Four Domestications: Fire, Plants, Animals, and . . . Us

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LECTURE I.
THE LATE-NEOLITHIC MULTISPECIES RESETTLEMENT CAMP

Rather like a knight-errant, I have, for the past two decades, been on a thus far futile quest. The particular dragon I have been meaning to slay—or at least report on firsthand—can be described by the awkward word "sedentarization." Why, I have continually wondered, has it been the aim of all states, classical and modern, colonial and independent, populist and authoritarian, communist and neoliberal, to assemble rural people on fixed agricultural fields—to sedentarize them? Sedentarization, perhaps the oldest state project, seems hardwired into the very architecture of stateness.

That, then, is the quest. The reason I am still wandering is because I have lost my way several times. I thought when I sat down to write my two previous books *Seeing Like a State* and *The Art of Not Being Governed* that they were aimed squarely at the heart of the beast. But my eye wandered as other interesting prey crossed my line of vision, and, before I knew it, my quiver was empty and the original prey long out of sight. These Tanner Lectures have inspired me to go a-hunting again and take one more shot at the beast. And, at my age, it may be my last shot—a Parthian shot over the rump of my retreating horse.

Given the oral format of the Tanner Lectures, I dispense with most of the heavy pedagogical siege weapons and race at breakneck speed through millennia of history, hardly pausing to admire the sights that have merited the intellectual careers of better scholars than I. The excuse I offer for my speed and superficiality is my desire to rectify another intellectual misadventure. For twenty years now I have been giving the introductory lecture to an interdisciplinary seminar at Yale on agrarian societies. Little by little, I have tried to develop an account of how we get agrarian societies in the first place. After all, *Homo sapiens* has been around for about two hundred thousand years and only sixty thousand, tops, of those years out of Africa. The first agrarian states—then a mere smudge on the map and a rounding error in the world's population—appear, on a generous estimate, around sixty-five hundred years ago. They represent just a shade over 3 percent of our history as a species. And, I was somewhat surprised to learn, evidence of domesticated food plants and livestock occurs several thousand years before anything we could call an agrarian state pops into archaeological view.

How might one tell the story of how we as a species, having spent virtually all our span on planet earth as hunters and gatherers, ended up assembled in great clumps, growing grain, tending livestock, and governed by the political units we call states and empires? One option, and the one I choose to exploit here, is to examine the preconditions that made it even conceivable that we should gather, or be gathered, in substantial numbers in a single place and not immediately starve. These preconditions are, I believe, the result of three world-altering domestications: fire, plants, and animals. Each of these three domestications brought us closer together, reshaped the natural world, and in turn reshaped us as well. In domesticating much of the natural world, we, in turn, domesticated ourselves. Only in the context of these domestications did we become suitable raw material for the critical concentrated mass of foodstuffs and manpower that state formation requires. The state is, as we shall see, both the beneficiary and the forcing house of these domestications.

What fire meant for hominids and for the rest of the natural world is thrown into sharp relief by a cave excavation in South Africa. At the deepest and therefore oldest strata, there are no carbon deposits and hence no fire. Here one finds full skeletal remains of large cats and fragmentary bone shards—bearing tooth marks—of many fauna, among which Homo erectus. At a higher, later, stratum, one finds carbon deposits, signifying fire. Here, there are full skeletal remains of Homo erectus and fragmentary bone shards of various mammals, reptiles, and birds, among which a few gnawed bones of large cats. The change in cave "ownership" and the reversal in who was apparently eating whom testify eloquently to the power of fire for the species that first learned to use it. At the very least, fire provided warmth, light, and relative safety as well as a precursor to the domus, or hearth.

The case for the domestication of fire being the decisive great transformation in the fortunes of hominids is convincing. It has been mankind's oldest and greatest tool for reshaping the natural world. "Tool," however, is not quite the right word. Unlike an inanimate knife, fire has a life of its own; throughout much of history it has been a necessary but not entirely domesticated animal, requiring training, feeding, and watchfulness lest it escape its shackles.

Homo sapiens cannot claim the prize for domesticating fire. The bulk of the evidence suggests that Homo erectus and Homo neanderthalensis were using fire at least a half-million years ago—more than twice as

early as our appearance as a species on the scene—and perhaps as much as eight hundred thousand years ago. As with all domestications, one ought not to imagine the domestication of fire as originating in a flash of intuition by some late-Pleistocene ancestor of Thomas Edison. Primates have been known to forage eagerly after a natural fire for the beans and tubers cooked to palatability by the heat. It doesn't seem preposterous for such a primate to have thrown a handful of beans on the embers to cook them. When it occurred to some of our ancestors to push a few sticks closer to the dying embers to rekindle its warmth, light, and food-softening properties, we will never know.

Our ancestors could not have failed to notice how natural wildfires transformed the landscape: how they cleared older vegetation and encouraged a host of quick-colonizing grasses and shrubs—many of them bearing desired fruits, berries, and nuts. They could also not have failed to notice that a fire drove fleeing game from its path, exposed hidden burrows and nests, and, more important, later stimulated the browse that attracted game—in native North America, elk, beaver, hare, porcupine, turkey, quail, and ruffed grouse, for example. Once in control of fire, early mankind and, until today, hunter-gatherers and swidden farmers have used fire to transform the landscape more to their liking. They encouraged the flora and fauna they desired and discouraged those they didn't. Until roughly a hundred years ago when fire was declared an enemy of public lands, there was scarcely any part of the globe that had not been remade by human (anthropogenic) fires—that is, hardly a landscape that was not fire adapted.

We best understand this massive human intervention into the natural world, I believe, as low-intensity farming and animal husbandry. Even before controlling fire, mankind and other primates have, of course, been shaping their world by hunting, trapping, plucking, hacking, defecating, and uprooting, but their impact was not appreciably greater than other large fauna. The use of fire, however, dramatically amplified their capacity to reorder the biota around them and create a more desirable habitat. For our purposes, however, the wielding of fire has the effect of assembling, gathering, concentrating selected resources closer at hand. Fire acts as a powerful magnet, bringing a suite of desirable flora and fauna closer to the hearth. We are a very long way from the grain field and livestock corral here, but on a very long view, one can see the centripetal force of fire accelerating the reorganization of the natural world for the convenience of Homo sapiens. Fire served, then, as the plow and harness of biotic

domestication for about five hundred millennia before what we know as the Neolithic revolutions of farming and animal husbandry proper.

Rather than roaming far and wide for naturally occurring food, humankind has now rearranged its world so as to surround itself with its needs closer at hand. Concentrating foodstuffs and game reduces, in proportion, the necessary radius of hunting and gathering. As the carrying capacity of a given landscape grows, the population potentially becomes slightly more dense and settled.

Fire powerfully concentrates people in yet another way: cooking. It is virtually impossible to exaggerate the importance of cooking in human evolution. The application of the fire to raw food externalizes the digestive process; it gelatinizes starch and denatures protein. The chemical disassembly of raw food, which in a chimpanzee requires a gut roughly three times the size of ours, allows Homo sapiens to eat far less food and expend far fewer calories extracting nutrition from it. The effects are enormous. It allowed early man to gather and eat a far wider range of foods than before: plants with thorns, thick skins, and bark could be opened, peeled, and detoxified by cooking; hard seeds and fibrous foods that would not have repaid the caloric costs of digesting them became palatable; the flesh and guts of small birds and rodents could be sterilized. Even before the advent of cooking, Homo sapiens was a broad-spectrum omnivore, pounding and mashing raw meat and plants, but with fire, the range of foods she could digest expanded exponentially. As testimony to that range, an archaeological site in the Rift Valley dated twenty-three thousand years ago gives evidence of a diet spanning four food webs (water, woodland, grassland, and arid), encompassing at least 20 large and small animals, 16 families of birds, and 140 kinds of fruit, nuts, seeds, and pulses as well as plants for medicinal and craft purposes (baskets, weaving, traps, weirs).

Fire for cooking was at least as important as landscape architect for the concentration of population. The latter placed more desirable foods within easier reach, while the former rendered a whole range of hitherto indigestible foods now both nutritious and palatable. The radius of a meal was greatly reduced. Not only that, but softer cooked foods as a form of external premastication allowed easier weaning and the feeding of the elderly and toothless.

Armed with fire to sculpt the environment and able to eat so much more of it, early humans could both stay closer to the hearth and, at the same time, establish new hearths in previously forbidding environments. Neanderthal colonization of northern Europe is a case in point; it would

have been inconceivable without fire for warmth, hunting, and cooking. There is some evidence that Neanderthals would drive mammoths, almost certainly with fire, off cliffs in the late autumn and then camp close to the resulting cold-storage meat supply for the remainder of the winter, hacking off slabs of frozen flesh as needed, cooking it with fire that, along with the mammoth hides, kept them warm.

The genetic and physiological effects of at least half a million years of cooking have been enormous. Compared to our primate cousins, our gut is less than half the size of theirs, our teeth are far smaller, and we spend far fewer calories chewing and digesting. The gains in nutritional efficiency, it is claimed, largely account for the fact that our brains are three times the size one would expect, judging by other mammals. In the archaeological record, the surge in brain size coincides with hearths and the remains of meals. Morphological changes of this magnitude have been known to occur in other animals in as little as twenty thousand years following a dramatic shift in diet and ecological niche.

Fire, one might say, is our trump card as a species, a monopoly that largely accounts for our reproductive success as the world's most successful "invasive." Much as certain trees, plants, and fungi, we too are a fire-adapted species: pyrophites. We have adapted our habits, diet, and body to the characteristics of fire, and, having done so, we are chained, as it were, to its care and feeding. If the litmus test for a domesticated plant or animal is that it cannot propagate itself without our assistance, then, by the same token, we have adapted so massively to fire that our species would have no future without it. One small but telling piece of evidence is that raw foodists who insist on cooking nothing *invariably* lose weight.

A mere ten thousand years ago, all Homo sapiens, roughly four million of them, were all hunter-gatherers. Between 60 and 80 percent of our diet came from plant sources, supplemented by nutritionally valuable high-protein foods from hunting, fishing, and shellfish gathering. Not long afterward, we have evidence for the domestication of wheat, barley, rice, millet, maize, lentils, potatoes, and peas from a relatively few centers where their wild ancestors are found in the Fertile Crescent, Southwest China, the Andes, Central America, and Ethiopia. These domestications did not precipitate the rise of agrarian civilizations; in fact, it would take at least four millennia before these grains would become the staples of the first agrarian kingdoms. (This long interim between grain domestication and states will preoccupy us later.) Not only did the domestication of

plant foods long predate the agrarian states, but all of the twelve to fifteen crops that today dominate world commerce were domesticated by the sophisticated applied botanists also known as our Neolithic ancestors. "Historical man" has added nothing to this achievement. What is perhaps most astonishing about our diets in the subsequent ten thousand years is how narrow they have become to the point that they are now totally dominated by the three major world grains: rice, maize, and wheat.

How the domestication of food plants took place has been the subject for a great many speculative tales with rather sketchy circumstantial evidence to back them. First, we know that domestications of different plants took place independently in many areas of the world. Why should we imagine that the process was comparable everywhere? Second, the reproductive characteristics of different domesticates vary widely, and human-assisted propagation of the banana, of millets, of manioc, of maize, and of peas is likely to vary accordingly.

