the assumption which was universal among Englishmen that their technology was obviously superior to that of the Indians, a judgement continued by many historians. Every writer had schemes for developing the rich resources which he thought must be hidden in America. Even though their geographical knowledge slowly became more realistic as they realized that latitude was not the sole determinant of climate, they continued to believe that superior European technology would develop America in a way which the Indians never could.

What did English colonists say about the actual technological level of the Indians among whom they lived? This is the other issue which is raised by statements like those of Smith and Rosier. When this question is asked we again see the contrast between the rhetorical flourishes which occur in general statements and the reporting of detailed observations. Smith is a particularly outstanding example of this because, despite the denunciation just seen, he not only refers again and again to Indian agriculture, but he also makes no secret of the fact that he and all of the Jamestown colonists lived almost entirely on corn which they got from the Indians during the time he was in Virginia.

Agriculture was not just one form of technology among many. It was of prime importance, because it makes settled life possible. Just as the shepherd is superior to the hunter, so town life supported by agriculture is the highest form of human life for these writers. Mankind is meant to live gathered together in towns. . . . Eyewitness evidence from America clearly placed the Indians on the side of civil humanity as town dwellers, not nomads ranging over the land hunting and gathering for their subsistence. . . .

Alongside the towns in the typical picture of Indian life transmitted by eyewitness writers were the cornfields and gardens in which they grew their basic food of corn, pease, and pulses. DeBry's engraving of the town of Secota from John White's drawing shows fields of corn in three stages of growth, patches of tobacco, a group of sunflowers, a pumpkin patch, and a garden with unidentifiable vegetables. Hunting was supplementary to the Indian basic diet of maize and beans. Neither of these two vegetables is a complete protein when eaten alone. That is, neither contains all of the eight amino acids which the human body cannot manufacture for itself. However, when eaten together, they do form superior complete proteins, increasing the protein content of the ingredients by fifty percent. Further, growing beans and corn together as the Indians did increases yield, because the beans, as legumes, fix nitrogen in the soil. Eyewitness reports from America refute the contention that the "colonists liked to regard the Indians as members of a nomadic hunting race with no fixed habitation, roaming over thousand of acres of virgin wilderness." Again and again writers from Virginia and New England refer to Indian corn and its cultivation. Several of the earliest writers actually presented several-page descriptions of methods of preparing

the soil, cultivation, and storage and use of crops. Many writers make it clear that they have seen cornfields and gardens which extended to several hundred acres. The Indians are clearly people who are recognizable as fellow agriculturalists with the English.

When the Indians set out to clear a field, they did not cut down the trees and pull out their roots as the English did in order to plow in straight lines. The Indians killed the trees by girdling them or burning the roots, and then planted their crops in hills around and between the dead tree trunks. Both men and women worked on clearing new ground, but the tending of the crops was done by the women and children. Their method of clearing fields involved less work than the English method, but several writers remarked on the assiduousness with which the Indian women kept their fields free of weeds. William Wood said the fields looked more like gardens, the women "not suffering a choking weede to advance his audacious head above their infant corne, or an undermining worme to spoile his spurnes."

Indian cultivation methods were portrayed as primitive, but English writers were extravagant in praise of the product, particularly the Indian corn, variously called maize or Turkey or Guinie wheat. It was commonly said to be superior to any European grain, mostly because of its larger yield and its greater variety of uses. For Harriot, its superiority came from the fact that the Indians had two harvests each year. He and the Plymouth colonists also remark on the beauty of its red, blue, yellow, and white kernels, "a very goodly sight." Several of the writers simply affirm that it is "good meat" and can be used in a variety of ways. One use for which some of the writers had great hopes was as a source of that precious commodity, sugar. The stalk was said to yield juice so sweet that Sir Thomas Gates says the colonists make a cordial of it.

The most important attribute of maize was its great yield. English writers try various formulas to convey the fact that one grain of maize will produce a very large stalk which will have several large ears on it. Several writers simply affirmed that Indian corn is the best grain in the world. Some specifically say it is better than any English grain. Others try to give figures, such as Gabriel Archer, who says each grain of corn produces a large stalk with 2 or 3 stems each having an ear "above a spanne longe, besett with cornes at the least 300 upon an eare for the most part 5, 6, & 700." The marginal note beside this statement puts it more simply: "infinite increase."

Not only was their grain superior, but some of the writers indicated that Indian cultivation methods were also superior. George Percy told of being conducted by Indians through "the goodliest Corne fieldes that ever was seene in any Countrey." Writers from all areas tell of the Indians instructing them in the planting and tending of Indian corn, but the Plymouth colonists complained that they still had smaller harvests than the Indians did. One reason for the poor yields in Plymouth colony was apparently their unwillingness to do the arduous work that the Indian women did in their fields. Lynn Ceci argues, though, that the most famous instance of instruction, that in which Squanto taught the Pilgrims to plant corn with fish, was not a transmission of an Indian trait. He had learned this technique, Ceci believes, from other Europeans with whom he had lived. William Wood gave a vivid picture of all that was involved in Indian agriculture when he told of the instruction the colonists received:

Many wayes hath their advice and endeavour bene advantageous unto us: they being our first instructors for the planning of their Indian Corne, by teaching us to cull out the finest seede, to observe the finest season, to keepe distance for holes, and fit measure for hills, to worne it, and weede it; to prune it, and dresse it as occasion shall require.

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Care for the morrow was a principle attribute which distinguished civilized man from the brutes. Such providence was implicit in reports of Indian agriculture. Several of the writers carried the point further and wrote of the techniques by which the Indians stored their harvest for the winter. In fact most of the food grown was stored for winter use. . . .

. . . Reports of Indian agriculture were . . . important because they indicated that the country was fruitful and would be good for Englishmen who went there to live. Beyond this, many eyewitnesses assumed the role of ethnographers and endeavored to give a detailed picture of Indian life. The wealth of information was designed to enable the reader to picture the Indians and the environment they created. It was the details of daily life, the Indians in their houses, at meals, and at their occupations, which constituted a good ethnographic record for these writers and their audience. They generally attempted to give their readers a mental picture by comparing American things or practices to familiar ones, to bring them home. These descriptions were not characterized by disgust or scorn as many historians allege. The immense detail and the analytical tool of comparison of Indian practices to European ones both testify to the interest of the eyewitnesses in the Indians as human beings, not to an attitude of contemptuous dismissal.

