Seeing Like a State

How Certain Schemes to Improve the Human Condition Have Failed

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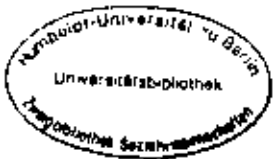
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Introduction

This book grew out of an intellectual detour that became so gripping that I decided to abandon my original itinerary altogether. After I had made what appeared to be an ill-considered turn, the surprising new scenery and the sense that I was headed for a more satisfying destination persuaded me to change my plans. The new itinerary, I think, has a logic of its own. It might even have been a more elegant trip had I possessed the wit to conceive of it at the outset. What does seem clear to me is that the detour, although along roads that were bumpier and more circuitous than I had foreseen, has led to a more substantial place. It goes without saying that the reader might have found a more experienced guide, but the itinerary is so peculiarly off the beaten track that, if you're headed this way, you have to settle for whatever local tracker you can find.

A word about the road not taken. Originally, I set out to understand why the state has always seemed to be the enemy of "people who move around," to put it crudely. In the context of Southeast Asia, this promised to be a fruitful way of addressing the perennial tensions between mobile, slash-and-burn hill peoples on one hand and wet-rice, valley kingdoms on the other. The question, however, transcended regional geography. Nomads and pastoralists (such as Berbers and Bedouins), hunter-gatherers, Gypsies, vagrants, homeless people, itinerants, runaway slaves, and serfs have always been a thorn in the side of states. Efforts to permanently settle these mobile peoples (sedentarization) seemed to be a perennial state project—perennial, in part, because it so seldom succeeded.

The more I examined these efforts at sedentarization, the more I came to see them as a state's attempt to make a society legible, to arrange the population in ways that simplified the classic state functions of taxation, conscription, and prevention of rebellion. Having begun to think in these terms, I began to see legibility as a central problem in statecraft. The premodern state was, in many crucial respects, partially blind; it knew precious little about its subjects, their wealth, their landholdings and yields, their location, their very identity. It lacked anything like a detailed "map" of its terrain and its people. It lacked, for the most part, a measure, a metric, that would allow it to "translate" what it knew into a common standard necessary for a synoptic view. As a result, its interventions were often crude and self-defeating.

It is at this point that the detour began. How did the state gradually get a handle on its subjects and their environment? Suddenly, processes as disparate as the creation of permanent last names, the standardization of weights and measures, the establishment of cadastral surveys and population registers, the invention of freehold tenure, the standardization of language and legal discourse, the design of cities, and the organization of transportation seemed comprehensible as attempts at legibility and simplification. In each case, officials took exceptionally complex, illegible, and local social practices, such as land tenure customs or naming customs, and created a standard grid whereby it could be centrally recorded and monitored.

The organization of the natural world was no exception. Agriculture is, after all, a radical reorganization and simplification of flora to suit man's goals. Whatever their other purposes, the designs of scientific forestry and agriculture and the layouts of plantations, collective farms, ujamaa villages, and strategic hamlets all seemed calculated to make the terrain, its products, and its workforce more legible —and hence manipulable—from above and from the center.

A homely analogy from beekeeping may be helpful here. In premodern times the gathering of honey was a difficult affair. Even if bees were housed in straw hives, harvesting the honey usually meant driving off the bees and often destroying the colony. The arrangement of brood chambers and honey cells followed complex patterns that varied from hive to hive—patterns that did not allow for neat extractions. The modern beehive, in contrast, is designed to solve the beekeeper's problem. With a device called a "queen excluder," it separates the brood chambers below from the honey supplies above, preventing the queen from laying eggs above a certain level. Furthermore, the wax cells are arranged neatly in vertical frames, nine or ten to a box, which enable the easy extraction of honey, wax, and propolis. Extraction is made

possible by observing "bee space"—the precise distance between the frames that the bees will leave open as passages rather than bridging the frames by building intervening honeycomb. From the beekeeper's point of view, the modern hive is an orderly, "legible" hive allowing the beekeeper to inspect the condition of the colony and the queen, judge its honey production (by weight), enlarge or contract the size of the hive by standard units, move it to a new location, and, above all, extract just enough honey (in temperate climates) to ensure that the colony will overwinter successfully.

I do not wish to push the analogy further than it will go, but much of early modern European statecraft seemed similarly devoted to rationalizing and standardizing what was a social hieroglyph into a legible and administratively more convenient format. The social simplifications thus introduced not only permitted a more finely tuned system of taxation and conscription but also greatly enhanced state capacity. They made possible quite discriminating interventions of every kind, such as public-health measures, political surveillance, and relief for the poor.

These state simplifications, the basic givens of modern statecraft, were, I began to realize, rather like abridged maps. They did not successfully represent the actual activity of the society they depicted, nor were they intended to; they represented only that slice of it that interested the official observer. They were, moreover, not just maps. Rather, they were maps that, when allied with state power, would enable much of the reality they depicted to be remade. Thus a state cadastral map created to designate taxable property-holders does not merely describe a system of land tenure; it creates such a system through its ability to give its categories the force of law. Much of the first chapter is intended to convey how thoroughly society and the environment have been refashioned by state maps of legibility.

This view of early modern statecraft is not particularly original. Suitably modified, however, it can provide a distinctive optic through which a number of huge development fiascoes in poorer Third World nations and Eastern Europe can be usefully viewed.

But "fiasco" is too lighthearted a word for the disasters I have in mind. The Great Leap Forward in China, collectivization in Russia, and compulsory villagization in Tanzania, Mozambique, and Ethiopia are among the great human tragedies of the twentieth century, in terms of both lives lost and lives irretrievably disrupted. At a less dramatic but far more common level, the history of Third World development is littered with the debris of huge agricultural schemes and new cities (think of Brasília or Chandigarh) that have failed their residents.

It is not so difficult, alas, to understand why so many human lives have been destroyed by mobilized violence between ethnic groups, religious sects, or linguistic communities. But it is harder to grasp why so many well-intended schemes to improve the human condition have gone so tragically awry. I aim, in what follows, to provide a convincing account of the logic behind the failure of some of the great utopian social engineering schemes of the twentieth century.

I shall argue that the most tragic episodes of state-initiated social engineering originate in a pernicious combination of four elements. All four are necessary for a full-fledged disaster. The first element is the administrative ordering of nature and society—the transformative state simplifications described above. By themselves, they are the unremarkable tools of modern statecraft; they are as vital to the maintenance of our welfare and freedom as they are to the designs of a would-be modern despot. They undergird the concept of citizenship and the provision of social welfare just as they might undergird a policy of rounding up undesirable minorities.

The second element is what I call a high-modernist ideology. It is best conceived as a strong, one might even say muscle-bound, version of the self-confidence about scientific and technical progress, the expansion of production, the growing satisfaction of human needs, the mastery of nature (including human nature), and, above all, the rational design of social order commensurate with the scientific understanding of natural laws. It originated, of course, in the West, as a by-product of unprecedented progress in science and industry.