Two tales of domestication seem to jostle for hegemony. One is the so-called dump-heap, or midden, theory. The basic idea, which suspiciously builds on an assumption of preexisting sedentism, is that household or village wastes are deposited in a particular location. Over time the natural composting of the dump heap forms a nutrient-rich soil in which any number of discarded, viable seeds, pits, and cuttings sprout and grow. Voilà!—the birth of the garden and the beginning of agriculture. Curiously, this tale is normally told about seed plants, especially grains, when such seeds are virtually never viable after cooking or passage through the alimentary canal. As a story, it seems far more plausible for the roots, tubers, and cuttings that can vegetatively propagate than for seeds. Throw a piece of a wild potato on the dump heap, and it will probably sprout.

The second story contends that early domestication began in rich woodland areas of natural diversity (Vavilov Centers) in which some plants were so favored that they were tended, weeded, and allowed to sufficiently self-seed so as to ensure an annual supply. And indeed there are areas in the Middle East today where the natural stands of wild wheat and barley are so dense as to mimic a cultivated field.

The question of *why* early farming was taken up is, however, intrinsically more interesting than how it was invented. It is not obvious why hunters and gatherers, provided with the bounty of the natural world and made more accessible by fire, would choose voluntarily to move toward farming with its far more demanding regimen of labor. Even in the twentieth century, Marshall Sahlins has reminded us that foragers and hunters could be described as the original affluent society. They typically spent less

than half of their waking hours in what we might call "work" and the rest of the time in repose and in what an anthropologist might call cultural elaboration.[1] The dominant, though not entirely convincing, explanation is that farming was adopted in those settings where population pressure on natural resources had increased to the point where it became necessary to extract more calories from the same territory, a theory famously laid out by Ester Boserup nearly a half-century ago.[2]

Three pieces of fragmentary evidence appear to bear out this reasoning. First, in the two millennia or so before farming is established, foraging populations all over the world seem to have grown substantially.[3] This mini population boom is accompanied by a more intensive gathering of plant foods—nuts, grains, tubers—at the expense of meat from large game, which is presumably becoming scarcer. Starchy foods were becoming a staple before they were cultivated. A second straw in the wind is the fact that a good many sites of early agriculture were settings where crops could be sown with a minimum of labor. The most striking case is what is known as "flood-retreat" agriculture—broadcasting seed on the soft and fertile silt left on a riverbank by the receding annual floods. Finally, there is abundant evidence from many sites that whenever there has been a dramatic drop in population, because of epidemics, war, or famine, the remaining population typically shifts toward less intensive, labor-saving means of subsistence now that the pressure on resources has plummeted. Thus, many native American groups moved to hunting and gathering after the catastrophic epidemics brought by the Europeans; similarly, following the Black Plague of the fourteenth century, areas once intensively cultivated were abandoned in favor of less intensive slash-and-burn (swidden) cultivation.

The driving principle of Boserup's account is the economic principle of least effort for a given output—a principle documented in brilliant detail by A. V. Chayanov in his study of Russian smallholding peasants, *The Theory of Peasant Economy*.[4] Precisely because intensive farming generally involves higher labor costs per unit output, it is avoided so long as

1. Marshall Sahlins, *Stone Age Economics* (Chicago: Aldine-Atherton, 1972).

2. Ester Boserup, *The Conditions of Agricultural Growth* (London: G. Allen and Unwin, 1965).

3. Anna Curtenius Roosevelt, "Population, Health, and the Evolution of Subsistence," in *Paleopathology at the Origins of Agriculture,* edited by Mark Nathan Cohen and George J. Armelagos, 559–83 (Orlando: Academic Press, 1984). The two millennia in question vary, temporally, from setting to setting depending on the time when farming first appears in the archaeological record.

4. A. V. Chayanov, *The Theory of Peasant Economy,* edited by Daniel Thorner, Basile Kerblay, and R. E. F. Smith (Homewood, IL: R. D. Irwin, 1966).

less onerous forms of subsistence are available. It is taken up reluctantly by hard-pressed foragers who have reached the carrying capacity of their environment. On this account, the adoption of farming calls into question any simple narrative of human progression from hunting and foraging to swiddening, and then to agriculture proper. Agriculture almost certainly entailed a large increase in drudgery and, as we shall see, declines in health and life expectancy. Looking backward, farming seems to be man's first major step toward civilization; it cannot, however, have looked that way to those who first embarked upon it.

As with fire, there was no Edison lightbulb moment. Who gets credit for fire? The first hominid to pick up a firebrand and flourish it, the first to figure out how to carry embers from one place to another, the first to ignite a fire with flint or friction? With plants as well, there is no bright line between plants that are tolerated, encouraged, semidomesticated, and sown in a tilled field. Fruits that foragers brought back to their camp repeatedly would have grown from seed there. Those who noticed that the seeds grew best in the midden humus and threw their seeds there, those who removed weeds threatening to choke it, those who selected and resowed seed from the best fruit trees—all would have had a hand in "inventing" gardening and domestication.

Everywhere, the adoption of agriculture was protracted and halting. Domesticated cereals have been known for at least ten thousand years, but, in most places, it took several thousand years before they were systematically planted in tilled fields. Barley and wheat were planted in Britain only five thousand years ago. It was not as if, once shown the magic of farming, foragers and hunters rushed to embrace the advantages of agriculture. The principal reason was that a subsistence spread across several food techniques and food webs was far more stable and reliable than an exclusive reliance on planting. Early farmers might do some planting, but it was likely to be overshadowed by foraging of wild foods, collecting shellfish, trapping fish, and hunting. With such a balanced portfolio, their subsistence risks were spread in a way that protected them from the failure of a single source of food. They were unlikely to give up this security until they were forced to. Left to their own devices, they avoided intensive agriculture until they pressed hard against the carrying capacity of their environment. When obliged to cultivate, they first opted for the forms of agriculture that offered the highest return for the least labor. Depending on the context, these were likely to be shifting cultivation (a.k.a. fire-field cultivation or swiddening) with long-fallow or flood-retreat agriculture.

If pressed still further, they shortened the fallow and, as a last resort, took to the plow. Throughout this long transition, there was much oscillation; whenever the pressure on land was relaxed—usually because of catastrophic mortality—the survivors returned to letting fire do the arduous work of the plow, or even to hunting and foraging.

Many plants are very finicky about where and when they will grow and resist domestication. Homo sapiens selected those wild plants that thrived nearby and were most useful. In the process of adapting them little by little to the field, we dramatically reversed the direction of natural selection. Selection pressure prior to farming favored varieties that thwarted browsers and gatherers. It thus favored plants that shattered easily, spilling their seeds, and those that matured erratically or had long-dormant seeds. The farmer, by contrast, wants nonshattering (indehiscent) varieties with determinate growth and simultaneous maturity. Plants that produce more and larger seeds, that ripen uniformly, that are easily threshed, that germinate reliably, that outrace weeds, and that have few glumes and appendages are likely to contribute most to the harvest, and thus their offspring will be favored in next year's planting. The morphological differences alone became massive over time; it is hard to imagine that wild maize, a diminutive plant with many small cobs and tiny seeds, is one and the same species as the giant with few cobs and huge seeds now cultivated.

The early agricultural field is vastly more simplified and "cultivated" than the world outside it; it represents a kind of floral zoo. Yet it is far, far more complex and diverse than the modern field of sterile hybrids or clones. A crop was grown for many purposes—not just to maximize the bushels of grain per hectare. A grain might be grown for its straw as thatch, for making brooms, for mats or bedding, for porridge, for flour, for beer, for ceremonial use. The field itself was a terrain of selection, spontaneously throwing up new varieties—called land races—that were occasionally hardier and more disease resistant than their ancestors. Cultivators, then, selected for a large number of characteristics within a species, with the net result being a sown field (or fields) of great diversity. Some species tolerated drought, others humidity; some were especially adapted to local soils; some thwarted birds; others resisted damaging rusts and fungi; others withstood a frost. Many varieties had low average yields, but as a *portfolio* of cultivars they were dependable and would yield a crop in any but the most disastrous conditions. The diversity of crops and subspecies was greatest in natural settings of great ecological and climatic diversity, and least in rich alluvial bottomlands with dependable water and more

reliable growing conditions. The more monotonic the environment, particularly the soils, the more monocropped its agriculture.

The purpose of the cultivated field and of the garden is precisely to eliminate most of the variables that would compete against the cultigen. In this artificial environment—other flora, exterminated for a time by fire or the plow; opportunistic weeds pulled out by their roots or hoed; birds, rodents, and browsers scared off or fenced out; perhaps carefully watered and fertilized—we make a nearly ideal world in which our favorites will thrive. Steadily, by coddling the plant and rigorously favoring those varieties and only those varieties that meet our needs, we often create a fully domesticated plant. "Fully domesticated" means simply that it is, in effect, our creation; it can no longer survive without our attention. In evolutionary terms, a fully domesticated plant has become a superspecialized, floral "basket case," and its future is entirely dependent on our own. If it ceases to please us, it will be banished and almost certainly perish.

We think of ourselves, Homo sapiens, as the agent in this narrative; we domesticated the potato, maize, rice, bananas. But if we squint at the matter from a slightly different angle, it is we who have become domesticated. Michael Pollan puts it roughly this way in his sudden aperçu while gardening.[5] As he is weeding and hoeing around his tomato plants, it dawns on him that he has become the slave of the tomato. Here he is on his hands and knees, day after day, weeding, fertilizing, protecting, and in general reshaping the immediate environment to the utopian expectation of his tomato plants. Who is doing whose bidding becomes almost a problem in metaphysics.

It is useful, I think, to appreciate in a larger sense how the domestication of plants—as farming—enmeshed us in an elaborate annual set of routines that organized our work life, our settlement patterns, our social structure, and our ritual life. From field clearing and preparation (by fire, plow, ard, harrow) to sowing, cultivation, and weeding to constant vigilance as the field ripens, the crop organizes much of our timetable. The harvest itself sets in train another sequence of routines: in the case of cereal crops, cutting, bundling, threshing, gleaning, separation of straw, raking, winnowing, sieving, drying, sorting—most of which has historically been coded as women's work. Then, the daily preparation of grains for consumption—pounding, grinding, fire making, cooking, or baking throughout the year—sets the tempo of the domus.

5. Michael Pollan, *Second Nature: A Gardener's Education* (New York: Atlantic Monthly Press, 1991).

These meticulous, demanding, interlocked, mandatory annual and daily routines, I would argue, belong at the very center of a comprehensive account of "the civilizing process." They strap us to a minutely choreographed routine of dance steps; they shape our physical bodies; they shape the architecture of the domus; they insist, as it were, on certain patterns of cooperation and coordination. Once Homo sapiens takes that fateful step into agriculture, he enters an austere monastery whose taskmaster consists mostly of the demanding genetic clockwork of the plant itself. Norbert Elias writes convincingly of the growing chains of dependency among ever-denser population that made for the mutual accommodation and restraint he terms "the civilizing process."[6] Literally thousands of years before the changes Elias describes, however, man was already disciplined and subordinated by the metronome of his own crops.