Though all the writers clearly assumed that European technology was superior to Indian, they took great pains to affirm that the Indians were extraordinarily competent in their own relationship to their environment. Thomas Hariot, in the earliest eyewitness description of North American Indians, stressed their ingenuity and "excellence of wit." Affirmations of the Indians' skill and intelligence come from all areas and throughout the period. Frequently writers say they are trying to overcome the opinion in England that the Indians are, as Morton says, "dull, or slender witted people." Hariot's praise of their ingenuity is frequently echoed. The other qualities most often praised are their ability to learn quickly and their dexterity. Alexander Whitaker of Jamestown offered, in refutation of the opinion that the Indians are "simple," this description:

they are a very understanding generation, quicke of apprehension, suddaine in their dispatches, subtle in their dealings, exquisite in their inventions, and industrious in their labour.

"Subtle" was not always a praise word in this period. It can mean crafty, and smacks of sharp practice. Still, the picture communicated here is of intelligent and competent people. Their very subtlety means that the English will have to be careful in dealing with them. Colonists back up this picture of intelligent and skilful Indians with detailed pictures of the Indians in their daily lives, working, hunting, cooking, and playing, and this included a description of the environment they created for themselves. . . .

As modern concern for the interaction between man and the environment grows, some writers have asserted that the first in a long chain of ecological disasters occurred with the entrance of Europeans into America. . . .

It is undeniable that English writers of this period thought of the natural world as given to man by God for man's use. Not to develop nature's resources was seen by them as sinful. Nature, to 17th century Englishmen, represented potential. That is, all nature is the raw material from which man can make products necessary and useful for life. For this reason, the products of man and nature in combination were

considered superior to nature alone. . . . Artificial was a word of high praise, while natural meant simple, or simple-minded. . . .

Seventeenth century writers, then, celebrated man's exploitation of nature. They did not see man as taking from nature and spoiling it in the process. Rather, they saw man as part of nature, as having a crucial and God-designed role in the development of nature's potential. . . .

The English did not think of exploitation of nature in terms of ruthless depletion of resources. English writers exhibited real concern for the development and conservation of resources. Furthermore, they were sometimes critical of observed Indian practices as wasteful. One such practice was the annual or semi-annual burning of the woods. Many of the early writers remark on the open parklike quality of American woods, and the great open areas. They say that thick underbrush is seen only in swampy areas. Reports from Virginia and New England claim that a man can ride a horse at a gallop through the woods. In fact, it seems likely that, because pre-contact Indians burned the woods every year, wooded areas in present day eastern North America are thicker and more tangled with underbrush, more like people's idea of the forest primeval, than those seen by the early colonists. Burning was a beneficial practice. Not only did it facilitate movement and hunting, but it also made possible the growth of a great variety of food-producing plants—fruits, berries, and nuts—and attracted animals, such as deer, elk, and buffalo, which would not live in a dense forest. Finally, the burning also drove away some unwelcome animals, such as reptiles. . . .

More of a problem is Indian treatment of animals. Did the Indian as the "first ecologist" carefully harvest the deer according to his need alone? Several of the early English writers were concerned about this issue. Thomas Hariot was concerned over the impact of English desire for deer skins on the deer population. He reassures his readers that they can trade for thousands of skins yearly and cause no more to be killed than is done already. . . . [Ralph] Hamor was shocked by Indian hunting practices, as he said they kill deer "all the yeer long, neither sparing yong nor olde, no not the Does readie to fawne, nor the yong fawnes, if but two daies old." New Englanders reported finding carcasses of deer which had had only the horns taken off. So many deer are killed at hunting time, according to Thomas Morton, that the Indians "have bestowed six or seven at a time, upon one English man whome they have borne affection to."

The evidence demonstrates that the Indians were not averse to making massive changes in the natural world, as in their burning, when they felt the result would favor their livelihood. It does not prove that the English were superior in their ecological concerns. What the evidence does demonstrate is that neither side has a unique grasp of natural environment. At least some 16th and early 17th century Englishmen were very concerned about establishing a responsible relationship to this environment. . . .

The single most popular product of Indian technology was the canoe. Many writers described the wonderful boats, and frequently they gave long descriptions of their manufacture as well. The canoes were of two types. The earliest descriptions, those from Virginia territory, were of dugout canoes. John White painted a picture of one of these being made. Hariot began his note to this picture: "The manner of making their boates in Virginia, is verry wonderfull." He was concerned to demonstrate that it is possible to make such a canoe without iron tools. The method he described, that of alternately burning out the center and scraping it with sea shells,

proved to his satisfaction that "god indueth these savage people with sufficient reason to make things necessarie to serve their turnes." Hariot and Barlowe say these canoes can carry up to 20 men, but John Smith says some of them have a capacity of 40 though he admits the smaller ones are more common. Only William Wood of New England mentioned dugouts.

It was the birchbark canoes which were seen as most marvelous. Martin Pringe offered the first and one of the best descriptions of their manufacture. The canoes he saw, one of which was brought back to Bristol, were 17 feet long and 4 feet wide:

made of the Barke of a Birch-tree, farre exceeding in bignesse those of England: it was sewed together with strong and tough Oziers or twigs, and the seamies covered over the Rozen or Turpentine little inferiour in sweetnesse to Frankincense, as we made triall by burning a little thereof on the cookes at sundry times after our coming home: it was also open like a Wherrie, and sharpe at both ends, saying that the beake was a little bending roundly upward. And though it carried nine men standing upright, yet it weighed not at the most above sixtie pounds in weight, a thing almost incredible in regard of the largenesse and capacitee thereof.

John Winthrop said the canoes of the Long Island Indians could hold 80 men.

The most startling characteristic of the canoe was its lightness for its size and capacity. Thomas Morton says that two men can carry a canoe that will hold ten to twelve men. William Wood says one man can carry a canoe a mile, and he points out that this is what makes canoes well-suited to the environment, that they can be carried overland from stream to stream. As John Guy says, "... every place is to them a harborough; where they can go ashore themselves, they take aland with them their Canoa." Allied with this lightness was the marvelous swiftness of the canoe. James Rosier recounted an incident in which "they in their Canoa with three oares, would at their will go ahead of us and about us, when we rowed with eight oares strong; such was their swiftnesse, by reason of the lightnesse and artificiall composition of their Canoa and oares."