High modernism must not be confused with scientific practice. It was fundamentally, as the term "ideology" implies, a faith that borrowed, as it were, the legitimacy of science and technology. It was, accordingly, uncritical, unskeptical, and thus unscientifically optimistic about the possibilities for the comprehensive planning of human settlement and production. The carriers of high modernism tended to see rational order in remarkably visual aesthetic terms. For them, an efficient, rationally organized city, village, or farm was a city that *looked* regimented and orderly in a geometrical sense. The carriers of high modernism, once their plans miscarried or were thwarted, tended to retreat to what I call miniaturization: the creation of a more easily controlled micro-order in model cities, model villages, and model farms.

High modernism was about "interests" as well as faith. Its carriers, even when they were capitalist entrepreneurs, required state action to realize their plans. In most cases, they were powerful officials and heads of state. They tended to prefer certain forms of planning and so-

cial organization (such as huge dams, centralized communication and transportation hubs, large factories and farms, and grid cities), because these forms fit snugly into a high-modernist view and also answered their political interests as state officials. There was, to put it mildly, an elective affinity between high modernism and the interests of many state officials.

Like any ideology, high modernism had a particular temporal and social context. The feats of national economic mobilization of the belligerents (especially Germany) in World War I seem to mark its high tide. Not surprisingly, its most fertile social soil was to be found among planners, engineers, architects, scientists, and technicians whose skills and status it celebrated as the designers of the new order. High-modernist faith was no respecter of traditional political boundaries; it could be found across the political spectrum from left to right but particularly among those who wanted to use state power to bring about huge, utopian changes in people's work habits, living patterns, moral conduct, and worldview. Nor was this utopian vision dangerous in and of itself. Where it animated plans in liberal parliamentary societies and where the planners therefore had to negotiate with organized citizens, it could spur reform.

Only when these first two elements are joined to a third does the combination become potentially lethal. The third element is an authoritarian state that is willing and able to use the full weight of its coercive power to bring these high-modernist designs into being. The most fertile soil for this element has typically been times of war, revolution, depression, and struggle for national liberation. In such situations, emergency conditions foster the seizure of emergency powers and frequently delegitimize the previous regime. They also tend to give rise to elites who repudiate the past and who have revolutionary designs for their people.

A fourth element is closely linked to the third: a prostrate civil society that lacks the capacity to resist these plans. War, revolution, and economic collapse often radically weaken civil society as well as make the populace more receptive to a new dispensation. Late colonial rule, with its social engineering aspirations and ability to run roughshod over popular opposition, occasionally met this last condition.

In sum, the legibility of a society provides the capacity for large-scale social engineering, high-modernist ideology provides the desire, the authoritarian state provides the determination to act on that desire, and an incapacitated civil society provides the leveled social terrain on which to build.

I have not yet explained, the reader will have noted, why such high-

modernist plans, backed by authoritarian power, actually failed. Accounting for their failure is my second purpose here.

Designed or planned social order is necessarily schematic; it always ignores essential features of any real, functioning social order. This truth is best illustrated in a work-to-rule strike, which turns on the fact that any production process depends on a host of informal practices and improvisations that could never be codified. By merely following the rules meticulously, the workforce can virtually halt production. In the same fashion, the simplified rules animating plans for, say, a city, a village, or a collective farm were inadequate as a set of instructions for creating a functioning social order. The formal scheme was parasitic on informal processes that, alone, it could not create or maintain. To the degree that the formal scheme made no allowance for these processes or actually suppressed them, it failed both its intended beneficiaries and ultimately its designers as well.

Much of this book can be read as a case against the *imperialism* of high-modernist, planned social order. I stress the word "imperialism" here because I am emphatically not making a blanket case against either bureaucratic planning or high-modernist ideology. I am, however, making a case against an imperial or hegemonic planning mentality that excludes the necessary role of local knowledge and know-how.

Throughout the book I make the case for the indispensable role of practical knowledge, informal processes, and improvisation in the face of unpredictability. In chapters 4 and 5, I contrast the high-modernist views and practices of city planners and revolutionaries with critical views emphasizing process, complexity, and open-endedness. Le Corbusier and Lenin are the protagonists, with Jane Jacobs and Rosa Luxemburg cast as their formidable critics. Chapters 6 and 7 contain accounts of Soviet collectivization and Tanzanian forced villagization, which illustrate how schematic, authoritarian solutions to production and social order inevitably fail when they exclude the fund of valuable knowledge embodied in local practices. (An early draft contained a case study of the Tennessee Valley Authority, the United States' high-modernist experiment and the granddaddy of all regional development projects. It was reluctantly swept aside to shorten what is still a long book.)

Finally, in chapter 9 I attempt to conceptualize the nature of practical knowledge and to contrast it with more formal, deductive, epistemic knowledge. The term *mētis*, which descends from classical Greek and denotes the knowledge that can come only from practical experience, serves as a useful portmanteau word for what I have in mind.

Here I should also acknowledge my debt to anarchist writers (Kropotkin, Bakunin, Malatesta, Proudhon) who consistently emphasize the role of mutuality as opposed to imperative, hierarchical coordination in the creation of social order. Their understanding of the term "mutuality" covers some, but not all, of the same ground that I mean to cover with "mētis."

Radically simplified designs for social organization seem to court the same risks of failure courted by radically simplified designs for natural environments. The failures and vulnerability of monocrop commercial forests and genetically.engineered, mechanized monocropping mimic the failures of collective farms and planned cities. At this level, I am making a case for the resilience of both social and natural diversity and a strong case about the limits, in principle, of what we are likely to know about complex, functioning order. One could, I think, successfully turn this argument against a certain kind of reductive social science. Having already taken on more than I could chew, I leave this additional detour to others, with my blessing.

In trying to make a strong, paradigmatic case, I realize that I have risked displaying the hubris of which high modernists are justly accused. Once you have crafted lenses that change your perspective, it is a great temptation to look at everything through the same spectacles. I do, however, want to plead innocent to two charges that I do not think a careful reading would sustain. The first charge is that my argument is uncritically admiring of the local, the traditional, and the customary. I understand that the practical knowledge I describe is often inseparable from the practices of domination, monopoly, and exclusion that offend the modern liberal sensibility. My point is not that practical knowledge is the product of some mythical, egalitarian state of nature. Rather, my point is that formal schemes of order are untenable without some elements of the practical knowledge that they tend to dismiss. The second charge is that my argument is an anarchist case against the state itself. The state, as I make abundantly clear, is the vexed institution that is the ground of both our freedoms and our unfreedoms. My case is that certain kinds of states, driven by utopian plans and an authoritarian disregard for the values, desires, and objections of their subjects, are indeed a mortal threat to human well-being. Short of that draconian but all too common situation, we are left to weigh judiciously the benefits of certain state interventions against their costs.