If fire served to concentrate more food resources within easy reach, the transition to farming marked an accentuation of this trend. Like a powerful magnet, fire and planting shifted foodstuffs in denser and denser rings around the habitation. The planted field itself is a herbarium—adapted to the special needs of the cultigen being nursed to maturity and kept separate from the surrounding nature at a great cost in labor. To the degree that the crop is fully domesticated, the more it needs in the way of defensive work to prevent it from being overwhelmed by disease, weeds, and vermin.

The shift in emphasis from pure hunting and gathering to shifting slash-and-burn cultivation to sedentary fixed-field farming is a shift biotically from relative complexity to relative simplicity. The hunter-gatherer encourages, usually by fire, certain plants and animals she aims to harvest. The swidden cultivator, also using fire, encourages and plants a great variety of crops and may, as well, use the field as a hunting ground. In these respects, the tempo of hunter-gatherers and swiddeners is attuned to the various tempos of their prey and crops—the long cycle of large mammals, the maturity of fruit and nut trees, and the annual cycle of planted crops. From the early Neolithic domestications of grains until the advent of major grain civilizations—a very long period—people moved back and forth within this continuum as circumstances dictated. The move toward more intensive fixed-field farming, however, was a qualitative change. Subsistence production came to depend on a few staple crops

6. Norbert Elias, *Power and Civility* and *The History of Manners,* translated by Edmund Jephcott (New York: Pantheon Books, 1982).

that required careful tending. As food production and diet became narrower and simpler, it became, by the same token, more fragile. The fate of more and more people rested on the annual fate of a handful of staple crops we had trained to live in our jealously guarded herbarium.

The domestication of animals, with the exception of the dog who, it can fairly be said, domesticated us, *came after, not before,* the major plant domestications. This reverses the earlier nineteenth-century supposition that pastoral nomadism was a primitive form developed by hunters. That supposition derived from a misplaced social Darwinist evolutionary series: hunting and gathering, nomadism, shifting agriculture, fixed agriculture, towns. The sheep, the goat, and the pig were all domesticated about eight thousand years ago—sheep and goats in Southwest Asia and the pig in both China and Southwest Asia. Cattle and the horse came considerably later. All five of these animals, rather like weedy escapes from the garden such as carrots, sunflower, rye, oats, and vetch, were for a long time quite capable of returning to the wild and breeding with their wild relatives. The archaeological remains of the herd animals—cattle, sheep, and goats—are almost always associated with seed, particularly grain, farming and occur after the first evidence of farming. This sequence fits nicely with the argument, put most forcefully by Lattimore, that pastoral nomadism is a secondary adaptation taken up by defecting farmers for a combination of environmental and political reasons.[7]

The best way to look at the domestication of animals, in the context of our concern with concentration and sedentism, is to see it through the lens of cooking. What cooking does is to allow us to eat things we otherwise could not, and for less caloric expenditure. Most domesticated animals do the same for us. They are our dedicated four-footed—oops, in the case of chickens, ducks, and geese, two-footed—foragers. We, in effect, send them out to forage on our behalf. They range farther than we might, and, most important, they eat and digest plants, nuts, fungi, and insects that we cannot find or will not eat. They metabolize all these products of nature and turn them into protein and fat that we crave and consume. It is as if we had a large number of servant foragers scouring the environment and processing its offerings—in effect metabolizing or cooking it and bringing it to the hearth.

7. Owen Lattimore, "The Frontier in History," in *Studies in Frontier History,* 469–91 (London: Oxford University Press, 1962).

In principle, the domesticated animal does no more for us than the animal brought down by a hunter. A deer provides the same service, and, if wild animals were plentiful and easy to hunt, there would be little point in domestication for meat, hides, bone, tendon, and so on. After all, domestication does entail costs: corrals, guard dogs, winter fodder. From this angle, the domestication of animals is simply an intensification of hunting.

The scarcity of game is obviously one spur to domestication. But the advantages of most domestication extend beyond the uses of the slain animal. We also make use of the domesticated animal's reproductive functions. Cattle, zebu, water buffalo, yak, goat, sheep, reindeer, dromedary, Bactrian camel, horse, and ass are all, or were once, milch animals. That milk could be preserved by turning it into such products as yogurt, butter, cheese, and the like. In the case of poultry, the unhatched eggs could be regularly eaten. From the fur-bearing animals, especially sheep, the wool could be taken to weave or process into rugs, garments, or felt. One can skin an animal only once, but one can shear it annually. One can even, judiciously, harvest blood from domesticates for human consumption. The systematic use of the products of the living animal—particularly its reproductive functions—is what sets animal domestication apart from intensified hunting.

Beyond direct human consumption, domestic animals become vital to early agriculture. They could, in this respect, be seen to mimic the effects of fire. Just as the meat and fat they yielded resembled intensive hunting, so their manure and their land-clearing proclivities closely tracked the use of fire to fertilize fields and help clear new fields for agriculture. Without them, many soils would have been quickly exhausted and woodland clearances far more labor intensive. (Early New England European farmers cleared woodland for arable pasture by running pigs and turkeys on it for a few years—the turkey to clear the undergrowth and the pigs to grub out the roots.) Finally, much later in the evolutionary record, cattle, horses, camels, and water buffalo were trained as work animals to transport men and goods long distances and to pull the plow through soils impossible to work without draft animals.

As with plants, the gradual incorporation of herd animals into the extended household is perhaps best described as a mutual domestication—recalling the "domus" in "domestication." Selecting continuously for the traits we desired—particularly docility—we end by creating, as with domesticated plants, a species that would be hard put to survive on its

own in the wild. As a sheep breeder myself for more than twenty years, I have always been personally offended when sheep are used as a synonym for cowardly crowd behavior and a lack of individuality. We have, for the past eight thousand years, been selecting among sheep for tractability—slaughtering first the aggressive ones who broke out of the corral. How dare we, then, turn around and slander a species for some combination of normal herd behavior and precisely those characteristics we have selected for?

In turn, we have been as shaped by our domesticated animals as by our domesticated plants. We prepare corrals, mangers, bedding, and stalls for them and, when necessary, bring them fodder. We tend and protect their vulnerable offspring; we milk, shear, and medicate them. Having taken them in and transformed them, we become, in a sense, their servants as well. They depend on us as we on them. Like grain farming, stock rearing sets in motion a whole series of routines that choreograph our day and our year.

At this point, the full suite of civilizing domestications—fire, plants, and animals—is in place. So too, for this reason, are the critical conditions for the concentration of resources that make sedentarization feasible. One imagines that early Homo erectus would have sought to place themselves at an optimal distance from existing natural food webs—say, a riverbank, a woodland, and open grassy areas. As they moved back and forth across these ecologies and the rich resources that the "edge" zones between them provide, such locations would have offered the most varied and stable diet for the least effort. What these domestications provided, for the first time ever, was the chance to reassemble, to relocate, the natural world—the part of it that Homo sapiens found most useful—around himself. Homo sapiens made the world more portable and moved it closer to the domus. If you will forgive the anachronistic impiety, instead of Mohammed going to the mountain, *this* mountain actually came to Mohammed. Fire cleared the land and reorganized its plant and animal life; it made more of those plants and animals palatable; the domesticated grains—which are palatable only when cooked—brought plant life previously gathered where it occurred into a tighter circle around the domus; and the domesticated animals brought game and its products virtually to the front door. At about this time, unmistakable signs of sedentarism appear in the archaeological record: pots and granaries.

LECTURE II.
THE LONG GOLDEN AGE OF BARBARIANS, A.K.A. NONSTATE PEOPLES

The history of the peasantry is written by the townsman
The history of the nomads is written by the settled
The history of hunter-gatherers is written by the farmers
The history of nonstate peoples is written by the court scribes
All may be found in the archives cataloged under "Barbarian Histories"

Historical mankind has been mesmerized by the narrative of progress and civilization as codified by the first great agrarian kingdoms. As new and powerful societies, they were determined to distinguish themselves as sharply as possible from the populations from which they sprang and who still beckoned and threatened at their fringes. In its essentials, it was an "ascent of man" story. Agriculture, it held, replaced the savage, wild, primitive, lawless, and violent world of hunter-gatherers and nomads. Agriculture, on the other hand, was the origin and guarantor of the settled life, of formal religion, of society, and of government by laws. Those who refused to take up agriculture did so out of ignorance or a lack of intelligence. In every early agricultural setting, the superiority of farming was underwritten by an elaborate mythology recounting how a powerful god or goddess entrusted the sacred grain to a chosen people.

The basic narrative has long survived the mythology that originally supplied its charter. From Giambattista Vico to Oswald Spengler, to social Darwinist accounts of social evolution in general, the sequence of progress from hunting and gathering to nomadism to agriculture was settled doctrine. It is, implicitly or explicitly, the march of civilization conveyed by most pedagogical routines and imprinted on the brain of virtually any schoolgirl or schoolboy. The move from one mode of subsistence to the next is seen as sharp and definitive. No one, once shown the techniques of agriculture, would dream of remaining a nomad or forager. Each step is presumed to represent an epoch-making leap in mankind's well-being: more leisure, better nutrition, longer life expectancy, and, at long last, a settled life that promoted the household arts and the development of civilization. Dislodging this narrative from the world's imagination is wellnigh impossible; the twelve-step program required to accomplish that beggars the imagination.

The first step of my fantasy detox regimen requires that we begin by dispelling the prevailing mystifications about foraging-and-hunting societies. Instead of living a famished life on the edge of starvation, most hunting-and-gathering societies have enjoyed robust good health. Almost to a man (they were, after all, men), the first Europeans to encounter the natives of the New World expressed their astonishment at what admirable physical specimens they were. They lived in a world of relative plenty, enjoying an impressively rich and varied diet. In an important sense, the natives of North America were fire farmers; their sophisticated use of fire to create new browse and habitat for the dozens of mammals and birds they hunted was a kind of harvesting of game that they had consciously encouraged. To picture hunters and gatherers as living hand to mouth is a mistake. A great many of their subsistence techniques were "delayed-return" activities, as with their management of fire. They wove nets, traps, baskets, and weirs; they built boats, rafts, and bridges; they tended beehives. The practical botanical knowledge of even contemporary hunter-gatherers has never ceased to inspire the awe of professional botanists. In fact, pure hunters and gatherers already possessed all of the practical skills we now associate with the Neolithic agricultural revolution. They gathered ripe stands of wild grasses, threshed them, winnowed them, sieved them, detoxified them if necessary by soaking or parching, ground them, and prepared them as foods. If we overlook the fact that many of the smaller grains they ate were found and encouraged rather than planted, they were in every respect agriculturalists like their Middle Eastern cousins. And, of course, by the time the Europeans arrived, they had long been planting their own grain, maize, along with beans and squash, now regarded as the perfect trinity of nutrition.

As we noted earlier, even contemporary foragers, although pushed to the least-favorable ecological margins, typically manage to spend half or more of their day in what industrial society would call leisure and socializing. Those foragers who were located in the most favorable settings, such as the Pacific Northwest with its bounty of salmon runs (eels on the East Coast), built a very elaborate material culture, famous for its conspicuous consumption in potlatch ceremonies. Before agriculture, one could say that the Pacific Northwest was the Paris of the foraging world, with a density of population, wealth, and display that had no equal. Finally, one should not imagine the preagricultural world as consisting of isolated autarkic bands. Foragers and hunters were integrated along river systems and coastlines, especially by the exchange of both prestige goods and

valuable foods, medicines, and plant materials across ecological zones. As archaeologists have discovered, a considerable degree of specialization and trade is common among hunters and gatherers.