There is a theme running through all English discussions of Indian technology which emerges most clearly in descriptions of the canoe. This is the belief that the Indians were better adapted to life in America than the English were. Though the writers believed in the general superiority of English technology, they were clearly aware of the fact that they would have to learn from the Indian in order to survive. Not only did they realize this, they made no attempt to disguise it from their English audience. Concerning the canoe, they not only demonstrated that it was a faster craft than their small boats, but they also showed that it was more useful in America, because it could go where their small boats could not go, and was more flexible to use. William Wood gives a vivid picture of the relative clumsiness of the Englishman and his boat:

In these cockling fly-boates, wherein an English man can scarce sit without a fearefull tottering, they will venture to Sea, when an English Shallope dare not beare a knot of sayle; scudding over the overgrowne waves as fast as a winde-driven Ship, being driven by their paddles; being much like battle doores; if a crosse wave (as is seldome) turn her keele up-side downe, they by swimming free her, and scramble into her againe.

Indian canoes easily navigated the rocky and swift-moving rivers for which English boats were useless and they could easily be carried around obstacles. John Smith was scornful of the equipment sent to Jamestown by the Virginia Company. He wrote them

specifically about a boat in four pieces which they sent to be carried in pieces above the fall line and then assembled and used for exploring the river. Smith explained the difficulty: "If he had burnt her to ashes, one might have carried her in a bag; but as she is, five hundred cannot, to a navigable place above the Falles." American conditions were going to require adaptation.

The Skulking Way of War

PATRICK MALONE

Although Indians welcomed many of the articles offered as gifts or as trade items, they were selective in their adoption of foreign products. Favored goods usually satisfied functional or symbolic needs already existing in the aboriginal culture. A particular object might be more durable, efficient, or attractive than an Indian artifact serving a similar purpose. The function and meaning of an artifact could, however, change dramatically as it passed from one culture to another. Indians flatly rejected a number of European items, made physical modifications to others before adopting them, and acquired some simply to make use of the raw material contained in them. Native American craftsmen acknowledged the value of imported metals but retained their respect for traditional forms and ornamentation when they cut up brass or iron goods to create products that were distinctly Indian in appearance. . . .

No European artifact adopted by the Indians had a more dramatic effect on their military system than did the firearm. . . .

. . . Yet, even in their rush to acquire the white man's guns, Indians showed excellent judgment in assessing the relative values of the several types of firearms which Europeans used in America.

The vast majority of firearms carried by early explorers and by the Pilgrims, who came to New England in 1620, were muskets called "matchlocks" after their firing mechanism. . . . During the first half of the century, colonists relied heavily on matchlocks for their military defense.

Matchlock muskets, standard equipment in European armies, were relatively inexpensive for prospective colonists. Simple in operation the lock lowered a lighted match, held in a device called a serpentine, into an open pan of priming powder. By pulling a trigger on some weapons or depressing a lever on others, the musketeer forced the serpentine to rotate against a restraining spring, thus bringing the match into contact with the priming powder and setting off an explosive train leading from the pan through a touch hole to the propellant charge in the barrel. The projectile, usually a large lead ball weighing a twelfth of a pound, was sent on its way with great force.

European armies found the matchlock musket an effective arm for massed formations. Although it weighed up to twenty pounds, was inaccurate beyond fifty yards, and had to be fired using a forked rest, it performed well during European infantry actions in which ranks of musketeers fired concentrated volleys at close

From Patrick Malone, *The Skulking Way of War: Technology and Tactics Among the New England Indians* (Baltimore: Johns Hopkins University Press, 1993) pp. 37-42, 44-46, 67-68, 73, 77-89, 95-106, 114-125.

range. However, a weapon suitable for the battlefields of Europe was not necessarily adequate for warfare in the forests of New England.

In Europe, soldiers fought opponents who were willing to accept battle under mutually advantageous situations and to forego actions in bad weather, darkness, or forested terrain. The militiamen of New England in the seventeenth century faced Indian warriors with a long tradition of success through stealth and surprise. Indians used the forest as an ally against their enemies. They attacked when and where they chose, striking when least expected and taking advantage of every weakness an enemy revealed.

Many characteristics of the matchlock proved to be liabilities in the New World. A musketeer had to light his match, a cord treated with saltpeter or gunpowder, in advance of any action. Failure to have a ready match could prove fatal, because attackers were not likely to give their enemies a chance to start a fire. A musketeer in a combat situation was expected to keep both ends of his match lighted, to adjust it frequently as it burned down, and to blow the ashes off the smoldering tip which was clamped in the serpentine of his musket. Since a match burned at a rate of up to nine inches an hour, considerable quantities of the special cord had to be carried into the field and kept in good condition.

In rainy weather a musketeer tried to keep his match dry in his hat or under cover in some other way. The effort was troublesome and the results often futile.

As early as 1607, Indians recognized weaknesses in the ignition system of the matchlock musket. William Strachey, in his narrative of the voyage of Gilbert and Popham to Sagadahoc, explained that a group of Indians "subtly devised how they might put out the fire in the shallop [boat], by which means they saw they should be free from the danger of our men's pieces, and to perform the same, one of the savages came into the shallop and taking the fire brand, which one of our company held in his hand there to light the matches, as if he would light a pipe of tobacco, as soon as he [the Indian] had gotten it into his hand he presently threw it into the water and leapt out of the shallop." Although these Indians had discovered the Achilles' heel of the matchlock, they were unwilling to bet their lives on their solution. When Gilbert ordered his men "to present their pieces" in a desperate bluff, the shaken warriors decided not to risk the possibility that the muskets could still fire without lighted matches. They took their bows and fled into the forest.

The flaws in the matchlock became more obvious to Indians as they tested weapons acquired in trade and as they witnessed the problems experienced by musketeers in some of the early skirmishes between white men and Indians. A warrior who suddenly darted from the brush was no easy target for a European whose weapon required a separate rest to support it in firing. Even worse, the musketeer might be surprised when he was unable to fire his matchlock at all because of an extinguished match or wet priming powder. His chances of ambushing the Indians in their own forests were minimal with a lighted match that not only glowed in shadows or darkness, but also gave off a recognizable odor. Even if he managed to fire his weapon, the process of reloading it was slow, complicated (over forty separate motions were prescribed in most military manuals), and dangerous.