As I finished this book, I realized that its critique of certain forms of state action might seem, from the post–1989 perspective of capitalist triumphalism, like a kind of quaint archaeology. States with the pretensions and power that I criticize have for the most part vanished or

have drastically curbed their ambitions. And yet, as I make clear in examining scientific farming, industrial agriculture, and capitalist markets in general, large-scale capitalism is just as much an agency of homogenization, uniformity, grids, and heroic simplification as the state is, with the difference being that, for capitalists, simplification must pay. A market necessarily reduces quality to quantity via the price mechanism and promotes standardization; in markets, money talks, not people. Today, global capitalism is perhaps the most powerful force for homogenization, whereas the state may in some instances be the defender of local difference and variety. (In *Enlightenment's Wake*, John Gray makes a similar case for liberalism, which he regards as self-limiting because it rests on cultural and institutional capital that it is bound to undermine.) The "interruption," forced by widespread strikes, of France's structural adjustments to accommodate a common European currency is perhaps a straw in the wind. Put bluntly, my bill of particulars against a certain kind of state is by no means a case for politically unfettered market coordination as urged by Friedrich Hayek and Milton Friedman. As we shall see, the conclusions that can be drawn from the failures of modern projects of social engineering are as applicable to market-driven standardization as they are to bureaucratic homogeneity.

Part 1

State Projects of

Legibility and Simplification

1 Nature and Space

Would it not be a great satisfaction to the king to know at a designated mo-
ment every year the number of his subjects, in total and by region, with all the
resources, wealth & poverty of each place; [the number] of his nobility and ec-
clesiastics of all kinds, of men of the robe, of Catholics and of those of the
other religion, all separated according to the place of their residence? . . .
[Would it not be] a useful and necessary pleasure for him to be able, in his
own office, to review in an hour's time the present and past condition of a
great realm of which he is the head, and be able himself to know with certi-
tude in what consists his grandeur, his wealth, and his strengths?
—Marquis de Vauban, *proposing an annual census to Louis XIV in 1686*

Certain forms of knowledge and control require a narrowing of vision.
The great advantage of such tunnel vision is that it brings into sharp
focus certain limited aspects of an otherwise far more complex and un-
wieldy reality. This very simplification, in turn, makes the phenome-
non at the center of the field of vision more legible and hence more
susceptible to careful measurement and calculation. Combined with
similar observations, an overall, aggregate, synoptic view of a selective
reality is achieved, making possible a high degree of schematic knowl-
edge, control, and manipulation.

The invention of scientific forestry in late eighteenth-century Prus-
sia and Saxony serves as something of a model of this process.[1] Al-
though the history of scientific forestry is important in its own right, it
is used here as a metaphor for the forms of knowledge and manipula-
tion characteristic of powerful institutions with sharply defined inter-
ests, of which state bureaucracies and large commercial firms are per-
haps the outstanding examples. Once we have seen how simplification,
legibility, and manipulation operate in forest management, we can
then explore how the modern state applies a similar lens to urban plan-
ning, rural settlement, land administration, and agriculture.

The State and Scientific Forestry: A Parable

I [Gilgamesh] would conquer in the Cedar Forest. . . . I will set my hand to it
and will chop down the Cedar.
—*Epic of Gilgamesh*

The early modern European state, even before the development of sci-
entific forestry, viewed its forests primarily through the fiscal lens of

revenue needs. To be sure, other concerns—such as timber for ship-building, state construction, and fuel for the economic security of its subjects—were not entirely absent from official management. These concerns also had heavy implications for state revenue and security.[2] Exaggerating only slightly, one might say that the crown's interest in forests was resolved through its fiscal lens into a single number: the revenue yield of the timber that might be extracted annually.

The best way to appreciate how heroic was this constriction of vision is to notice what fell outside its field of vision. Lurking behind the number indicating revenue yield were not so much forests as commercial wood, representing so many thousands of board feet of saleable timber and so many cords of firewood fetching a certain price. Missing, of course, were all those trees, bushes, and plants holding little or no potential for state revenue. Missing as well were all those parts of trees, even revenue-bearing trees, which might have been useful to the population but whose value could not be converted into fiscal receipts. Here I have in mind foliage and its uses as fodder and thatch; fruits, as food for people and domestic animals; twigs and branches, as bedding, fencing, hop poles, and kindling; bark and roots, for making medicines and for tanning; sap, for making resins; and so forth. Each species of tree—indeed, each part or growth stage of each species—had its unique properties and uses. A fragment of the entry under "elm" in a popular seventeenth-century encyclopedia on aboriculture conveys something of the vast range of practical uses to which the tree could be put.

> Elm is a timber of most singular use, especially whereby it may be continually dry, or wet, in extremes; therefore proper for water works, mills, the ladles and soles of the wheel, pumps, aqueducts, ship planks below the water line, . . . also for wheelwrights, handles for the single handsaw, rails and gates. Elm is not so apt to rive [split] . . . and is used for chopping blocks, blocks for the hat maker, trunks and boxes to be covered with leather, coffins and dressers and shovelboard tables of great length; also for the carver and those curious workers of fruitage, foliage, shields, statues and most of the ornaments appertaining to the orders of architecture. . . . And finally . . . the use of the very leaves of this tree, especially the female, is not to be despised, . . . for they will prove of great relief to cattle in the winter and scorching summers when hay and fodder is dear. . . . The green leaf of the elms contused heals a green wound or cut, and boiled with the bark, consolidates bone fractures.[3]

In state "fiscal forestry," however, the actual tree with its vast number of possible uses was replaced by an abstract tree representing a volume of lumber or firewood. If the princely conception of the forest was still utilitarian, it was surely a utilitarianism confined to the direct needs of the state.

From a naturalist's perspective, nearly everything was missing from

the state's narrow frame of reference. Gone was the vast majority of flora: grasses, flowers, lichens, ferns, mosses, shrubs, and vines. Gone, too, were reptiles, birds, amphibians, and innumerable species of insects. Gone were most species of fauna, except those that interested the crown's gamekeepers.

From an anthropologist's perspective, nearly everything touching on human interaction with the forest was also missing from the state's tunnel vision. The state did pay attention to poaching, which impinged on its claim to revenue in wood or its claim to royal game, but otherwise it typically ignored the vast, complex, and negotiated social uses of the forest for hunting and gathering, pasturage, fishing, charcoal making, trapping, and collecting food and valuable minerals as well as the forest's significance for magic, worship, refuge, and so on.[4]

If the utilitarian state could not see the real, existing forest for the (commercial) trees, if its view of its forests was abstract and partial, it was hardly unique in this respect. Some level of abstraction is necessary for virtually all forms of analysis, and it is not at all surprising that the abstractions of state officials should have reflected the paramount fiscal interests of their employer. The entry under "forest" in Diderot's *Encyclopédie* is almost exclusively concerned with the *utilité publique* of forest products and the taxes, revenues, and profits that they can be made to yield. The forest as a habitat disappears and is replaced by the forest as an economic resource to be managed efficiently and profitably.[5] Here, fiscal and commercial logics coincide; they are both resolutely fixed on the bottom line.

The vocabulary used to organize nature typically betrays the overriding interests of its human users. In fact, utilitarian discourse replaces the term "nature" with the term "natural resources," focusing on those aspects of nature that can be appropriated for human use. A comparable logic extracts from a more generalized natural world those flora or fauna that are of utilitarian value (usually marketable commodities) and, in turn, reclassifies those species that compete with, prey on, or otherwise diminish the yields of the valued species. Thus, plants that are valued become "crops," the species that compete with them are stigmatized as "weeds," and the insects that ingest them are stigmatized as "pests." Thus, trees that are valued become "timber," while species that compete with them become "trash" trees or "underbrush." The same logic applies to fauna. Highly valued animals become "game" or "livestock," while those animals that compete with or prey upon them become "predators" or "varmints."