Life before agriculture was, then, anything but nasty, brutish, and short. All in all, it is not clear that a forager would jump at the chance to become a full-time farmer. Horticulture might offer a welcome addition to a portfolio of subsistence strategies, providing a store of edible foods in a lean season. This perhaps explains why, for several thousand years after its first use, farming did not replace but rather supplemented hunting and foraging. This fact is, to say the least, inconvenient to the "ascent of man" narrative. Why was it that the hunters and gatherers who, after all, established agriculture—and "historic man has added no plant . . . of major importance to the domesticated forms on which he [now] depends"[1]—kept it at arm's length for such a long time?

Agriculture, particularly intensive agriculture, it turns out, is bad for your health. Martin Jones sums up the archaeological record: "The skeletal evidence from hunter-gatherers has left no evidence behind of chronic or severe nutritional stress or disease. Pre-historic farming communities, however, were different. We find repeated evidence of illnesses linked to dietary stress. Moreover, the stature of early farmers had recurrently diminished from that of their hunter-gatherer predecessors."[2]

These conclusions were reached on the basis of a 1982 symposium designed to evaluate paleopathological data from around the world in order "to measure the impact on human health of the Neolithic revolution and the antecedent changes in pre-historic hunter-gatherer food economies."[3] The similarity of findings from several world regions that were not interconnected and still innocent of state-making is remarkable. They show that stress, however, does not seem to have become common and widespread until after the development of high degrees of sedentism, population density, and reliance on agriculture. At this stage in all regions, the incidence of physiological stress increases greatly, and average mortality rates increase appreciably. Most of these agricultural populations have high frequencies of porotic hyperostosis (overgrowth of poorly formed bone associated with

1. Carl O. Sauer, *Agricultural Origins and Dispersals* (New York: American Geographical Society, 1952), 102.

2. Martin Jones, *Feast: Why Humans Share Food* (Oxford: Oxford University Press, 2007), 245.

3. Mark Nathan Cohen and George J. Armelagos, *Paleopathology at the Origins of Agriculture,* (Orlando, Fla.: Academic Press, 1984) xix.

malnutrition, particularly iron deficiency–related malnutrition) and cribra orbitalia (a localized version of porotic hyperostosis in the eye sockets), and there is a substantial increase in the number and severity of (tooth) enamel hypoplasias and pathologies associated with infectious disease.[4]

During the later Neolithic, when systems of intensive agriculture had developed and dense, sedentary settlement was the rule, there was a widespread, marked increase in rates of physiological stress and mortality, apparently due both to lessened diet quality, adequacy, and stability and to increased rates of infectious disease.[5]

How this slow-motion plunge from relatively robust health to malnutrition and disease took place is a slightly more complicated story. It turns out that Ester Boserup was right about population pressure being the driving force behind intensive agriculture, but not in the way she envisioned. In the late Pleistocene, long before Boserup's story begins, there was throughout the world apparently an increase in the human population, enough, it seems, to put pressure on local resources. The result was a shift toward a more intensive exploitation of less favored foods of greater abundance, particularly plants. This change in subsistence is known to some archaeologists as the "broad-spectrum revolution." It entailed less reliance on game and fish, both high in the trophic pyramid, and more reliance on plants at its base that were less nutritionally rich but far more abundant. The role of a few starchy plants of high productivity and storability in the diet grew proportionately. According to some paleoarchaeologists, this intensified use of a few plant species stimulated new land races that, further selected for caloric value, productivity, and storage, led to an agriculture focused on plants capable of intensive harvesting.

It was not the development of farming per se that led to the increased rates of malnutrition and disease found in the archaeological record but rather its intensiveness. For a very long time after the first appearance of farming, it was practiced alongside foraging and hunting. Straddling wild and cultivated food resources, early farmers could insulate themselves from the worst effects of a harvest failure or the scarcity of game or a forage food. Only when their diet became largely confined to the handful of crops they grew did their health show signs of severe deterioration.

Most, if not all, of the malnutrition detected in what I will call "agricultural woman"—for women were the most severely affected—seems to

4. Roosevelt, "Population, Health, and the Evolution of Subsistence," in ibid., 559–83.

5. Ibid., 576.

be due to iron deficiency. Preagricultural woman had a diet that supplied abundant amounts of omega-6 and omega-3 fatty acids derived from meats, fish, and certain plant oils. The ratio of omega-6 to omega-3 was also favorable: varying from 1:1 to 3:1. Perhaps what is most important is that the digestive system of Homo sapiens had adapted to a diet of this kind for 95 percent of its history. Even contemporary hunter-gatherer societies have a diet broadly comparable with the older late-Pleistocene diet, with 65 percent of their food value coming from meat sources and 35 percent from plants. The omega-6 and -3 fatty acids are important because they facilitate the uptake of iron necessary for the formation of oxygen-carrying red blood cells. Cereal diets, by contrast, not only lack the essential fatty acids but actually inhibit the uptake of iron. The result of the first intensive cereal diets in the late Neolithic (wheat, maize, barley, rice, millet) was therefore the appearance of an iron-deficiency anemia, leaving an unmistakable forensic bone signature. Women, because of their blood loss from menses, would have been far more exposed to this iron-deficiency anemia. What other pathologies can be traced to this relatively sudden and radical departure from our age-old Pleistocene food habits is the source of lively research and debate. It is at about this time, perhaps not coincidentally, that blood type A makes its first appearance. Previously, all Homo sapiens were type O. Type A blood appears to carry more immunity against diseases of crowding and may be associated with the shift in dietary habits.

A PERFECT EPIDEMIOLOGICAL STORM

The great anthropogenic changes wrought by fire, farming, and husbandry have altered the world forever. Hitherto, the species brought together finally by the Neolithic revolution were relatively dispersed—each occupying its distinctive niche in a diverse environment. For the first time, and fatefully, they were all assembled together in a late-Neolithic mosh pit—a heap of people, animals, and grain such as the world had never seen. Epidemic diseases depend on a concentration of hosts—on population density—to spread, in much the same way that a forest fire depends on a certain buildup of combustible material to fuel a conflagration. A massive concentration of Homo sapiens alone would have been enough to fuel certain infectious diseases among them by coughing, touching, and handling the same objects. The same applies, of course, for other animals, particularly the social-herd animals who form an epidemiological package of their own. Plants, too, obey the same epidemiological rule: the more

that members of the same species are crammed together in one place, the more likely they will transmit plant diseases among themselves. But what we have in the Neolithic revolution is the unprecedented concentration of certain species of hominids, livestock, birds, and cultivars—much less diverse than the world outside—all living in the same space and, together, creating a perfect epidemiological storm. For certain disease organisms, it was an unprecedented feast. It is no small irony that the very domestications that made possible the concentration of people and foodstuffs necessary to the development of civilization—of high culture—should have had such a devastating impact on health and nutrition.

Prescientific peoples seem always to have known that crowding increases the risk of infectious disease, even if they remained ignorant of the precise vectors of transmission. Highland peoples in northern Luzon, for example, moved quickly to block the passes into the mountains whenever there was a deadly outbreak in the Spanish lowlands. The London wealthy in the 1665 plague epidemic, Defoe tells us, left as soon as they could for the countryside. Oxford and Cambridge Universities maintained pesthouses outside town to which students could be dispersed the moment an epidemic struck.

What was less clear, both in folk knowledge and, until relatively recently, in scientific knowledge, is the vast range of diseases shared by us and the animals we have domesticated. Nor is it simply a question of a particular disease, say, of pigs or cattle, that moves between them and their human companions. It is, in fact, the entire assemblage of livestock, grain, and humans that brings in its wake a vast entourage of what may be called "obligate weeds."

In the plant world, where I believe the term was invented, an obligate weed is a fellow traveler that mimics and is adapted to thrive in precisely the same niche we have prepared for the cultigens we have planted. Every major grain has one or more obligate weeds that develop under the same field conditions but may, for example, shed their grains earlier so as to self-seed before the harvest. In a broadly comparable way, the entire Neolithic complex touches off a great pilgrimage of rodents, insects, parasites, worms, fungi, bacteria, and so on, all specialized to the complex and, over time, selected to thrive in that niche. Their ancestors, of course, existed in the wild but not in anything like the numbers and concentrations that the Neolithic complex made possible. They are there for precisely the same reason that Homo sapiens is there: to be as close as possible to their sources of nourishment. Each was adapted in one way or another not just to the humans and their domesticated animals but to the whole

environment of the domus, the barnyard, the human and animal wastes, the granary, the fields, the cleared land and the grazed pasture, and all of the other obligate pests and weeds.

One imagines that the heap of pests and pathogens proliferated at a rate that at least matched and, especially in the case of quickly reproducing arthropods such as fleas and flies, greatly exceeded that of Homo sapiens. The baseline of human concentration alone is striking. For hunter-gatherer populations, we are normally not talking about numbers of persons per square kilometer but rather numbers of square kilometers per person. The upper limit of swidden or slash-and-burn cultivation is thought to be around twenty persons per square kilometer. When it comes to sedentary grain cultivation, the concentrations are at least ten times as dense and can, under favorable conditions of irrigation and or rice paddies, be a hundred times as dense.

The Neolithic complex represents heaven on earth for, to name just a few, mice, rats, certain birds, rabbits, and foxes. Each of these weedy obligates brings along its own train of parasites, lice, mites, ticks, and *their,* in turn, minute train of microscopic parasites and hangers-on. The barnyard, granary, and domus also represent an ideal habitat for invertebrates who thrive on the feast of grain, mammals, and waste set out for them: ticks, cockroaches, fleas, mites, mosquitoes, and intestinal worms, to name only a handful.

We miss much of the point, then, if we see in our mind's eye just a steady stream of humans, cattle, and staple grains gradually massing around the domus and within early villages. At a more powerful level of magnification, we would see the humans; animals attended by their ticks, fleas, and mites; and, in the case of cultivars, their rusts, molds, and arthropod feeders. Each of these, in turn, is accompanied by its own parasites and pathogens right down to the level of microbes and viruses. Then come the rats, mice, birds, and rabbits that find the granaries, humans, and insects congenial. They in turn bring their microbes, not to mention the domestic cats encouraged to control their populations. What we have, then, is something like an enormous Noah's Ark for all the species, down to the smallest, that are adapted to life on board.

The Neolithic hearth of civilizations turned out also to be the hearth of a host of zoonotic diseases—diseases that move between humans, birds, and animals, often by means of vectors of transmission such as fleas, lice, and ticks. Their role in human health, in population dynamics, in the mathematics of epidemics and acquired immunity, and, not least,

in the death of most of the New World's population following contact has been ably chronicled by William McNeill, Alfred Crosby, and Jared Diamond. Their arguments are familiar to most of you, and I shall not repeat them here.

The unprecedented crowding of so many species spawned, over time, a novel ecological niche favoring the selection of insects and pathogens that could move successfully back and forth among the passengers on the ark. Just as Alfred Crosby characterizes the momentous and lethal fifteenth-century encounter between New and Old World hominids, fauna, flora, and pathogens as the "Columbian exchange," so we might term the assemblage of domesticates the "late-Neolithic multispecies resettlement camp." Its consequences for health, mortality, and social life are as epochal as the Columbian exchange and, in fact, laid the epidemiological groundwork for that encounter ten millennia later.