Captain Myles Standish, an experienced professional soldier and an influential military leader in Plymouth Colony, preferred a type of firearm more advanced than the matchlock. He brought with him to New England a "snaphaunce," [flintlock]

which was self-igniting and required no rest to steady it while firing. One advantage of this weapon was shown during an attack by Indians on Cape Cod in 1620: Standish was able to fire while some of his men were calling "for a firebrand to light their matches."

... The flintlock was a much better weapon for forest warfare than the matchlock, but the Indian was quicker to realize this than the average colonist.

Despite increasing evidence that the matchlock was unsuited for forest warfare, colonial governments were slow in requiring militiamen to equip themselves with expensive flintlocks. The fact that European armies still fought with matchlocks had a powerful influence. The best musketeer of the day fired volleys on command, with little regard for aiming and with justified confidence in the capability of a lighted match to ignite dry powder. Formal battles in nice weather on open fields made the cumbersome matchlock appear effective; military commanders in England did not worry about ambushes, night attacks, or enemies who took cover behind trees.

In sharp contrast to the majority of English colonists, New England Indians chose flintlocks over matchlocks almost immediately. They knew how to hunt and fight in the forested terrain of the eastern woodlands, and they knew at once that a weapon dependent on a lighted match did not compare with a self-igniting flintlock. The practices of trained European armies meant nothing to them; Indians simply chose the weapon best suited for their hunting and their military tactics.

A man and his firearm form a weapons system in which the skill of the man is at least as important as the inherent accuracy of his weapon. Although the English colonists brought firearms with them to New England, very few of the men could shoot well. The average colonist had little or no familiarity with guns when he arrived and was slow to develop any proficiency as a marksman in the New World. Hunting practices and militia training on both sides of the Atlantic did not prepare colonists to shoot accurately and quickly at evasive targets. Indians, on the other hand, were trained from childhood in hunting and military skills that were readily adaptable to the use of firearms. The warriors of the forest quickly demonstrated superior abilities with the projectile weapons of the Europeans.

... The residual effects of [the colonists'] English cultural heritage, reinforced by constant communication and continuing immigration, remained strong in succeeding generations. The colonists' proficiency with guns in the seventeenth century is, therefore, best examined with a transatlantic perspective.

In sixteenth- and seventeenth-century England, men rarely acquired ability with firearms through hunting experiences. Hunting was the sport of the upper classes and was forbidden to most of the common people. There were numerous restrictions on who could hunt and on what methods could be used; hunting laws were usually designed to preserve game for the privileged few. The most socially respectable forms of the sport were riding behind a pack of hounds, coursing with swift greyhounds, and hawking. In these activities, the hunter was relying on animals to kill other animals and was not testing his marksmanship.

From the late sixteenth to the mid-seventeenth century the importance of musketry increased tremendously in European warfare, while the need for skilled marksmanship actually declined. The military requirements of the period called for musketeers to load and handle their matchlock weapons with precise movements, to level them in the direction of an enemy formation, and to fire on command in a volley. The critical

element in this massing of firepower was the simultaneous discharge of all the muskets in one or more ranks.

... This type of massed firepower made a high degree of individual accuracy less important than rapidity in firing and reloading the musket. ...

Although numerous incidents in warfare against New England Indians demonstrated the value of aiming one's musket at a single enemy, most colonial officers and musketeers did not recognize the critical importance of individual marksmanship until the last stages of King Philip's War. The Pilgrims' first skirmish with hostile Indians in 1620 should have convinced those early colonists of the need for improved accuracy. William Bradford told how an Indian shooting arrows from beside a tree "stood three shots of a musket, until one taking full aim at him ... made the splinters of the tree fly about his ears, after which he gave an extraordinary shriek and away they went." Fifty-seven years after this occurrence, and after the horrors of King Philip's War, the authorities of Plymouth Colony finally instructed militia officers to "not only train their soldiers in their postures and motions but also at shooting at marks." ...

One might assume that colonists living in or near a "wilderness" would become good marksmen because of experience in hunting, whether or not they received military training in shooting at targets. Unfortunately, our popular image of sharp-shooting frontiersmen is questionable even for the early nineteenth-century settlers of Kentucky and is far removed from the reality of the seventeenth-century colonists in New England. The latter as we have seen, had little, if any, hunting experience when they arrived, and they were soon so busy creating villages and towns that they had few opportunities to hunt. Most became hard-working agriculturists or craftsmen, more concerned with homes, shops, and cultivated lands than with the pursuit of wild animals. ...

William Wood admitted reluctantly that "every one's employment [did] not permit him to fowl." Recognizing the incompetence of some would-be fowlers, he wrote: "many go blundering away their powder and shot, that have no more skill to kill, or win a goose, than many in England that have rusty muskets in their houses knows what belongs to a soldier. ... ?" Also, beavers and otters were "too cunning for the English" but not for the Indians, "those skillful hunters whose time [was] not so precious, whose experience-bought skill [had] made them practical and useful in that particular." Roger Williams said that Indians armed with guns killed an "abundance of fowl," because they were "naturally excellent marksmen; and also more hardened to endure the weather, and wading, lying, and creeping on the ground, etc." ...

Because the Indians had superior talents as hunters, the colonists let them supply much of the wild game that was eaten in the settlements. Wildfowl and deer were prized as food by both the Indians and the English. John Josselyn said that although the deer were "innumerable," there were "but few slain by the English." William Wood believed that it upset the Indians more "to see an Englishman take one deer, than a thousand acres of land." Some Indians were, however, willing to put their deer-hunting abilities to use for the English and to supply venison for a price. In a poem on New England, William Bradford wrote: "For us to seek for deer it doth not boot, / Since now with guns themselves [Indians] can shoot." ...

Wolves and deer were wary animals which clearly presented too great a challenge for average colonists. Some men did try their luck at fowl-shooting, a type of hunting that required no real accuracy in this period of New England history. A few

shot large numbers of the waterfowl that frequented the New England coast from the fall to the early spring, but this activity took more time than most men were willing to spend away from their daily masks. Isaac de Rasieres said that the geese at Plymouth in 1627 were "easy to shoot, inasmuch as they congregate together in such large flocks." Wood claimed that some men had killed "50 ducks at a shot, 40 teals at another." His figures may have been inflated, but they show that men shot at entire flocks and not at individuals birds. Thomas Morton provided further evidence of this fact when he wrote: "I have had often 1000 [geese] before the mouth of my gun." ...