The kind of abstracting, utilitarian logic that the state, through its officials, applied to the forest is thus not entirely distinctive. What is distinctive about this logic, however, is the narrowness of its field of vision, the degree of elaboration to which it can be subjected, and above

all, as we shall see, the degree to which it allowed the state to impose that logic on the very reality that was observed.[6]

Scientific forestry was originally developed from about 1765 to 1800, largely in Prussia and Saxony. Eventually, it would become the basis of forest management techniques in France, England, and the United States and throughout the Third World. Its emergence cannot be understood outside the larger context of the centralized state-making initiatives of the period. In fact, the new forestry science was a subdiscipline of what was called cameral science, an effort to reduce the fiscal management of a kingdom to scientific principles that would allow systematic planning.[7] Traditional domainal forestry had hitherto simply divided the forest into roughly equal plots, with the number of plots coinciding with the number of years in the assumed growth cycle.[8] One plot was cut each year on the assumption of equal yields (and value) from plots of equal size. Because of poor maps, the uneven distribution of the most valuable large trees (*Hochwald*), and very approximate cordwood (*Bruststaerke*) measures, the results were unsatisfactory for fiscal planning.

Careful exploitation of domainal forests was all the more imperative in the late eighteenth century, when fiscal officials became aware of a growing shortage of wood. Many of the old-growth forests of oak, beech, hornbeam, and linden had been severely degraded by planned and unplanned felling, while the regrowth was not as robust as hoped. The prospect of declining yields was alarming, not merely because it threatened revenue flows but also because it might provoke massive poaching by a peasantry in search of firewood. One sign of this concern were the numerous state-sponsored competitions for designs of more efficient woodstoves.

The first attempt at more precise measurements of forests was made by Johann Gottlieb Beckmann on a carefully surveyed sample plot. Walking abreast, several assistants carried compartmentalized boxes with color-coded nails corresponding to five categories of tree sizes, which they had been trained to identify. Each tree was tagged with the appropriate nail until the sample plot had been covered. Because each assistant had begun with a certain number of nails, it was a simple matter to subtract the remaining nails from the initial total and arrive at an inventory of trees by class for the entire plot. The sample plot had been carefully chosen for its representativeness, allowing the foresters to then calculate the timber and, given certain price assumptions, the revenue yield of the whole forest. For the forest scientists (*Forstwissenschaftler*) the goal was always to "deliver the greatest possible *constant* volume of wood."[9]

The effort at precision was pushed further as mathematicians worked from the cone-volume principle to specify the volume of saleable wood contained by a standardized tree (*Normalbaum*) of a given

size-class. Their calculations were checked empirically against the actual volume of wood in sample trees.[10] The final result of such calculations was the development of elaborate tables with data organized by tree size and age under specified conditions of normal growth and maturation. By radically narrowing his vision to commercial wood, the state forester had, with his tables, paradoxically achieved a synoptic view of the entire forest.[11] This restriction of focus reflected in the tables was in fact the only way in which the whole forest could be taken in by a single optic. Reference to these tables coupled with field tests allowed the forester to estimate closely the inventory, growth, and yield of a given forest. In the regulated, abstract forest of the forstwissenschaftler, calculation and measurement prevailed, and the three watchwords, in modern parlance, were "minimum diversity," the "balance sheet," and "sustained yield." The logic of the state-managed forest science was virtually identical with the logic of commercial exploitation.[12]

The achievement of German forestry science in standardizing techniques for calculating the sustainable yield of commercial timber and hence revenue was impressive enough. What is decisive for our purposes, however, was the next logical step in forest management. That step was to attempt to create, through careful seeding, planting, and cutting, a forest that was easier for state foresters to count, manipulate, measure, and assess. The fact is that forest science and geometry, backed by state power, had the capacity to transform the real, diverse, and chaotic old-growth forest into a new, more uniform forest that closely resembled the administrative grid of its techniques. To this end, the underbrush was cleared, the number of species was reduced (often to monoculture), and plantings were done simultaneously and in straight rows on large tracts. These management practices, as Henry Lowood observes, "produced the monocultural, even-age forests that eventually transformed the Normalbaum from abstraction to reality. The German forest became the archetype for imposing on disorderly nature the neatly arranged constructs of science. Practical goals had encouraged mathematical utilitarianism, which seemed, in turn, to promote geometric perfection as the outward sign of the well-managed forest; in turn the rationally ordered arrangements of trees offered new possibilities for controlling nature."[13]

The tendency was toward regimentation, in the strict sense of the word. The forest trees were drawn up into serried, uniform ranks, as it were, to be measured, counted off, felled, and replaced by a new rank and file of lookalike conscripts. As an army, it was also designed hierarchically from above to fulfill a unique purpose and to be at the disposition of a single commander. At the limit, the forest itself would not even have to be seen; it could be "read" accurately from the tables and maps in the forester's office.
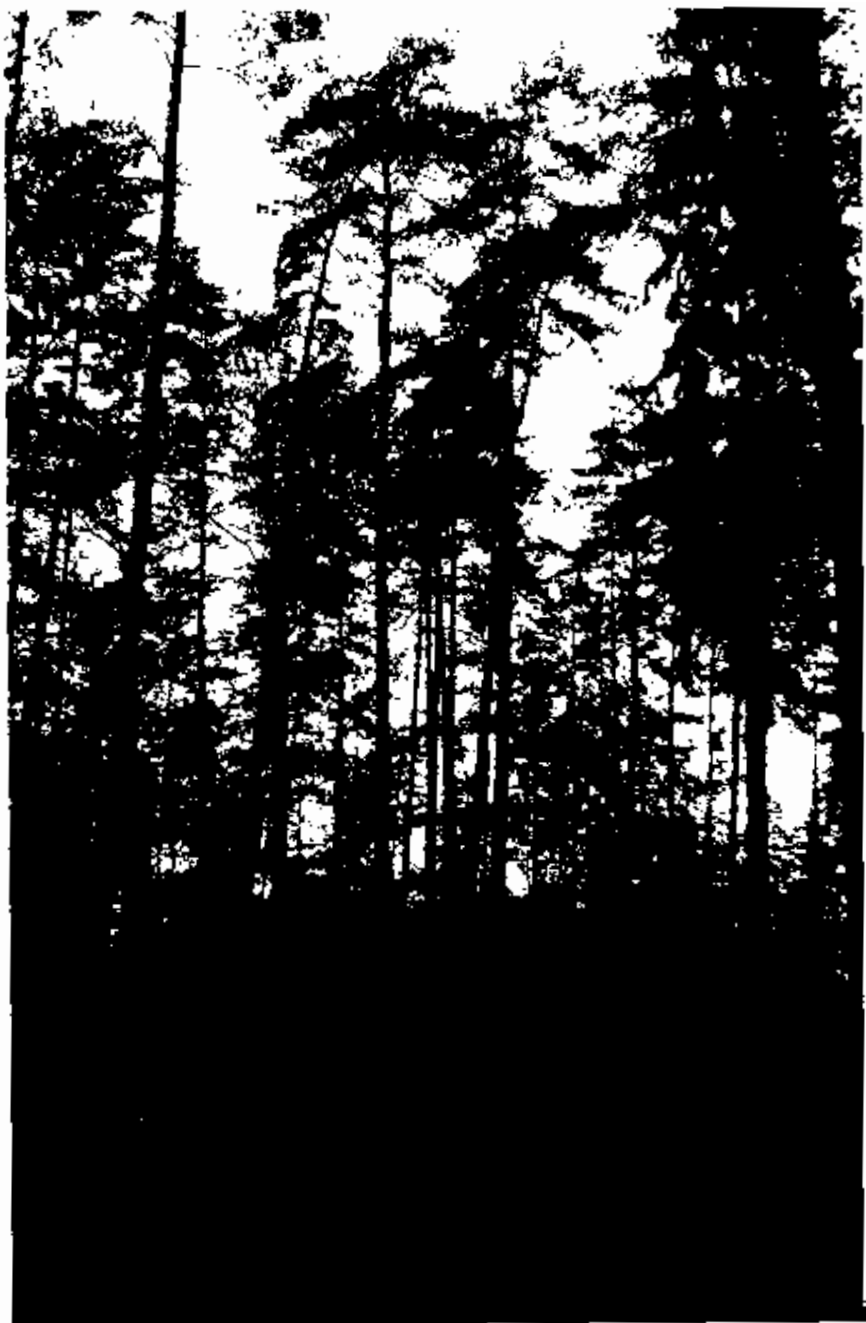
1. Mixed temperate forest, part managed, part natural regeneration