The diseases to which the late-Neolithic multispecies resettlement camp gave rise are nearly endless and, of course, are continually being generated today—Lyme disease and West Nile virus being two recent examples. Virtually all of the infectious diseases that afflict Homo sapiens are zoonotic. A list of such diseases that figured prominently in the prehistoric and historical record, long before the mechanisms of their transmission were understood, makes melancholy reading: bubonic plague, smallpox, influenza, falciparum malaria, measles, pertussis, cholera, measles, mumps, yellow fever, tuberculosis, anthrax, typhus, leprosy, brucellosis, encephalitis, rabies, tetanus. If I were to chant the names of all the named zoonotic diseases, as a shaman might, you'd be here all evening. To give you an idea of the zoonotic profusion, a website on zoonoses that warns that it is not comprehensive lists such diseases by the species that might serve as a vector of transmission. For cat, it lists twenty-eight zoonotic diseases, for dogs thirty-three, for rodents fifty-two, horses ten, rabbits/hares/pikas fourteen, bats seven, birds and poultry sixteen, cattle twenty, sheep and goats sixteen, nonhuman primates twenty-seven, pigs twenty-six. (See William McNeill's *Plagues and Peoples* for slightly different figures.)[6] They are further classified according to whether transmission is direct, via vertebrate hosts, or requiring invertebrate (mostly insect) intermediaries.

Many of these diseases have cut down whole populations and, in historical times, brought down whole kingdoms. In the location where they

6. William H. McNeill, *Plagues and Peoples* (New York: Anchor Books, 1989), 51.

first arose, after an initial wave or waves of infection, those who survived had an acquired immunity that, in some cases, was passed on to subsequent generations. The disease became endemic and less deadly. When, through traveling hosts, the disease encountered an immunologically innocent population—what Crosby calls a "virgin land" epidemic, such as occurred in the postcontact New World—the results were catastrophic.

No big surprise that the literature on zoonotic disease has concentrated almost exclusively on human health. But the late-Neolithic multispecies resettlement camp made everyone sick. An evenhanded, species-neutral account of the Neolithic revolution would devote at least as much attention to "reverse zoonosis": the diseases that Homo sapiens transmitted to his domesticates and their obligate faunal weeds. (Well, if we were really evenhanded and species neutral, we would note that it was an occasion of great flourishing for certain microbes, pathogens, and parasites.) A complete account would also require us to trace the diseases circulating among the nonfaunal residents of the Neolithic complex. Under the plausible assumption that the more closely related the species, the more likely those pathogens will move between them, we would start, say, with the exchange of afflictions between sheep and goats or between ducks and geese.

The longer the domestication, the larger the number of species, the more jam-packed they are, the greater the likelihood of zoonotic diseases jumping species and spreading. Guangdong, in southeastern China, from this perspective is probably the oldest and most compact concentration of humans, pigs, chickens, ducks, geese, pond fish, and their obligate pests that the world has ever seen. Small wonder that it should serve as something of a petri dish for the propagation of new strains of zoonotic diseases such as avian flu and recurrent strains of influenza, including the one responsible for the 1918 pandemic.

We have, to this point, not spoken of the plants in the resettlement camp. Plants are subject to the same epidemiological rules as mammals. The more crowded they are, the fewer the species, and the more uniform within species, the more likely insect and worm pests as well as rusts, molds, and wilts will race through the fields. This was precisely the effect of the "cerealization" of the late-Neolithic complex. Only a few species of favored plants were admitted to the resettlement camp; they were crowded together in fixed fields of even maturity, and they were over time selected to have the same desirable characteristics. Although this is far from the concentration and homogeneity of, say, industrial wheat or

maize that must be protected by pesticides and herbicides, the Neolithic complex nonetheless represented its own promising petri dish for the proliferation of plant pests and diseases. This meant that while the major staple grains were now closer at hand and selected for their productivity, the new grain edifice was everywhere more unstable and prone to devastating explosions of pests and pathogens. So long as Neolithic farmers straddled multiple food webs by foraging wild foods, hunting, and fishing, the loss of a single grain crop was a misfortune; once grain farming dominated subsistence, however, it might mean famine.

This brings us to an apparent paradox. The evidence, on the one hand, is indisputable. The appearance of intensive agriculture and sedentism brings in their wake signs of general malnutrition, disease, and higher mortality rates. Not only are these facts inconvenient for the narrative of the arts of agriculture contributing in an unproblematic way to human well-being, but they are, at first glance, contradictory to another indisputable fact: that population growth speeds up among farming populations at the very time that their health and mortality worsen. As a pure statistical matter, there can be only two explanations for this paradox. Either the grain centers were drawing in population from external sources, or there must have been a compensating increase in natality—in birthrates—despite the decline in health. Both are, I believe, at work, and the complex institutional reasons this might have occurred are part of the story to which I now turn.

THE EARLY STATE AND THE LATE-NEOLITHIC RESETTLEMENT CAMP

The comparative history of early states is a vast and complex subject to which I am in no position to make an original contribution. I will venture, however, to say something about the elective affinity between the earliest states and the late-Neolithic complex. As political enterprises that depended absolutely on a critical mass of grain and manpower concentrated around a (walled) center, they required something on the order of the late-Neolithic complex in order to gain a foothold. Where the ecological conditions for the late-Neolithic complex were not favorable, states rarely arose. Once the first small statelets did emerge—often in competition with other small statelets—they endeavored to amplify and intensify the Neolithic complex: by extending irrigation works, by promoting settlement and grain production, by suppressing other forms of subsistence—hunting and gathering, swiddening, root-and-tuber

horticulture—and by forms of central grain storage and slave-raiding expeditions. The early states were tenuous affairs and rarely failed to fragment or disintegrate within a few generations at most, but the ecological gleam in their eye was always a growing, concentrated population and what one of our American patriotic songs describes as "amber waves of grain."

The late-Neolithic complex was long in place before the first fledgling states appeared—at least four thousand years in the case of, say, China and Egypt and at least as much as eight thousand years in the case of Angkor and Pagan in Southeast Asia. All the grains—millet, barley, maize, wheat, and rice—and animal traction on which later civilizations would rely were common knowledge. The spread of this complex fostered the growth of small centers of population, trade, and specialization that displayed considerable sophistication in pottery and metallurgy long before the era of state-making.

The earliest states appeared in the most favorable ecological settings where the Neolithic complex offered a high return for a minimum of effort: for example, in the rich silts of the Nile Valley, the easily worked loess soils along the Yellow River, and in the Tigris-Euphrates valley. Given reliable water, rich alluvium, animal traction, and productive grains, such settings had an exceptionally high carrying capacity; more people and grain could be crammed into a limited space. The concentration was vital. Under premodern conditions, bulk commodities such as grain can only be moved profitably over relatively short distances by land—a maximum of roughly 250 kilometers, providing the land is flat. This sets some sharp limits to the geographical reach of the state. If water transport is possible, however, those limits are greatly expanded. My favorite striking illustration of this is the claim that as late as 1800 (even before steamships), one could sail from Southampton, England, to the Cape of Good Hope in less time than it took to go from London to Edinburgh by stagecoach, and, of course, one could carry a lot more. The early state, for this reason, typically hugged a navigable river or a coastline and spread out along the lines of least geographical friction—watercourses and flat land, rich grain lands, flat alluvium, perennial water, and, preferably, easy water were the ecological niches favored by the early state.

The elective affinity between early states and "amber waves of grain" is especially strong. With the partial exception of the Incan Empire whose high altitude and ecological variety balanced it between grain and potatoes, it is hard to think of a single early agrarian state that was not

utterly grain dependent. States are twinned with grain for several reasons. It grows conspicuously aboveground, it all ripens at about the same time, the harvest is easy to estimate, it is economical to cart reasonable distances because of its relatively high value per unit weight and volume (compared to other foodstuffs), and it stores relatively well. Injurious to overall health as a predominantly grain diet may be, it is, par excellence, the staple crop of the state. The early state, in particular, is not so much concerned with the gross domestic product of its realm as with the *gross assessable and accessible* product. What matters is a crop that is easily legible so that it may be taxed and a revenue in kind that can be stored and used to feed nonproducers—especially during a siege or famine.

The Cartesian simplicity of monocropped grain on fixed, annual, measurable fields arrayed contiguously on a flat alluvium plain lends itself to centralized control. Compare the ease of this landscape of appropriation to almost any other traditional form of subsistence. Hunter-gatherers are mobile and widely dispersed; they subsist across many different food webs; they can hardly be said to have a staple food unless it is game that they consume, for the most part, shortly after the kill. Fire-field (swidden) cultivators shift their fields every few years and plant as many as thirty or forty different crops, each of which is likely to mature at a different time. Horticulturalists, who plant a good many roots and tubers, are also not promising taxpayers. Their crops are often unobtrusive, they grow underground, and, most important, they can often, as in the case of cassava (manioc, yucca), be left safely underground for as much as two years after maturity. If the tax man wants your cassava, he will have to dig it up tuber by tuber, and, then, he has a cartload of cassava that isn't worth much and won't store for long aboveground. Nomadic pastoralists, for their part, could, particularly if they had horses, outrun any tax man, although the Ottoman authorities tried to count their flocks when they stopped annually for lambing. If we change the geography along with the subsistence system, the problems for the state are compounded. What if the terrain is rugged and mountainous; what if there are no navigable rivers and no perennial sources of water? Any one of these forms of livelihood and terrain militates against the control of manpower and the appropriation of their products. Any combination of them all but precludes state formation.

The early state, then, required a very special niche that was uniquely favorable to concentrated populations and intensive grain monocropping. It attempted, though not with great success, to amplify this

agroecology. A chronicle entry praising the accomplishments of Wei Yan, the defense minister for the heir of the duke of Chu around the fifth century BCE, illustrates much of the craft of early state-making. By the eighth day of the tenth month, Wei Yan had registered lands and fields, surveyed mountains and forests, gathered products from lakes and ponds, measured rocks and hills, marked saline and alkaline lands, counted swamps, planned reservoirs, built embankments for small fields, herded cattle in waterfronts. Then he made the military levy based on the revenue. He did everything according to the rites.[7] Wei Yan, it is clear, is taking an inventory of resources—first of all the fields of grain (probably millet)—much the way a new tax assessor might.

The early states in China and elsewhere, particularly when they were manpower starved, did what they could to attract population. They extended existing irrigation works; more accurately, they scaled up the irrigation works, tanks, and reservoirs that cultivators had already devised. They might even offer land to new settlers along with a plow animal, seed, and food grains for the first year—perhaps even a tax holiday for the first few years. Petty kingdoms devastated by war, famine, epidemics, and desertion might try to rebuild their manpower and grain base in this fashion. Such means represented what we could call the voluntaristic side to state building and naturally the one that found a strong echo in the official chronicles and proclamations.