... For more sport a colonist could shoot flying pigeons in flocks of "millions and millions." The vast flights seemed to have "neither beginning nor ending," and "the shouting of people, the rattling of guns, and pelting of small shot could not drive them out of their course." Actually men found it more effective to take these birds with nets as they roosted than to shoot into their crowded flights. By the 1670s, John Josselyn thought the number of pigeons was "much diminished," because of "the English taking them with nets." ...

Archaeological excavations at the sites of eight seventeenth-century homesteads in Plymouth Colony have yielded valuable clues about the diets and hunting practices of the colonists. Few wild animal bones were found among a total of approximately ten thousand bone fragments from the sites; well over ninety percent of the fragments were from domestic animals slaughtered for food. Bones from wild ducks appeared fairly often, but excavators found none from turkeys and only a very few from wild mammals. Although none of the sites dates from the first thirty years of the colony's existence, the preliminary results of this faunal analysis lend support to the theory that hunting in New England was an infrequent practice usually limited to the relatively easy shooting of wildfowl. ...

The Indians' choice of firearms and ammunition had a significant effect on their ability to hit what they were aiming at, particularly if their target was as elusive as a deer or an alert warrior from another tribe. In trade they demanded flintlocks, which allowed them to "snap shoot" at a moving target. They came to prefer firearms with relatively short barrels, weapons which a man could point rapidly and which were easy to use in thick vegetation. ...

By ... 1675 ... the New England colonists had made numerous adaptations in their militia system, but they were still restricted by allegiance to cultural traditions and to standard military practices of their age. They did not acknowledge the obvious advantage of multiple shot over full-size musket balls in the close-range encounters of forest warfare. They had finally given up the matchlocks still in use on European battlefields and had armed themselves with the flintlocks that Indians had preferred for half a century. Yet they still did not realize the crucial significance of their flintlock musket's potential for accurate fire at either stationary or moving opponents. Neither their militia drills nor their minimal hunting experience gave them any real training in marksmanship. It would take months of military defeat before the colonists would admit that the Indians' way of employing muskets in warfare was clearly better than their own.

An Indian in combat chose an opponent, aimed specifically at that individual, and used acquired abilities in marksmanship to kill or wound him. He often chose small balls for his flintlock and was, for that reason alone, more likely to score a hit

than any musketeer firing only the standard single ball. An Indian was also more likely to be well-practiced in the aimed firing of his weapon than an English colonist. He had probably spent years snap-shooting at moving animals, testing the rapid ignition system of his flintlock and learning how to lead a moving target. He could fire his weapon from many different positions; he could even shoot with it steadied against a tree or rock that shielded most of his body from enemy bullets. He understood that he was both the potential target and the skilled operator of a deadly machine. The colonist had brought the firearm to the New World: in King Philip's War, the Indian would demonstrate how to use this machine. . . .

The Indian military system in southern New England underwent dramatic changes during the seventeenth century as Europeans introduced Indians to new weapons, tools, technological skills, and military philosophies. Indians selectively adopted artifacts, crafts practices, and ideas to fit the perceived needs of a culture threatened by both colonial expansion and tribal rivalries. They gained confidence from their increasing understanding of European technology and lost whatever awe they may have initially felt at the sight of such European products as firearms and axes. Even in the early 1630s, William Wood of Massachusetts Bay notices that "fresh supplies of new and strange products hath less'n'd their admiration, and quickened their invention, and desire of producing such things as they see, wherein they express no small ingenuity, and dexterity of wit. . . ."

The prospect of Indians extensively adopting English material culture and practicing English crafts aroused mixed feelings among the Puritans. . . . Colonial authorities allowed craftsmen to instruct trusted Indians in useful trades, but a royal proclamation in 1630 forbade anyone to teach an Indian "to make or amend" firearms "or anything belonging to them."

Southern New England Indians had many opportunities to learn English craft techniques. The language barrier, which frustrated the first efforts to convert the Indians, had little effect on the transfer of technology between cultures. Craft techniques can spread easily across cultural boundaries without verbal communication. Indians already versed in traditional methods of manufacturing aboriginal artifacts could learn a great deal just by observing English products and experimenting with tools and materials acquired in trade. Since they moved freely through colonial settlements, Indians could also observe English craftsmen at work and perhaps receive some instruction. Thomas Shepard said that the Indians at Nonantum in 1647 were "very dextrous at any thing they see done once." In the previous decade, Wood had noted that Indians could "soon learn any mechanical trades, having quick wits, understanding apprehensions, strong memories, with nimble inventions, and a quick hand in using of the axe or hatchet." . . .

Puritan missionaries, believing that a Christian should lead a useful and industrious life, made technological training an important part of the process of "civilizing" their Indian converts. They provided both instruction and tools for Christian Indians and strongly encouraged them to learn a trade. For some Indians the promise of such an introduction to English technology many have been as great as incentive for conversion as any attractions of the English faith. . . .

Serious disputes with Plymouth Colony in 1671 caused the Wampanoags to prepare for possible military action. Hugh Cole visited the tribal headquarters at Mount Hope in that year and noted the presence of Narragansett craftsmen who were repairing

the Wampanoags' firearms. These artisans were apparently experienced in working with muskets and other metal weapons. In their Rhode Island home, the Narragansetts had their own forge, and at least one member of the tribe was a skilled blacksmith.

Recent excavations at a seventeenth-century Narragansett cemetery in Rhode Island have revealed an Indian blacksmith kit. This set of tools, including a hammer and some chisel-like wedges, was apparently buried with a man who had skill in its use. Narragansetts believed that souls in their afterlife would have need for many of the same artifacts they possessed when alive. Iroquois (Seneca) sites in New York from the same general period have also yielded tools for working on firearms. In addition to normal blacksmithing tools and a great many flintlock parts, Iroquois graves contained a hand vise (probably for holding sears and tumblers in filing operations), a three-cornered file, and a whetstone. One mass of 426 flintlock parts found in a single Iroquois grave must have belonged to a very capable and busy repairman. . . .