2. One aisle of a managed poplar forest in Tuscany

How much easier it was to manage the new, stripped-down forest. With stands of same-age trees arranged in linear alleys, clearing the underbrush, felling, extraction, and new planting became a far more routine process. Increasing order in the forest made it possible for forest workers to use written training protocols that could be widely applied. A relatively unskilled and inexperienced labor crew could adequately carry out its tasks by following a few standard rules in the new forest environment. Harvesting logs of relatively uniform width and length not only made it possible to forecast yields successfully but also to market homogeneous product units to logging contractors and timber merchants.[14] Commercial logic and bureaucratic logic were, in this instance, synonymous; it was a system that promised to maximize the return of a single commodity over the long haul and at the same time lent itself to a centralized scheme of management.

The new legible forest was also easier to manipulate experimentally. Now that the more complex old-growth forest had been replaced by a forest in which many variables were held constant, it was a far simpler matter to examine the effects of such variables as fertilizer applications, rainfall, and weeding, on same-age, single-species stands. It was the closest thing to a forest laboratory one could imagine at the time.[15] The very simplicity of the forest made it possible, for the first time, to assess novel regimens of forest management under nearly experimental conditions.

Although the geometric, uniform forest was intended to facilitate management and extraction, it quickly became a powerful aesthetic as well. The visual sign of the well-managed forest, in Germany and in the many settings where German scientific forestry took hold, came to be the regularity and neatness of its appearance. Forests might be inspected in much the same way as a commanding officer might review his troops on parade, and woe to the forest guard whose "beat" was not sufficiently trim or "dressed." This aboveground order required that underbrush be removed and that fallen trees and branches be gathered and hauled off. Unauthorized disturbances—whether by fire or by local populations—were seen as implicit threats to management routines. The more uniform the forest, the greater the possibilities for centralized management; the routines that could be applied minimized the need for the discretion necessary in the management of diverse old-growth forests.

The controlled environment of the redesigned, scientific forest promised many striking advantages.[16] It could be synoptically surveyed by the chief forester; it could be more easily supervised and harvested according to centralized, long-range plans; it provided a steady, uniform commodity, thereby eliminating one major source of revenue fluctuation; and it created a legible natural terrain that facilitated manipulation and experimentation.

This utopian dream of scientific forestry was, of course, only the *immanent* logic of its techniques. It was not and could not ever be realized in practice. Both nature and the human factor intervened. The existing topography of the landscape and the vagaries of fire, storms, blights, climatic changes, insect populations, and disease conspired to thwart foresters and to shape the actual forest. Also, given the insurmountable difficulties of policing large forests, people living nearby typically continued to graze animals, poach firewood and kindling, make charcoal, and use the forest in other ways that prevented the foresters' management plan from being fully realized. [17] Although, like all utopian schemes, it fell well short of attaining its goal, the critical fact is that it did partly succeed in stamping the actual forest with the imprint of its designs.

The principles of scientific forestry were applied as rigorously as was practicable to most large German forests throughout much of the nineteenth century. The Norway spruce, known for its hardiness, rapid growth, and valuable wood, became the bread-and-butter tree of commercial forestry. Originally, the Norway spruce was seen as a restoration crop that might revive overexploited mixed forests, but the commercial profits from the first rotation were so stunning that there was little effort to return to mixed forests. The monocropped forest was a disaster for peasants who were now deprived of all the grazing, food, raw materials, and medicines that the earlier forest ecology had afforded. Diverse old-growth forests, about three-fourths of which were broadleaf (deciduous) species, were replaced by largely coniferous forests in which Norway spruce or Scotch pine were the dominant or often only species.

In the short run, this experiment in the radical simplification of the forest to a single commodity was a resounding success. It was a rather long short run, in the sense that a single crop rotation of trees might take eighty years to mature. The productivity of the new forests reversed the decline in the domestic wood supply, provided more uniform stands and more usable wood fiber, raised the economic return of forest land, and appreciably shortened rotation times (the time it took to harvest a stand and plant another).[18] Like row crops in a field, the new softwood forests were prodigious producers of a single commodity. Little wonder that the German model of intensive commercial forestry became standard throughout the world.[19] Gifford Pinchot, the second chief forester of the United States, was trained at the French forestry school at Nancy, which followed a German-style curriculum, as did most U.S. and European forestry schools.[20] The first forester hired by the British to assess and manage the great forest resources of India and Burma was Dietrich Brandes, a German.[21] By the end of the nineteenth century, German forestry science was hegemonic.

The great simplification of the forest into a "one-commodity ma-

chine" was precisely the step that allowed German forestry science to become a rigorous technical and commercial discipline that could be codified and taught. A condition of its rigor was that it severely bracketed, or assumed to be constant, all variables except those bearing directly on the yield of the selected species and on the cost of growing and extracting them. As we shall see with urban planning, revolutionary theory, collectivization, and rural resettlement, a whole world lying "outside the brackets" returned to haunt this technical vision.

In the German case, the negative biological and ultimately commercial consequences of the stripped-down forest became painfully obvious only after the *second* rotation of conifers had been planted. "It took about one century for them [the negative consequences] to show up clearly. Many of the pure stands grew excellently in the first generation but already showed an amazing retrogression in the second generation. The reason for this is a very complex one and only a simplified explanation can be given. . . . Then the whole nutrient cycle got out of order and eventually was nearly stopped. . . . Anyway, the drop of one or two site classes [used for grading the quality of timber] during two or three generations of pure spruce is a well known and frequently observed fact. This represents a production loss of 20 to 30 percent."[22]

A new term, *Waldsterben* (forest death), entered the German vocabulary to describe the worst cases. An exceptionally complex process involving soil building, nutrient uptake, and symbiotic relations among fungi, insects, mammals, and flora—which were, and still are, not entirely understood—was apparently disrupted, with serious consequences. Most of these consequences can be traced to the radical simplicity of the scientific forest.