For the earliest states, getting hold of manpower was imperative for economic and military purposes, and, given the fact that there was usually a nonstate frontier nearby, it could rarely be accomplished by enticement alone. This is, I believe, chiefly why all early states, and many "late" states in areas of low population, were slaving states. Wars in the world of classical states, East and West, were usually less about the conquest of territory (unless it was a choke point on a trade route) and more about taking captives and plunking them down at the state core. Athens as a naval power with a small agrarian core was particularly dependent on slaves. Every Roman military expedition was accompanied by merchants who were looking to buy slaves. Slavery was central to Roman statecraft. In Southeast Asia, with its sparse populations, all states without exception were slaving states—some of them right up until the beginning of the twentieth century. Older hill people in the Malay Peninsula and in Laos

7. Quoted in Yong Xue, "Agrarian Urbanization: Social and Economic Changes in Jiangnan from the Eighth to the Nineteenth Century" (PhD diss., Yale University, 2006), 45. The list itself has the ring of a ritual injunction rather than what Wei Yan may have actually done.

can still remember their grandparents' stories about Malay and Thai slave raids in the hills. The most important demographic movement in early modern Southeast Asia was the forcible resettlement of captives from the periphery—from hunter-gatherer communities, from small fishing communities—captured in wars or sold by slave-raiding hill peoples or pirates and assembled at the state center. Ecologically speaking, they were moved from dispersed subsistence peripheries to the wet-rice core that was the basis of state power. In quite a few cases, the word used in the lowlands for hill peoples actually meant "slave" as well. The examples—all of them before the more famed North Atlantic slave trade to supply plantation labor for the New World—could be multiplied.

So, we have possibly here one piece of evidence that helps explain the increase in population in state cores despite higher mortality due to malnutrition and epidemic diseases. The next problem early statecraft faced was how to keep its population in the resettlement camp. Many of the laws of early imperial China—eighteenth-century imperial Russia would do just as well—were devoted to preventing flight. Under Tang dynasty laws, leaving one's native place was punishable by thirty blows and vagrancy by three years of forced labor. Subsistence strategies illegible enough to resist revenue collection, such as foraging and shifting cultivation, were discouraged, prohibited, and punished, as well as being culturally stigmatized as barbaric.

The classical strategy to reinforce the revenue-producing grain core is, of course, the enclosure of the woodland and "wasteland"—the commons on which other subsistence strategies could be practiced. To some degree, the expansion of the grain core itself, as, for example, along the Yellow River's northern heartland of China, transformed the landscape so as to place the open commons at a greater and greater distance from the core. The normal resort of foraging forest and open-land foods in a subsistence crisis was now out of reach. The desert fringing the Nile's floodplain may have accomplished the same purpose for the rulers of early Egypt.

The long history of the enclosure of the commons, so ably evoked by Marx in the *Grundrisse,* is as much about eliminating non-revenue-producing, dispersed livelihoods as it is about the origin of private property in theft. An open, accessible frontier is always a threat to forms of unfree labor, as the proliferation of maroon communities throughout the New World testifies. After Emancipation, following the US Civil War, much of the ex-slave population headed for open common land and the hills. These lands had been a commons under slavery, as it benefited slave owners to

have slaves provision themselves as much as possible from the commons. Once free, the ex-slaves could maintain an independent life, foraging, hunting, trapping, planting a few crops, keeping a cow and some pigs and geese, and only sporadically engaging in day labor for their few cash needs. They were, in fact, living the same way that poor independent whites had. This spelled the ruin of plantation agriculture and of southern revenue. Only with the passage of a number of draconian fence laws in the 1880s depriving freedmen access to the commons for their livestock were they driven back into wage labor and into the infamous sharecropping system.

The process of eliminating alternative mixed subsistence options is part and parcel of every state strategy to defend and expand the intensive grain core. Ester Boserup, writing of intensive European agriculture, puts the matter succinctly, though in her mind the motives for fleeing the grain core would have been more to avoid drudgery than to gain freedom. In situations of low population density, she writes, "it is impossible to prevent the members of the lower class from finding alternative means of subsistence unless they are made personally unfree. When population becomes so dense that land can be controlled it becomes unnecessary to keep the lower class in bondage; it is sufficient to deprive the working class of the right to be independent cultivators [foragers, hunters and gathers, pastoralists, swiddeners]."[8]

Replacing non-revenue-producing forms of subsistence with arable fields of grain was, agroeconomically speaking, the principle behind the original *Drang nach Osten* of the High Middle Ages from the eleventh to the thirteenth centuries. Colonization organized by religious and secular orders was designed to replace the mixed subsistence pattern of pastoralism, farming, and foraging—as well as those who practiced it—with a garland of small grain-land kingdoms. Termed "cerealisation" by Robert Bartlett, what was important about this "colonization was that it turned non-revenue-producing resources into a fountain of corn and silver."[9] Grain here too was the staple of state power; it is the state's diet in more than one way. The particular grain might differ, and the differences are not agroeconomically trivial. Irrigated rice, for example, allows population concentration and intensification far greater than wheat, millet, or maize. But wherever states arose (again with the partial exception of the Inca), they were based on the concentrated production of measurable,

8. Boserup, *Conditions of Agricultural Growth,* 73. Fragment in brackets added.

9. Robert Bartlett, *The Making of Europe: Conquest, Colonization, and Cultural Change, 950–1350* (Princeton: Princeton University Press, 1993), 152.

storable grain. History records no cassava, no sweet potato, no banana kingdoms—though it does record, more recently, banana republics.

ZONE OF MANEUVER: REFUGIA FROM STATE AGROECOLOGY

The estimate for the world population of Homo sapiens around ten thousand years ago, roughly corresponding to the earliest appearance of cultivated grains in the archaeological record, is four million. By the year 2000 BCE, when a handful of petty states had popped up, historical demographers suppose the world's population to have been around twenty-five million. These statelets are a mere smudge here and there on the world's landscape, and the population living under their aegis is nothing more than a rounding error in the world's population figures of the time. In historical terms, the beginning of our species' adventure with the state form represents a mere 2 percent of our long history on earth.

I would argue further that notwithstanding the precocious early states and empires in China, the Middle East, and the Mediterranean, the hegemony of the state form, taking the world as a whole, is not established until around 1500 CE. One could quibble about the date, as the process was so greatly uneven from region to region. Quibbles aside, it means that until very, very deep into the Common Era, virtually all of the earth's surface was periphery and not state space, and a great deal of the world's population, though influenced by states, had not yet been, shall we say, "captured" or even captivated by them.

What strikes me, and what I want to call our attention to here, is the vast sweep of human history that can be characterized as an epoch of freedom in the modes of subsistence and of potential evasion of states. If we take about ten thousand years ago as the very beginning of Neolithic farming and four thousand years ago as the quasi-arbitrary beginning of states, there is a stretch of six thousand years when populations move more or less freely between modes of subsistence. If they farm or raise livestock, they are also likely to forage, hunt, and trade, and, more important, they can, as the circumstances require, move back and forth between these various activities. And states, once they do appear on a world scale, do not become hegemonic until long after. This, in turn, means that there is a further stretch of, say, three thousand to thirty-five hundred years when, despite the widespread existence of states, much of the world's population had a sporting chance of staying out of their clutches if they wished.

I want to insist a bit on this last point. We are, I believe, normally in danger of falling into what I would call the archeologically induced

hypnosis of empire. Until quite recently, scholarship, not to mention standard histories, has been dominated by the stories of the great empires: Egypt, Babylon, Han dynasty China, Rome. They occupied pride of place because they left the most concentrated volume of physical evidence. Dense state centers leave behind larger piles of rubble, and the larger the pile of rubble you leave, the larger your place in the historical record. The same logic applies with a vengeance to the written record. The thicker the paper trail you leave behind—land grants, memorials, tax records, corvée records, court chronicles—the larger your place in the historical record.

The mesmerism of dynastic and palace-centered histories introduces at least two major distortions. They are forcibly histories of "state space," and they ignore long periods of dynastic decline or periods when there was hardly a state at all. What is striking about even those areas where strong premodern states held sway is how relatively short-lived and evanescent they were. The aura of the Roman Empire as an idea endured far longer than the empire itself. In a truly evenhanded, year-by-year record of most areas known for incubating the early states, most of the pages from, say, 2000 BCE to 1500 CE would be blank. There were, even in these promising areas, more interregna than regna. The greatest distortion of rubble and written histories, however, is that they omit the vast and well-peopled landscape outside the small enclaves of imperial order. The more dispersed, mobile, egalitarian oral societies, regardless of their sophistication, extensive trading networks, and aggregate population, are relatively invisible in the historical record because they spread their debris more widely and left no laudatory self-descriptions of themselves. From a wide-angle and truly long-durée perspective, most life until fairly recently has been lived outside state cores, and movement into state cores and away from them has been comparatively easy. This is a far cry from our experience in which the entire world is, or is fast becoming, administered space.

These claims are important and controversial enough to merit at least a brief gesture toward the sort of evidence that would sustain them. In my unavoidably hasty survey, I want to emphasize the relative fragility of the early states, the oscillation between periods of political consolidation and periods of collapse and dispersal, and the pliability of subsistence strategies as populations shifted among an almost infinite combination of subsistence options depending on their desires and the circumstances they faced.

The rise of petty states in India, with the notable more ancient exception of Mohenjo Daro and Harappa about which little is known, began

around 1000 BCE. Despite being populous, fertile, and culturally innovative, the northern two-thirds of the subcontinent produced, over the next twenty-eight hundred years, only two moderately long-lived (two-hundred-plus years) region-spanning kingdoms—Chandragupta and the Mughal Empire. The region was marked by the rise and fall of innumerable petty states, and prolonged interregna were more the rule than the exception. Why state consolidation was so rare in an agroecology quite favorable to it can be explained, according to Bennett Bronson, by the proximity of "effective" barbarians whose constant and devastating raids prevented the formation of durable kingdoms.[10] Of course, as was the case in China, the Mughal Empire was founded by (Persianized) barbarian descendants of steppe nomads.

One major effect of the flux of petty states coalescing and shattering was to create a nimble and adaptable population accustomed to moving between subsistence strategies. The colonial assumption that forest dwellers must, perforce, be the oldest aboriginal remnants left behind or overtaken by more advanced agrarian peoples was radically mistaken. Woodland foragers were just as likely to be ex-cultivators who had fled war, epidemics, or taxes. To associate the mode of subsistence with some durable ethnic identity and language was, as Sumit Guha carefully demonstrates, to utterly miss the point of the flux in politics, climate, and trade routes. "Herdsmen settled to till or to tax the tillers, but cultivators shifted to herding; swidden farmers took to the plough but ploughmen fled to the forests. . . . [I]n almost every part of India, climate fluctuations accompanied by war and turmoil periodically strained the agrarian order to the point of collapse, settled agriculture retreated before the advancing forest and savanna, and surviving humans shifted to other forms of subsistence."[11] The strategic dimension of subsistence strategies and mobility is clearly at work here. Fixed assets such as substantial houses, irrigated fields, granaries, and plow animals may well prove especially vulnerable to raids in the absence of a strong state.

Mainland Southeast Asia recapitulates many of the same themes of the Indian subcontinent, except for the fact that its early states sprang

10. Bennett Bronson, "The Role of Barbarians in the Fall of States," in *The Collapse of Ancient States and Civilizations,* edited by Norman Yoffee and George L. Cowgill, 196–218 (Tucson: University of Arizona Press, 1998). William McNeill would give the ecology of disease zones a greater role in accounting for the relative absence of state-making (*Plagues and Peoples,* xxxx).