Only a part of Indian military technology was devoted to weaponry; Indians also continued the aboriginal practice of building forts. The basic design and construction of most Indian fortifications remained unchanged after the arrival of the English, but Indians could build log palisades better and faster with European tools. In some cases colonists assisted Indian allies in the construction of their forts. The English may even have suggested minor modifications in this defensive technology. . . .

The Narragansetts built the largest and most impressive Indian fort in New England. Supportive of the Wampanoags from the early phases of King Philip's War, this tribe began the construction of its huge fort in the Great Swamp of Rhode Island in 1675. The design included certain features which strongly suggest the influence of European engineering practices. William Hubbard mentioned "a kind of block house" at one corner of the wooden stockade and a "flanker" at another point. The palisade of the fort was still incomplete when a force of one thousand colonists attacked on the night of December 19, 1675, but these formidable defenses caused the English to suffer heavy casualties in the assault. At least seventy colonial soldiers were mortally wounded while taking and burning the fort. Fire, as in the 1637 destruction of a Pequot fort, made the Narragansetts' losses much higher.

The tribe had successfully hidden their forge from the English until "The Great Swamp Fight." Nathaniel Saltonstall reported that the attacking soldiers killed "an Indian black-smith" who repaired Narragansett firearms. They also "demolished his forge, and carried away his tools." . . .

One band of Narragansetts did not flee the Rhode Island area but instead went into hiding in a stone fort west of the present town of Wickford. The Indians had constructed a secret refuge by using the natural boulders of a hilltop as part of their defenses and by adding connecting walls of carefully laid stone to complete the fortification. The impressive position is still easily recognizable. It is known as "the Queen's Fort," because Queen Quaiapen's Narragansett band probably built and occupied it.

The Indian most qualified to build a fort of stone for the Narragansetts had shown his talent with masonry in English settlements before the war. Saltonstall wrote that he was "famously known by the name of Stonewall, or Stone-layer John; for that being an active ingenious fellow he had learned the mason's trade, and was of great use to the Indians in building their forts, etc." His engineering skill probably accounts for the sophisticated plans of both the wooden fort in the Great Swamp and the queen's stone fort. The layout of the latter structure includes a semicircular

bastion and a sharp flanker, features which conform to seventeenth-century principles of European military engineering.

English forces did not discover the Narragansetts' stone fort during the war, but they did surprise the female sachem and her followers at a temporary campsite in June 1676. Major Talcott's company from Connecticut killed most of the Indians, including Queen Quaiapen and Stonewall John. The Indian craftsman has been the subject of considerable folklore since his death.

According to one Rhode Island legend which insults the New England Indians, Stonewall John was a renegade military engineer from England. Some people, unaware of the level of technology among the southern New England Indians in the seventeenth century, have found it difficult to believe that he was really an Indian. His reputation has overshadowed the achievements of other Indian craftsmen with widely varying degrees of skill who performed essential services for their tribes. Stonewall John was no doubt an exceptional dry mason and architect of fortifications, but he was only one individual within an entire system of technological support. Narragansett fortifications, although impressive examples of military engineering, were in fact the Indians' least effective application of technology to warfare. Only the Narragansetts tried to defend a large fort against the English in King Philip's War; the result was the catastrophe of the Great Swamp.

The violence inflicted on Indians was, in fact, even more terrible and less restrained than the horrors of the Thirty Year War, where Christians fought other Christians. To many of the English who went to war against New England Indians, their opponents were more like wolves than men. The attitudes of both officers and common soldiers were strongly affected by the moral dangers of combat against foes who seemed to possess some strange form of animal cunning, who treated prisoners cruelly, and who would not fight in expected ways. The escalation of the war against the Pequots in 1637 was accompanied by English accusations that the Indians were less than fully human. Some colonists actually suggested that the Pequots were agents of the devil.

The burning of the Pequot fort may have been the first example of total warfare in New England. After a series of accusations and violent incidents and one unsuccessful punitive expedition, troops from both Connecticut and Massachusetts Bay invaded the territory of the Pequots. The militiamen landed in Rhode Island and marched overland to the Mystic River in Connecticut where the Pequots had one of their fortified villages. The total force contained about ninety colonists, sixty Mohegans, and a number of Narragansetts who had been recruited to both guide and fight. The presence of Indian allies worried some of the English participants, but the Mohegans had already proven their willingness to kill Pequots in a previous action.

On May 26, 1637, the English and their Indian allies achieved a complete surprise with a dawn attack on the palisaded fortifications. The Pequots, who probably felt safe in their fort, awoke to the sound of a volley of musketry against the log walls. Immediately after opening fire, the English charged through the entrance of the fort and into the streets of the village. The colonial commander, Captain John Mason from Connecticut, led his men in setting fire to the highly flammable Pequot dwellings. Within seconds the entire village was ablaze. The English withdrew to form a ring around the doomed fort as the fire became an inferno. Mohegans and Narragansetts waited in a large circle beyond the soldiers.

These Indian allies were shocked by the horrible scene as hundreds of men, women, and children perished in the blaze or were cut down as they tried to escape. In the frenzied action, the English even mistakenly wounded some of their Indian supporters. An Indian with Captain John Underhill objected strenuously to this strange and terrible form of warfare, he "cried mach it, mach it; that is, it is naught, it is naught, because it is too furious, and slays too many men." A week before this massacre, Roger Williams had sent a note to the Puritan leaders in the Bay Colony explaining the Narragansetts' request "that women and children be spared."

Underhill, who commanded the small body of Massachusetts men with Mason, answered critics by insisting that the mass slaughter of both warriors and noncombatants was justified by biblical precedent:

It may be demanded, why should you be so furious? (as some have said). Should not Christians have more mercy and compassion? But I would refer you to David's War. When a people is grown to such a height of blood, and sin against God and man, and all confederates in the action, there He hath no respect to persons, but harrows them, and saws them, and puts them to the sword, and the most terrible death that may be. Sometimes the scripture declareth women and children must perish with their parents. . . . We had sufficient light from the word of God for our proceedings.

The Narragansetts and Mohegans had no experience with this type of war. They must have been amazed and horrified by the idea of destroying an entire village. The death, in one place, of perhaps four hundred or more Pequots created a scene of incredible carnage. Underhill admitted that "great and doleful was the bloody site to the view of young soldiers that had never been in war, to see so many souls lie gasping on the ground, so thick in some places, that you could hardly pass along."