Only an elaborate treatise in ecology could do justice to the subject of what went wrong, but mentioning a few of the major effects of simplification will illustrate how vital many of the factors bracketed by scientific forestry turned out to be. German forestry's attention to formal order and ease of access for management and extraction led to the clearing of underbrush, deadfalls, and snags (standing dead trees), greatly reducing the diversity of insect, mammal, and bird populations so essential to soil-building processes.[23] The absence of litter and woody biomass on the new forest floor is now seen as a major factor leading to thinner and less nutritious soils.[24] Same-age, same-species forests not only created a far less diverse habitat but were also more vulnerable to massive storm-felling. The very uniformity of species and age among, say, Norway spruce also provided a favorable habitat to all the "pests" which were specialized to that species. Populations of these pests built up to epidemic proportions, inflicting losses in yields and large outlays for fertilizers, insecticides, fungicides, or rodenticides.[25] Apparently the first rotation of Norway spruce had grown exceptionally well in large part because it was living off (or mining) the long-accumulated

soil capital of the diverse old-growth forest that it had replaced. Once that capital was depleted, the steep decline in growth rates began.

As pioneers in scientific forestry, the Germans also became pioneers in recognizing and attempting to remedy many of its undesirable consequences. To this end, they invented the science of what they called "forest hygiene." In place of hollow trees that had been home to woodpeckers, owls, and other tree-nesting birds, the foresters provided specially designed boxes. Ant colonies were artificially raised and implanted in the forest, their nests tended by local schoolchildren. Several species of spiders, which had disappeared from the mono-cropped forest, were reintroduced.[26] What is striking about these endeavors is that they are attempts to work around an impoverished habitat still planted with a single species of conifers for production purposes.[27] In this case, "restoration forestry" attempted with mixed results to create a *virtual* ecology, while denying its chief sustaining condition: diversity.

The metaphorical value of this brief account of scientific production forestry is that it illustrates the dangers of dismembering an exceptionally complex and poorly understood set of relations and processes in order to isolate a single element of instrumental value. The instrument, the knife, that carved out the new, rudimentary forest was the razor-sharp interest in the production of a single commodity. Everything that interfered with the efficient production of the key commodity was implacably eliminated. Everything that seemed unrelated to efficient production was ignored. Having come to see the forest as a commodity, scientific forestry set about refashioning it as a commodity machine.[28] Utilitarian simplification in the forest was an effective way of maximizing wood production in the short and intermediate term. Ultimately, however, its emphasis on yield and paper profits, its relatively short time horizon, and, above all, the vast array of consequences it had resolutely bracketed came back to haunt it.[29]

Even in the realm of greatest interest—namely, the production of wood fiber—the consequences of not seeing the forest for the trees sooner or later became glaring. Many were directly traceable to the basic simplification imposed in the interest of ease of management and economic return: monoculture. Monocultures are, as a rule, more fragile and hence more vulnerable to the stress of disease and weather than polycultures are. As Richard Plochmann expresses it, "One further drawback, which is typical of all pure plantations, is that the ecology of the natural plant associations became unbalanced. Outside of the natural habitat, and when planted in pure stands, the physical condition of the single tree weakens and resistance against enemies decreases."[30] Any unmanaged forest may experience stress from storms, disease, drought, fragile soil, or severe cold. A diverse, complex forest, however, with its many species of trees, its full complement of birds, insects, and

mammals, is far more resilient—far more able to withstand and recover from such injuries—than pure stands. Its very diversity and complexity help to inoculate it against devastation: a windstorm that fells large, old trees of one species will typically spare large trees of other species as well as small trees of the same species; a blight or insect attack that threatens, say, oaks may leave lindens and hornbeams unscathed. Just as a merchant who, not knowing what conditions her ships will face at sea, sends out scores of vessels with different designs, weights, sails, and navigational aids stands a better chance of having much of her fleet make it to port, while a merchant who stakes everything on a single ship design and size runs a higher risk of losing everything, forest biodiversity acts like an insurance policy. Like the enterprise run by the second merchant, the simplified forest is a more vulnerable system, especially over the long haul, as its effects on soil, water, and "pest" populations become manifest. Such dangers can only partly be checked by the use of artificial fertilizers, insecticides, and fungicides. Given the fragility of the simplified production forest, the massive outside intervention that was required to establish it—we might call it the administrators' forest—is increasingly necessary in order to sustain it as well.[31]

Social Facts, Raw and Cooked

> Society must be remade before it can be the object of quantification. Categories of people and things must be defined, measures must be interchangeable; land and commodities must be conceived as represented by an equivalent in money. There is much of what Weber called rationalization in this, and also a good deal of centralization.
> —Theodore M. Porter, *"Objectivity as Standardization"*

The administrators' forest cannot be the naturalists' forest. Even if the ecological interactions at play in the forest were known, they would constitute a reality so complex and variegated as to defy easy shorthand description. The intellectual filter necessary to reduce the complexity to manageable dimensions was provided by the state's interest in commercial timber and revenue.

If the natural world, however shaped by human use, is too unwieldy in its "raw" form for administrative manipulation, so too are the actual social patterns of human interaction with nature bureaucratically indigestible in their raw form. No administrative system is capable of representing *any* existing social community except through a heroic and greatly schematized process of abstraction and simplification. It is not simply a question of capacity, although, like a forest, a human community is surely far too complicated and variable to easily yield its secrets to bureaucratic formulae. It is also a question of purpose. State agents have no interest—nor should they—in describ-

ing an entire social reality, any more than the scientific forester has an interest in describing the ecology of a forest in detail. Their abstractions and simplifications are disciplined by a small number of objectives, and until the nineteenth century the most prominent of these were typically taxation, political control, and conscription. They needed only the techniques and understanding that were adequate to these tasks. As we shall see, here are some instructive parallels between the development of modern "fiscal forestry" and modern forms of taxable property in land. Premodern states were no less concerned with tax receipts than are modern states. But, as with premodern state forestry, the taxation techniques and reach of the premodern state left much to be desired.