11. Sumit Guha, *Environment and Ethnicity in India, 1200–1991* (Cambridge: Cambridge University Press, 1999), 28–29, 46.

up later than India's, shortly after the beginning of the Common Era. Cosmologically speaking, Southeast Asia's early states were "Indic," in the sense of borrowing the symbolic claims, regalia, and architectural forms of the petty courts in South India. Such courts, in Southeast Asia as in southern India, had very limited means to extract grain and corvée from anywhere beyond a small radius of the court center. Their cosmological bluster far exceeded their grasp, and, during the monsoon rains, their authority shrank virtually to the palace walls. It is hard to find a fair-sized provincial town today in mainland Southeast Asia that does not claim to have been, at some point in the distant past, the seat of a small kingdom. For the most part, as Sunait Chutintaranond writes, the region was "a mosaic of small, largely independent principalities, loosely grouped together at various times into such [larger] polities as Arakan, Pagan, Pegu, Martaban, Angkor."[12]

These petty states and their contingent confederates fought, traded, taxed, and captured or bought slaves when they could, and when, inevitably, they disintegrated, their populations scattered and fled or were swept up by surviving slaving states. In the manner of the Indian populations depicted by Sumit Guha, they were accustomed to moving in and out of state agroecology and taking up foraging, hunting, swiddening, trading, and raiding as the circumstances warranted. They were anything but permanent inmates of the intensive late-Neolithic resettlement camp. The existence of small states was, in fact, in some respects a boon to extrastate livelihoods. They represented valuable trade partners, as many of the goods sought by lowland courts for consumption or for resale to coastal traders came from the hills (including slaves). Although the swiddeners and foragers in upland Southeast Asia lacked the military prowess of the nomadic pastoralists on India's and China's northern frontiers, their mobility often allowed them to raid lowland wet-rice settlements or to extract tribute from them. Those who remained outside the ambit of the state could then avail themselves of many of the advantages of trading and raiding without the inconveniences of taxation, corvée labor, conscription, subordination, and a less varied diet.

We know a good deal about state-making in pre-Columbian America and the density of population that intensive maize cultivation made

12. Sunait Chutintaranond, "Leading Port Cities in the Eastern Martaban Bay in the Context of Autonomous History," in *Recalling Local Pasts: Autonomous History in Southeast Asia,* edited by Sunait Chutintaranond and Christopher John Baker (Chiang Mai, Thailand: Silkworm Books, 2002), 13.

possible. The Inca kingdom (based on maize and potatoes, given its extreme highland location) and the Mayan and Aztec were based on a similar concentration of storable foodstuffs near the court center and a reliable system of transportation—for war making and tribute. Elsewhere, but especially in the central plain of Mexico, there were innumerable small city-states that waxed and waned and a population that also adjusted its subsistence strategies accordingly.

The unparalleled and utterly catastrophic epidemics touched off by European contact, which killed as much as 90 percent of the New World population, make for such a definitive break that the themes we are pursuing take on an entirely new cast after the conquest. The demographic collapse of what had been a fully occupied continent—with, for example, twenty-five to thirty-five million people living in the central plain of Mexico—led, as one would anticipate, to a radical deintensification of modes of subsistence. Fixed-field cultivators moved to easier slash-and-burn methods now that land, for the survivors, was so plentiful or to foraging and hunting. States, of course, collapsed, except for the new Spanish and Portuguese *reducciones.* If the demographic collapse was not sufficient to prompt deintensification, the flight from forced labor and diseases in the *reducciones* as well as the desire to evade slaving expeditions made dispersal more attractive, if not imperative. Pierre Clastres, who is a source of inspiration for much of my recent work, was the first to suggest that the so-called primitive Amerindian societies of South America were not Stone Age survivals who had failed to invent agriculture and create states.[13] Instead, he argued—a claim that has subsequently been borne out—that they were previously sedentary cultivators who had *abandoned* agriculture and fixed villages in response to the conquest. Their movement and subsistence techniques were *designed* to avoid incorporation into the state; their social structure and egalitarian values also served to prevent states from arising among them. They became, as it were, "barbarians by design."

Along with their lethal germs, to which Native Americans had no acquired immunity, the Europeans also brought domesticates and artifacts that made hunting, foraging, swidden cultivation, pastoralism, and even raiding more attractive. The acquisition and breeding of horses transformed the life of many Native American groups by radically enlarging their mobility, steel blades allowed them to cultivate larger swiddens

13. Pierre Clastres, *La société contre l'état* (Paris: Éditions de Minuit, 1974).

with greater efficiency (the steel-bladed ax is anywhere from four to ten times more efficient in clearing woodland as a good stone ax), while firearms changed hunting, warfare, and raiding. While the collapse of indigenous New World states is clearly a case of murder rather than senility or suicide, the accompanying crash of the population and the move toward less intensive subsistence options alert us to the responsiveness of food-gathering strategies to demographic shocks.

Were I to impose on an already impatient listener and continue this lamentably sketchy account of weak states and modes of subsistence, I would cover roughly the period from 500 to 1500 CE in Europe as a period of weak or absent states and a rural population also moving back and forth between foraging, swiddening, and more intensive agriculture depending on demographic and political pressures. I would emphasize, for China, the common flight of sedentary, taxpaying cultivators to the pastoral frontier. The Great Wall(s), Lattimore and others remind us, were built quite as much to keep taxpayers in as to keep the nomad-barbarians out. Finally, I would show how Southwest China and upland Southeast Asia came largely to be populated by groups seeking to flee the oppressions, wars, taxes, famines, epidemics, and subordination of the state cores and adjusting their subsistence strategies accordingly. But this last episode I have already argued at great length in *The Art of Not Being Governed*.

Vulnerability of the Early States

It is hard for us—Homo sapiens—to think in units of time much beyond our own life spans. The tempo of a few centuries seems breathtaking. Partly for this reason, for most of us, the permanence of states seems an inescapable constant of our lives. So it is not so simple to grasp the reality that, in most of the world, the state was, for thousands of years after its first appearance, not a constant but a variable, and a very wobbly variable at that. The episodic consolidation of early state power that so dominates the civilizational narratives of the schoolbooks is, on a long view and until quite recently, more the exception than the rule. Why the early state should have been so congenitally weak and prone to an untimely death is instructive.

As nodes of concentrated power, early states were also the object of contention. A great many early states disintegrated in the course of succession struggles among rival claimants, many of which led to protracted civil wars and the flight of much of the population from the grain core.

The crystallization of one small state often precipitated the formation of another (e.g., Ur and Uruk) and provoked wars to control valuable trade routes, fertile soil, and irrigation water and to seize valuable manpower. It mattered little whether one's "own" army or that of a rival state's came marching through, for their quartermasters all needed grain, draft animals, livestock, poultry, fodder, and, above all, press-ganged conscripts and porters. Early petty states were to this extent mutually self-canceling, though one must imagine conscript armies quietly deserting before the bloodshed and epidemics became too devastating. That is, the death of a state did not at all necessarily mean the death of its inhabitants, though they may have been dispersed from the grain core to take up other livelihoods.

Quite apart from armed conflict, we have seen in some detail already how vulnerable early states were to ecological and diet-induced dangers of their own making. Their novel—in evolutionary terms—reliance on a narrow band of cereal food sources not only carried a nutritional cost but also exposed their populations to devastating crop failures due to crop diseases, local climate variability, and pest infestations.

What we have not previously examined, however, is the ecological effect of the state-amplified late-Neolithic resettlement camp. The early state—with the exception of a few pure trading states—required a manufactured agroecological landscape that was more modified and sculpted than anything that preceded it. Such modifications introduced new ecological perils that its founders could not have easily foreseen. Each of these perils threatened to diminish or even destroy the carrying capacity of the agroecology on which the state depended. Two classic examples will serve to illustrate the process. The first case is the problem of siltation and flooding. An early state located, let's say, near a river, as was common, will have a large appetite for wood: for construction; for firewood used in cooking and heating; for metallurgy; for pottery kilns and brick making, baking, brewing, and smithing; and to clear forests to make room for pasture and grain fields. It will therefore cut timber on a prodigious scale, and since wood is difficult to transport, but buoyant, it will preferentially be cut along the banks *upriver* from the settlement and floated to the center. Over time, the watershed upstream of the state will be deforested, substantially changing the hydrological regime of the river. The watershed's capacity to hold moisture and to release it slowly will be reduced, and the soils along the banks, depending on their steepness, will erode, bringing in their wake the siltation of the riverbed and irrigation channels. A typical result is more sudden and catastrophic floods as well as changes in the river's morphology that may isolate the state from its main

channel. Trying to rectify these problems by building levies, weirs, dikes, and canals imposes its own costs and unforeseen consequences.

A second ecological cul-de-sac associated with all early irrigation societies is the gradual deposition of salts to the point of making cultivation uneconomic or impossible. These and many other self-limiting ecological aspects of state grain complexes are the direct consequence of the massive modification of the biota that increases both its fragility and the long-run costs of maintaining it.

Even when early states somehow managed for a time not to self-immolate by war or ecocide, the evidence suggests that they were as often hemorrhaging population as fast, and sometimes faster, than they were accumulating it. In Southeast Asia and China, the chronicles and documents of statecraft dwell on the problem of modulating taxes and corvée so as not to drive off the population. The existence of a vast periphery where other forms of livelihood were available, and which also circumvented most of the exactions that were the lifeblood of the state, made exit a constant temptation. In a succession crisis, a crop failure, or a war, the rush for the exits was massive. But, I believe, even in more settled times, there was also a steady leakage from the state cores that had as much to do with autonomy and relative freedom from subordination as with the outright economic advantage of life outside the state core. This relative autonomy would have appealed above all to the captives, slaves, and lower classes who suffered most of the disadvantages and had few of the privileges of property holders, merchants, and officials. Many of the runaways might have been only recently incorporated into the state and thus had both the skills and the kinship connections to resume their previous livelihoods. Once at the periphery, they could move away from grain production, which facilitates confiscation, and toward root crops, foraging, and dispersal, which thwart it. Their physical mobility would be restored as well. One account of the Yomut Turkman farmers, incorporated into the Persian state, notes that they insisted on keeping their tents and some of their livestock so that they could if necessary move out of range.

Finally, a persistent vulnerability of the early states was the very non-state peoples surrounding them, many of whom they had, in the Old World at least, disgorged. Here, I am speaking less of the "barbarian stars," the Mongols, the Manchu, the Mughals, Osman, Attila, who either took over or found states, but rather the constant problem of smaller-scale raiding always faced by the early states.

The way we can best conceptualize this activity, I believe, is to see it as an advanced and lucrative form of hunting and foraging. Sedentary

communities represented, for mobile foragers, an irresistible site for concentrated gathering. Some idea of the pickings they offered can be gained by this inventory of the loot from a large hill raid on a lowland settlement in western India in late colonial times: 72 bullocks, 106 cows, 55 calves, 11 female buffalo, 54 brass and copper pots, 50 pieces of clothing, 9 blankets, 19 iron plows, 65 axes, ornaments, and grain.[14] It was an example of one-stop, albeit dangerous, shopping for the raiders. The Achilles' heel of intensive grain growers was precisely their sedentism: their immobility. To a mobile people, whether swiddeners, foragers, or pastoralists, they represented an inviting target. Raiders, like guerrilla fighters, have only to arrive in sufficient force at a particular place and time to overmatch a fixed settlement and then quickly withdraw. If successful, they could have by confiscation what they would otherwise have to trade for. As the Berber saying has it, "Raids are our agriculture." The disadvantages of immobility are perhaps best captured by the tame European cow in the New World; to Native Americans it seemed like a particularly witless game animal, waiting to be killed or led away.