Word of the merciless actions of the English militiamen in the Pequot War spread rapidly among the native population. Conservative Puritan Philip Vincent published an account of the war in London in which he claimed that the New England colonists were "assured of their peace, by killing the barbarians." He thought the war would have a positive effect as a deterrent: "For having once terrified them, by severe execution of just revenge, they shall never hear of more harm from them, except perhaps the killing of a man or two at his work. . . . Nay they shall have those brutes their servants, their slaves, either willingly or of necessity and docile enough if not obsequious."

By the beginning of King Philip's War, many of the Indians in southern New England had indeed learned a lesson from the earlier demonstration of total warfare against the Pequots, but it was not the lesson that Vincent envisioned. Indians had learned that the traditional restraints which had limited deaths in aboriginal warfare were nothing more than liabilities in any serious conflict with the English colonists. Wars between Indians had become bloodier as the weapons and attitudes of the Europeans influenced the native culture. Now a great confrontation was starting, and the Indians who challenged the authority of the New England colonies were ready to fight in a new way.

The Wampanoags, Narragansetts, Nipmucs, and Pocumtuks who either joined or were swept into the war with the English and their Indian allies in 1675 followed the precedent set in the Pequot war. They waged war on all colonists, not just combatants, and they used every means at their disposal to defeat their enemies. The total

warfare which the English had introduced to New England became a nightmare for frontier towns and militia bands. Although nothing that the Indians did ever approached the horror of the Pequot fort, King Philip's War showed the English how well and how fiercely Native Americans could fight.

The widespread use of fire arrows and torches against English houses was one demonstration of the Indians' new willingness to practice total warfare. Captain Thomas Wheeler, who lived through a Nipmuc attack on Brookfield, Massachusetts, in August 1675, told how the Indians wrapped special arrows with rags containing brimstone and "wild fire." Frustrated by the stubborn defense of the town's garrison house, the Nipmucs built two siege devices mounted on wheels and loaded with inflammable materials. To the relief of the trapped colonists, a rainstorm prevented the testing of this innovative equipment. Before the Indians left, however, they managed to burn every house except the defended one and one under construction. . . .

Until the English made good use of their Indian allies and began to adopt some Indian tactics, the warriors who opposed them were far superior in forest combat. Gookin said that the colonial soldiers were unprepared for fighting in which they "could see no enemy to shoot at, but yet felt their bullets out of the thick bushes where they lay in ambushment." The warriors sometimes camouflaged "themselves from the waist upwards with green boughs" so that "Englishmen could not readily discern them or distinguish them from the natural bushes." Colonists "had little experience" with such warfare, "and hence were under great disadvantages." Benjamin Thompson complained in a poem that "every stump shot like a musketeer."

Most disturbing to the colonists was the deadly effectiveness of Indian musketry, a result of careful aiming at individual opponents. The marksmanship and pragmatic military practices of the Indians put the leaders of militia bands in particularly perilous positions. Because in European combat the enemy usually made no effort to aim at anyone, and officer was as safe in a prominent position as were any of his soldiers in formation, the Narragansetts, who did not consider it unsportsmanlike to try to kill the leaders of their opponents, shot Captain Davenport three times during the "Great Swamp Fight."

. . . Six other captains were killed or died of wounds received in that action. . . .

The Indian mode of warfare, actually a blend of aboriginal and European elements, proved so successful in numerous engagements that perceptive officers and government officials began to urge changes in colonial military doctrine. There was, however, considerable resistance to suggestions of adopting the Indian tactics which seemed to work so well in the forests. William Hubbard after blaming the "Bloody Brook massacre" on the soldiers' failure to fight in a body, as expected of European musketeers, went on to criticize any imitation of the Indians' method of "skulking behind trees and taking their aim at single persons."

Field commanders noted the obvious fact that their Indian opponents would not conform to European concepts of battlefield conduct. It was futile to send out a general from the Bay Colony with specific orders to stop the enemy's "skulkings whereby he picks off the English." To defeat the warring tribes, the English would have to use tactics which they had long regarded with contempt and indignation. Although the process of borrowing methods from Indians was difficult for most officers and common soldiers, a few enterprising men began to depart from accepted European practices as soon as they faced well-armed and forest-wise opponents who knew the value of scouting, surprise, cover, concealment, mobility, and marksmanship. Soon

a tactical and technological revolution was underway, and a new doctrine of forest warfare was evolving.

When "multitudes of Indians who possessed themselves of every rock, stump, tree or fence that was in sight" ambushed Captain Church and a party of Plymouth colonists on July 9, 1675, the Englishmen dove for any cover they could find in the barren spot where they were temporarily trapped. . . .

Governor Leverett of Massachusetts Bay correctly appraised the military situation as early as September 24, 1675, when he commented that many men were "lost by not taking heed to the ambushments of the enemy nor observing their methods." He ordered the companies of the Bay Colony "to attend the enemies' method, which though it may seem a rout to ours is the best way of fighting the enemy in this bushy wilderness." His order did not cause any immediate changes, particularly because Indian scouts had been recently removed from most of the colony's military units. However, by the end of the following summer, soldiers from all of the New England colonies were shooting at individuals, using cover when fired upon, and moving through the woods quietly and carefully. Their ability to find and attack the enemy had greatly improved as they gained experience in the forest and listened to the advice of Indian allies. Connecticut units had learned much from their Mohegan and Pequot comrades-in-arms, and Captain Church had finally gotten the mixed company of Indians and Plymouth colonists which he had wanted.

Church probably did the most to popularize the adoption of unconventional tactics by English forces. On July 24, 1676, Governor Winslow commissioned him to "raise a Company of Volunteers of about 200 men, English and Indians: the English not exceeding the number of 60." . . .

This unusual Plymouth company killed or captured hundreds of Indians by fighting in the Indian manner. Church carefully studied the methods of his opponents and interrogated prisoners to gather information on enemy locations and tactics. By acting on the advice of both friendly and hostile Indians, he created a combined force which could defeat the enemy on its own ground. His captives offered one suggestion which improved the movement of troops through the forest and reduced casualties in combat; they told him that "the Indians always took care in their manner and fights not to come too thick together. But the English always kept in a heap together, that it was as easy to hit them as to hit a house." . . .