Absolutist France in the seventeenth century is a case in point.[32] Indirect taxes—excise levies on salt and tobacco, tolls, license fees, and the sale of offices and titles—were favored forms of taxation; they were easy to administer and required little or nothing in the way of information about landholding and income. The tax-exempt status of the nobility and clergy meant that a good deal of the landed property was not taxed at all, transferring much of the burden to wealthy commoner farmers and the peasantry. Common land, although it was a vitally important subsistence resource for the rural poor, yielded no revenue either. In the eighteenth century, the physiocrats would condemn all common property on two presumptive grounds: it was inefficiently exploited, and it was fiscally barren.[33]

What must strike any observer of absolutist taxation is how wildly variable and unsystematic it was. James Collins has found that the main direct land tax, the *taille*, was frequently not paid at all and that no community paid more than one-third of what they were assessed.[34] The result was that the state routinely relied on exceptional measures to overcome shortfalls in revenue or to pay for new expenses, particularly military campaigns. The crown exacted "forced loans" (*rentes, droits aliénés*) in return for annuities that it might or might not honor; it sold offices and titles (*vénalités d'offices*); it levied exceptional hearth taxes (*fouages extraordinaires*); and, worst of all, it billeted troops directly in communities, often ruining the towns in the process.[35]

The billeting of troops, a common form of fiscal punishment, is to modern forms of systematic taxation as the drawing and quartering of would-be regicides (so strikingly described by Michel Foucault at the beginning of *Discipline and Punish*) is to modern forms of systematic incarceration of criminals. Not that there was a great deal of choice involved. The state simply lacked both the information and the administrative grid that would have allowed it to exact from its subjects a reliable revenue that was more closely tied to their actual capacity to pay. As with forest revenue, there was no alternative to rough-and-ready calculations and their corresponding fluctuations in yields. Fiscally,

the premodern state was, to use Charles Lindblom's felicitous phrase, "all thumbs and no fingers"; it was incapable of fine tuning.

Here is where the rough analogy between forest management and taxation begins to break down. In the absence of reliable information about sustainable timber yield, the state might either inadvertently overexploit its resources and threaten future supply or else fail to realize the level of proceeds the forest might sustain.[36] The trees themselves, however, were not political actors, whereas the taxable subjects of the crown most certainly were. They signaled their dissatisfaction by flight, by various forms of quiet resistance and evasion, and, in extremis, by outright revolt. A reliable format for taxation of subjects thus depended not just on discovering what their economic conditions were but also on trying to judge what exactions they would vigorously resist.

How were the agents of the state to begin measuring and codifying, throughout each region of an entire kingdom, its population, their landholdings, their harvests, their wealth, the volume of commerce, and so on? The obstacles in the path of even the most rudimentary knowledge of these matters were enormous. The struggle to establish uniform weights and measures and to carry out a cadastral mapping of landholdings can serve as diagnostic examples. Each required a large, costly, long-term campaign against determined resistance. Resistance came not only from the general population but also from local power-holders; they were frequently able to take advantage of the administrative incoherence produced by differing interests and missions within the ranks of officialdom. But in spite of the ebbs and flows of the various campaigns and their national peculiarities, a pattern of adopting uniform measurements and charting cadastral maps ultimately prevailed.

Each undertaking also exemplified a pattern of relations between local knowledge and practices on one hand and state administrative routines on the other, a pattern that will find echoes throughout this book. In each case, local practices of measurement and landholding were "illegible" to the state in their raw form. They exhibited a diversity and intricacy that reflected a great variety of purely local, not state, interests. That is to say, they could not be assimilated into an administrative grid without being either transformed or reduced to a convenient, if partly fictional, shorthand. The logic behind the required shorthand was provided, as in scientific forestry, by the pressing material interests of rulers: fiscal receipts, military manpower, and state security. In turn, this shorthand functioned, as did Beckmann's Normalbäume, as not just a description, however inadequate. Backed by state power through records, courts, and ultimately coercion, these state fictions transformed the reality they presumed to observe, although never so thoroughly as to precisely fit the grid.

Forging the Tools of Legibility: Popular Measures, State Measures

Nonstate forms of measurement grew from the logic of local practice. As such, they shared some generic features despite their bewildering variety—features that made them an impediment to administrative uniformity. Thanks to the synthesis of the medievalist Witold Kula, the reasoning that animated local practices of measurement may be set out fairly succinctly.[37]

Most early measures were human in scale. One sees this logic at work in such surviving expressions as a "stone's throw" or "within earshot" for distances and a "cartload," a "basketful," or a "handful" for volume. Given that the size of a cart or basket might vary from place to place and that a stone's throw might not be precisely uniform from person to person, these units of measurement varied geographically and temporally. Even measures that were apparently fixed might be deceptive. The *pinte* in eighteenth-century Paris, for example, was equivalent to .93 liters, whereas in Seine-en-Montagne it was 1.99 liters and in Precy-sous-Thil, an astounding 3.33 liters. The *aune*, a measure of length used for cloth, varied depending on the material (the unit for silk, for instance, was smaller than that for linen), and across France there were at least seventeen different aunes.[38]

Local measures were also relational or "commensurable."[39] Virtually any request for a judgment of measure allows a range of responses depending on the context of the request. In the part of Malaysia with which I am most familiar, if one were to ask "How far is it to the next village?" a likely response would be "Three rice-cookings." The answer assumes that the questioner is interested in how much time it will take to get there, not how many miles away it is. In varied terrain, of course, distance in miles is an utterly unreliable guide to travel time, especially when the traveler is on foot or riding a bicycle. The answer also expresses time not in minutes—until recently, wristwatches were rare—but in units that are locally meaningful. Everyone knows how long it takes to cook the local rice. Thus an Ethiopian response to a query about how much salt is required for a dish might be "Half as much as to cook a chicken." The reply refers back to a standard that everyone is expected to know. Such measurement practices are irreducibly local, inasmuch as regional differences in, say, the type of rice eaten or the preferred way of cooking chicken will give different results.

Many local units of measurement are tied practically to particular activities. Marathi peasants, as Arjun Appadurai notes, express the desired distance between the onion sets they plant in terms of handbreadths. When one is moving along a field row, the hand is, well, the most handy gauge. In similar fashion, a common measure for twine or rope is the distance between the thumb and elbow because this corresponds with how it is wrapped and stored. As with setting onions, the

process of measuring is embedded in the activity itself and requires no separate operation. Such measurements, moreover, are often approximate; they are only as exact as the task at hand requires.⁴⁰ Rainfall may be said to be abundant or inadequate if the context of the query implies an interest in a particular crop. And a reply in terms of inches of rainfall, however accurate, would also fail to convey the desired information; it ignores such vital matters as the timing of the rain. For many purposes, an apparently vague measurement may communicate more valuable information than a statistically exact figure. The cultivator who reports that his rice yield from a plot is anywhere between four and seven baskets is conveying more accurate information, when the focus of attention is on the variability of the yield, than if he reported a ten-year statistical average of 5.6 baskets.

There is, then, no single, all-purpose, correct answer to a question implying measurement unless we specify the relevant local concerns that give rise to the question. Particular customs of measurement are thus situationally, temporally, and geographically bound.

Nowhere is the particularity of customary measurement more evident than with cultivated land. Modern abstract measures of land by surface area—so many hectares or acres—are singularly uninformative figures to a family that proposes to make its living from these acres. Telling a farmer only that he is leasing twenty acres of land is about as helpful as telling a scholar that he has bought six kilograms of books. Customary measures of land have therefore taken a variety of forms corresponding to those aspects of the land that are of greatest practical interest. Where land was abundant and manpower or draftpower scarce, the most meaningful gauge of land was often the number of days required to plow or to weed it. A plot of land in nineteenth-century France, for example, would be described as representing so many *morgen* or *journals* (days of work) and as requiring a specific kind of work (*homée, bechée, fauchée*). How many morgen were represented by a field of, say, ten acres could vary greatly; if the land were rocky and steeply pitched, it might require twice as much labor to work than if it were rich bottomland. The morgen would also differ from place to place depending on the strength of local draftpower and the crops sown, and it would differ from time to time as technology (plow tips, yokes, harnesses) affected the work a man could accomplish in a day.