Raiding, like overforaging, risked killing the goose that laid the golden egg. Villagers subject to constant raids would abandon their settlement to take up foraging or swiddening (and maybe begin raiding themselves) or move to a safer area. For this reason, it was often in the interest of potential raiders to establish a system of "sustainable foraging," otherwise known as tribute or taxation. In return for not being raided by them or by other competitors, the sedentary grain communities delivered regular tribute in kind. Such protection rackets took place on a huge scale in late-Tang China, absorbing much of the dynastic revenue; on a somewhat smaller scale at the end of the then tottering Roman Empire; and on a Lilliputian scale in upland Southeast Asia. Where such arrangements were stabilized over time, they begin to resemble the protection-racket aspects of early state-making.

THE GOLDEN AGE OF BARBARIANS; OR, THE CHARM OF LATE BARBARIAN LIFE

In closing, I want to sketch out a case that the long period—counted not in centuries but in millennia—between the formation of the early states and the development of the hegemonic nation-state little more than two centuries ago represented something of a "golden age of barbarians."

14. Ajay Skaria, *Hybrid Histories: Forests, Frontiers, and Wildness in Western India* (Delhi: Oxford University Press, 1999), 132.

What I mean is that it was "better," in many ways, to be a "barbarian" in this period than either before or after.

First, let me make it abundantly clear, if it isn't already, that I use the term "barbarian" with my tongue planted firmly in my cheek. "Barbarian" and its many cousins—"savage," "wild," "raw," "forest people," "hill people," "pagans"—are terms invented in state centers to describe and to stigmatize those who have "not yet" fully become subjects of the state. For the Ming and early Qing dynasties, the term "cooked," denoting assimilating barbarians, meant, in practice, those who had settled, been registered on the tax rolls, and were governed by Chinese magistrates—in short, those who were said to have "entered the map." A group that was identical in culture and language would often be divided into "cooked" and "raw" factions entirely on the basis of whether they were inside or outside state administration. In the Chinese as in the Roman Empire, the barbarians—and tribes—began precisely where taxes and sovereignty stopped. Let's then substitute the inelegant term "nonstate peoples" for "barbarians."

From the civilizational narrative confected in state centers, "nonstate" peoples are "prestate" peoples. Their incorporation is just a matter of time—not if, but when—and in the "ascent of man" progression, there is no backsliding. The gathering in and sedentarization of peoples under the state is an inevitable one-way historical process rather like iron filings gradually aligning themselves and coalescing around a powerful magnet. This picture—both in its unidirectionality and in its apparent benignity—is radically wrong for most of the past five thousand years.

Movement, flux, and mixed subsistence strategies are the hallmark of this entire period. Small grain and trading states rose, occasionally consolidated for a time, and then disintegrated for a time into the smaller elementary units of social life. The archaeological record is littered with the remains of small evanescent statelets of which we know virtually nothing. Throughout this entire period, populations were incorporated into states and then fled or were disgorged as they collapsed. As noted earlier for India, farmers abandoned the plow for the forest, forest dwellers took to swiddening or farming, and cultivators broke away to become pastoralists or foragers. Most populations would have been familiar with and adept at modifying their subsistence strategies when it was necessary. If an epidemic, war, or famine killed off much of the cultivating population, the survivors could actually remain in the same, now depopulated, place and move to less intensive food production.

The gradual increase in population over this long period would have, by itself, encouraged more intensive subsistence strategies, but the fragility of states, the increased exposure to the epidemics of crowding, and the vastness of the nonstate periphery would not have allowed us to discern anything like an emerging hegemony of the state until quite recent times. These conditions, lasting for millennia, were the basis for the "golden age of barbarians."

Life was better for barbarians *because* there were states—so long as they were not too strong. States represented, as we have seen, a juicy site for plunder and tribute. Just as the state required a sedentary grain-growing population for *its* predations, so did this concentration of settled people with their grain, livestock, manpower, and tools serve as a site of exactions for more mobile predators. When the predator's mobility was enhanced by horses and stirrups or by swift boats, the range and effectiveness of their raids were greatly extended. They could assemble and strike quickly and then disperse as quickly to the hills, deserts, steppes, and mangrove coasts where they could not easily be tracked. Nomad raiders, Vikings, and the Illanum ("sea gypsies," *orang laut*) of Southeast Asia played a major role in curtailing the growth of states and, when strong, carrying off much of its population. The returns to barbarian life would have been far less attractive in the absence of these concentrated foraging sites. It would be hard to tell whether the microparasites of sedentary concentrations or the outbreaks of the macroparasite raiders contributed most to the limits on the growth of states and their populations.

If we think of the carrying capacity of barbarian ecology, my argument is that it was enhanced by the existence of petty states in much the same way that it would have been enhanced by a propitious stand of wild cereals or a concentration of game. The greatest boon that the appearance of states provided to nonstate peoples, however, was as trading posts. Because they represented such narrow agroecologies, states were never remotely self-sufficient; they relied on a host of products from outside their ecological zone to survive—for example, wood products (rattan, bamboo, logs, charcoal), livestock, meat, nuts, minerals and gems, dyes, medicinal products, aromatic woods, and so on. Thus, once states arose, a quite substantial portion of all foraging was for products that could be exchanged for grain, cloth, iron pots, blankets, steel blades, salt, and the like. Once there were several small states on a river system or a coastline, the volume of trade and, hence, the rewards for foraging in the hinterland for trade goods increased exponentially. The terms of trade probably improved as well.

Foraging, which had always been in part for barter exchange, took on a whole new cast; it became what business schools call an entrepreneurial and speculative activity. Toward the end of the first millennium, as long-distance, point-to-point coastal trade developed, foraging then entered international commerce. A late-eighteenth-century Thai tribute mission to China, designed to dazzle the Chinese and to stimulate trade, illustrates the pattern. It was composed almost entirely of mountain products gathered by the hill Karen: elephants, eaglewood, ebony, rhinoceros horn, elephant tusks, bastard cardamom, long peppers, amber, sandalwood, peacock feathers, kingfisher feathers, rubies, sapphires, cutch, gambes (a gum resin), sappanwood, dammer, krabao seeds, and a variety of spices.[15]

It would be hard to exaggerate the effect of growing trade on the life of foragers. The impact of the worldwide trade in beaver pelts, aside from devastating the population of North America's most common mammal, completely transformed Native American life and social organization, provoking trade wars and rivalry for new hunting grounds. In the same fashion, Southeast Asian fishing communities and hill swiddeners were, from the seventh century of the Common Era onward, deeply involved in the Chinese luxury trade in feathers, rare woods, organs, and gallstones of wild animals for use as medicines and to restore potency. It has been said of one forest-foraging people of Borneo—the Punan—that they should be seen first and foremost as traders. Their subsistence activities can best be seen, it is argued, as serving to maintain their role in collecting wild commodities. Many hill foragers in Borneo and elsewhere are not fundamentally different from lowland populations but, rather, a segment that has chosen to specialize in upland foraging in large part because of its rewards. Borneo as a whole, some claim, was populated only relatively recently by Austronesian groups attracted by the rich opportunities for trade-based foraging. It is tempting to pair this observation with the analysis of the origins of pastoralism as a creation of breakaway agriculturalists seeking to occupy a specialized and rewarding niche vis-à-vis grain-growing communities.

The opportunities for plunder *and* for trade represented by the early state created, I would argue, a qualitatively different environment for non-state hunters and gatherers and swiddeners. Now, a great deal more of the world around them was valuable. They could participate fully in the new

15. Ronald Duane Renard, "The Role of the Karens in Thai Society during the Early Bangkok Period, 1782–1873," *Contributions to Asian Studies* 15 (1980): 15–28.

opportunities for trade without becoming subjects of the state. There is no easy way to prove it, since the early states did not exactly take a census of their "barbarians," but the richness of the opportunities for foraging, I believe, drew people to it. Sedentary cultivators and swiddeners, I imagine, would have been attracted to foraging and trade. If the much earlier establishment of intensive farming opened new possibilities of exchanges with foragers and pastoralists, the establishment of states further magnified the appeal of foraging (not to mention plunder). Should this conjecture prove correct, it is entirely possible that in many periods and particularly the "late barbarian era," the population of nonstate foragers was growing rather than shrinking. Life at the periphery became more, not less, attractive.

Life as a late barbarian would have been, on balance, pretty good. His subsistence was still spread across several food webs and was more nutritious. Being dispersed, foragers and swiddeners would have been less vulnerable to the failure of a single food source. More advantageous trade made for more leisure, thus further widening the leisure-drudgery ratio between foragers and farmers. And of course there was always plunder, ransom and tribute for the more powerful and mobile of nonstate peoples. Finally, and by no means trivial, swiddeners and foragers and most pastoralists were not domesticated or subordinated to the hierarchical social order of sedentary agriculture and the state. They were, in almost every respect, freer than the celebrated yeoman farmer. This is not a bad balance sheet for a class of barbarians over whom the waves of history were supposed to have rolled a long time ago.

There are, however, two deeply melancholy aspects of the golden age of barbarians. They have each directly to do with the ecologically given political fragmentation of barbarian life. Many of the trade goods brought to the trading states were, of course, other nonstate peoples who could be sold into bondage at the state core. So pervasive was this practice in mainland Southeast Asia that one can identify something like a chain of predation in which more strategically located and powerful groups raided their weaker and more dispersed neighbors. In so doing, they reinforced the state core at the expense of their fellow barbarians. The second melancholy aspect of the new hill livelihoods afforded by states was the sale of their martial skills to states as mercenaries. One would be hard put to find an early state that did not enlist nonstate peoples—sometimes wholesale—in their armies, to catch runaway slaves, and to repress revolts among their own restive populations. Barbarian levies had as much to do with building states as with plundering them.

State and nonstate peoples, agriculturalists and foragers, "barbarians" and "civilized" are twins both in reality and semiotically. Owen Lattimore and Pierre Clastres are the pathbreakers of the trail along which I plod. As long as we take the terms "civilization" and "barbarian" with the grain of salt that Lattimore intends and realize that he is writing about China and pastoral nomads on horseback, his insight is profound:

> Not only the frontier between civilization and barbarism, but the barbarian societies themselves, were in large measure created by the growth and the geographical spread of the great ancient civilizations. It is proper to speak of the barbarians as "primitive" only in that remote time when no civilization yet existed, and when the forbears of the civilized peoples were also primitive. From the moment that civilization began to evolve . . . it recruited into civilization some of the people who had held that land, and displaced others, and the effect on those who were displaced was that . . . they modified their economic practices and experimented with new kinds of specialization, and they also evolved new kinds of social cohesion and political organization, and new ways of fighting. Civilization itself created its own barbarian plague; the barbarian terror that harried the northern frontiers of civilization did not erupt from a distant, dark and bloody ground that had nothing to do with civilization; it was an activity of peoples who were the kind of people they were because their whole evolution had been in contact with, and had been molded by, the advance of civilization.[16]

16. Lattimore, *Studies in Frontier History,* 504–5.