The killing of Metacombet, or King Philip, on August 12, 1676, was a widely-publicized feat which demonstrated the value of Captain Church's Indian-like tactics. Church had learned from an informer that Metacombet was in a swamp below Mount Hope, where the war had begun. Rushing to the area with a small force, Church split his unit into a raiding party to drive the Wampanoag sachem and his few remaining followers from their camp and a blocking force to wait in ambush for any fleeing Indians. Church personally stationed his blocking force in the wooded wetlands near the Indian camp. In the semi-darkness before dawn, he placed pairs of one Indian and one Englishman behind trees at spots which seemed to almost insure interception. When the raiders fired into and then rushed the camp, the elusive sachem escaped into the swamp only to run toward a pair of waiting men. It was an Indian who shot Metacombet after his English partner's musket had misfired.

The ultimate defeat of the hostile tribes was inevitable long before the death of the man whom the English called King Philip. The Indians' tactical successes and their skillful use of European military technology were not enough to win a war

against the far more numerous colonists, whose Indian allies, fortified garrison houses, and almost unlimited logistical support tipped the scales heavily.

By the fall of 1676, disease, starvation, lack of ammunition, and relentless pursuit had brought disaster to the scattered Indians survivors. The hostility of the Mohawks toward the insurgent tribes had been a boon for the colonial forces and an important factor in the English military success. There was little hope of escape to the west, where the Mohawks were waiting, and few places where the remnants of proud bands could hide in New England. Colonists had burned corn fields, destroyed food caches, and kept their enemies from traditional fishing spots. When starvation forced Indians to leave hiding places in search of food, they frequently fell prey to grim soldiers who were no longer bewildered in the forest. The English units, guided by Indian scouts, had begun to use the same ambush and raid techniques with which their opponents had terrified most of New England in the previous year.

The English had also borrowed from the military material of the Indians during King Philip's War. Colonists learned to paddle birchbark canoes and to travel with snowshoes and moccasins in the deep snows of the New England winters. Hatchets, or tomahawks, designed for the Indian trade became standard sidearms in some units, replacing the traditional swords. Even English food proved less suitable for forest warfare than standard Indian rations. Bitter experiences with moldy bread and heavy supplies on long expeditions prompted a militia committee in Massachusetts Bay to add the following item to a list of military provisions: "fifty bushels of Indian corn, parched and beaten to nocahe." Each of these hundred soldiers was to carry his supply of this nourishing and durable meal in a small bag, as was the Indian practice.

Not every colonist was pleased that Indian allies and borrowed military practices had contributed so much to the success of the English forces, but almost everyone agreed by 1677 that warfare in the New England forests required departures from conventional European methods. John Eliot recognized the military changes which had occurred since the Pequot War:

In our first war with the Indians, God pleased to show us the vanity of our military skill, in managing our arms, after the European mode. Now we are glad to learn the skulking way of war.

The Middle Ground

RICHARD WHITE

Trade goods served both symbolic and utilitarian purposes. The same kettle that served to cement an alliance also cooked venison. . . . Turning to trade goods as items of everyday use draws attention to another facet of exchange: the possibility of dependency. The question of dependency—the possibility that without European goods and the fur trade the Algonquians would no longer be able to feed, clothe, or house themselves—looms over recent studies of the trade. To determine if this possibility became fact during the French fur trade, it is necessary to assess the place and prevalence of trade goods in everyday material life and the dependence of Algonquians upon them.

From Richard White, *The Middle Ground* (Cambridge, England: Cambridge University Press, 1991), pp. 128–141.

Superficially, Algonquian statements and actions regarding these matters seem to mimic the terms of the marketplace and indicate a material dependence on the French. On closer examination, however, their views and actions make sense only in the context of the particular social relationships that the goods themselves helped to establish. In referring to exchange, Algonquians spoke in terms of their *besoins*—their needs or necessities—and they visualized exchange as a way of satisfying these needs. *Besoin*, as used by the Algonquians, was not simply a statement of desire; the term had a particular resonance in their society because, once an appropriate social relationship had been established, an assertion of need for something could become a special claim on the thing needed. To be needy is to excite pity and thus to deserve aid. Just as in addressing manitous Algonquians sought to portray themselves as weak and miserable, so in addressing Onontio, Jesuits, or traders, they usually stressed their own misery and need. The Algonquians' emphasis on exchange as a way of satisfying their *besoins*, therefore, had a meaning quite different from that expressed in the French view of commerce as a way of filling needs.

In stressing their *besoins*, the Algonquians were actually making a claim on the French. Because they needed goods and were friends and allies of the French, they deserved to have those goods that the French possessed but did not themselves immediately require. Indians, like the Fox at their first contact, thought that "whatever their visitors possessed ought to be given to them gratis; everything aroused their desires, and yet they had few beavers to sell." Among the Potawatomis at initial contact, the French demand for payments for goods that Indians received led to violence. According to Algonquian cultural logic, the French, as allies, should act as if they were kinspeople of the Algonquians. Each side would supply the other's needs. Each side would graciously bestow what the other lacked.

Such a conception of exchange makes it clearer why middleman status was a matter of relative indifference to the Algonquians. If the French chose to bring them goods at their villages, this was to be praised not opposed. These western Algonquians conceived of traders as men who came to supply their *besoins*, and they welcomed them for their presence which promised to enhance the prestige, wealth, and strength of their villages. What infuriated them was not the loss of the opportunity to make the long and arduous journeys to Montreal to obtain their *besoins*, but the French announcement in the late 1690s that they were withdrawing their traders from the *pays d'en haut* and that they expected the Algonquians to resume their trade journeys. Onanghisse, the Potawatomi leader whose people the French presumed to be potential middlemen, was outraged:

Father! Since we want powder, iron, and every other necessary which you were formerly in the habit of sending us, what do you expect us to do? Are the majority of our women who have but one or two beavers to send to Montreal to procure their little supplies, are they to intrust them to drunken fellows who will drink them and bring nothing back? Thus, having in our country none of the articles we require and which you, last year, promised we should be furnished with, and not want, and perceiving only this—that nothing whatsoever is yet brought to us, and that the French come to visit us no more—you shall never see us again, I promise you, if the French quit us; this Father, is the last time we shall come to talk with you.

Significantly, Onanghisse said nothing about lower prices or potential profits; he spoke for the women, who, by implication, were a major force in exchange in the