Land might also be evaluated according to the amount of seed required to sow it. If the soil were very good, a field would be densely sown, whereas poor land would be more lightly seeded. The amount of seed sown to a field is in fact a relatively good proxy for average yield, as the sowing is done in anticipation of average growing conditions, while the actual seasonal yield would be more variable. Given a particular crop regimen, the amount of seed sown would indicate roughly

how productive a field had been, although it would reveal little about how arduous the land was to cultivate or how variable the harvests were. But the average yield from a plot of land is itself a rather abstract figure. What most farmers near the subsistence margin want to know above all is whether a particular farm will meet their basic needs reliably. Thus small farms in Ireland were described as a "farm of one cow" or a "farm of two cows" to indicate their grazing capacity to those who lived largely by milk products and potatoes. The physical area a farm might comprise was of little interest compared to whether it would feed a particular family.[41]

To grasp the prodigious variety of customary ways of measuring land, we would have to imagine literally scores of "maps" constructed along very different lines than mere surface area. I have in mind the sorts of maps devised to capture our attention with a kind of fun-house effect in which, say, the size of a country is made proportional to its population rather than its geographical size, with China and India looming menacingly over Russia, Brazil, and the United States, while Libya, Australia, and Greenland virtually disappear. These types of customary maps (for there would be a great many) would construct the landscape according to units of work and yield, type of soil, accessibility, and ability to provide subsistence, none of which would necessarily accord with surface area. The measurements are decidedly *local, interested, contextual,* and *historically specific.* What meets the subsistence needs of one family may not meet the subsistence needs of another. Factors such as local crop regimens, labor supply, agricultural technology, and weather ensure that the standards of evaluation vary from place to place and over time. Directly apprehended by the state, so many maps would represent a hopelessly bewildering welter of local standards. They definitely would not lend themselves to aggregation into a single statistical series that would allow state officials to make meaningful comparisons.

The Politics of Measurement

Thus far, this account of local measurement practices risks giving the impression that, although local conceptions of distance, area, volume, and so on were different from and more varied than the unitary abstract standards a state might favor, they were nevertheless aiming at objective accuracy. That impression would be false. Every act of measurement was an act marked by the play of power relations. To understand measurement practices in early modern Europe, as Kula demonstrates, one must relate them to the contending interests of the major estates: aristocrats, clergy, merchants, artisans, and serfs.

A good part of the politics of measurement sprang from what a contemporary economist might call the "stickiness" of feudal rents. Noble

and clerical claimants often found it difficult to increase feudal dues directly; the levels set for various charges were the result of long struggle, and even a small increase above the customary level was viewed as a threatening breach of tradition.[42] Adjusting the measure, however, represented a roundabout way of achieving the same end. The local lord might, for example, lend grain to peasants in smaller baskets and insist on repayment in larger baskets. He might surreptitiously or even boldly enlarge the size of the grain sacks accepted for milling (a monopoly of the domain lord) and reduce the size of the sacks used for measuring out flour; he might also collect feudal dues in larger baskets and pay wages in kind in smaller baskets. While the formal custom governing feudal dues and wages would thus remain intact (requiring, for example, the same number of sacks of wheat from the harvest of a given holding), the actual transaction might increasingly favor the lord.[43] The results of such fiddling were far from trivial. Kula estimates that the size of the bushel (*boisseau*) used to collect the main feudal rent (taille) increased by one-third between 1674 and 1716 as part of what was called the *réaction féodale*.[44]

Even when the unit of measurement—say, the bushel—was apparently agreed upon by all, the fun had just begun. Virtually everywhere in early modern Europe were endless micropolitics about how baskets might be adjusted through wear, bulging, tricks of weaving, moisture, the thickness of the rim, and so on. In some areas the local standards for the bushel and other units of measurement were kept in metallic form and placed in the care of a trusted official or else literally carved into the stone of a church or the town hall.[45] Nor did it end there. How the grain was to be poured (from shoulder height, which packed it somewhat, or from waist height?), how damp it could be, whether the container could be shaken down, and, finally, if and how it was to be leveled off when full were subjects of long and bitter controversy. Some arrangements called for the grain to be heaped, some for a "half-heap," and still others for it to be leveled or "striked" (*ras*). These were not trivial matters. A feudal lord could increase his rents by 25 percent by insisting on receiving wheat and rye in heaped bushels.[46] If, by custom, the bushel of grain was to be striked, then a further micropolitics erupted over the strickle. Was it to be round, thereby packing in grain as it was rolled across the rim, or was it to be sharp-edged? Who would apply the strickle? Who could be trusted to keep it?

A comparable micropolitics, as one might expect, swirled around the unit of land measurement. A common measure of length, the ell, was used to mark off the area to be plowed or weeded as a part of feudal labor dues. Once again, the lengths and widths in ells were "sticky," having been established through long struggle. It was tempting for a lord or overseer to try raising labor dues indirectly by increasing the length of the ell. If the attempt were successful, the formal rules of

corvée labor would not be violated, but the amount of work extracted would increase. Perhaps the stickiest of all measures before the nineteenth century was the price of bread. As the most vital subsistence good of premodern times, it served as a kind of cost-of-living index, and its cost was the subject of deeply held popular customs about its relationship to the typical urban wage. Kula shows in remarkable detail how bakers, afraid to provoke a riot by directly violating the "just price," managed nevertheless to manipulate the size and weight of the loaf to compensate to some degree for changes in the price of wheat and rye flour.[47]

Statecraft and the Hieroglyphics of Measurement

Because local standards of measurement were tied to practical needs, because they reflected particular cropping patterns and agricultural technology, because they varied with climate and ecology, because they were "an attribute of power and an instrument of asserting class privilege," and because they were "at the center of bitter class struggle," they represented a mind-boggling problem for statecraft.[48] Efforts to simplify or standardize measures recur like a leitmotif throughout French history—their reappearance a sure sign of previous failure. More modest attempts to simply codify local practices and create conversion tables were quickly overtaken and rendered obsolete by changes on the ground. The king's ministers were confronted, in effect, with a patchwork of local measurement codes, each of which had to be cracked. It was as if each district spoke its own dialect, one that was unintelligible to outsiders and at the same time liable to change without notice. Either the state risked making large and potentially damaging miscalculations about local conditions, or it relied heavily on the advice of local trackers—the nobles and clergy in the Crown's confidence—who, in turn, were not slow to take full advantage of their power.

The illegibility of local measurement practices was more than an administrative headache for the monarchy. It compromised the most vital and sensitive aspects of state security. Food supply was the Achilles heel of the early modern state; short of religious war, nothing so menaced the state as food shortages and the resulting social upheavals. Without comparable units of measurement, it was difficult if not impossible to monitor markets, to compare regional prices for basic commodities, or to regulate food supplies effectively.[49] Obliged to grope its way on the basis of sketchy information, rumor, and self-interested local reports, the state often responded belatedly and inappropriately. Equity in taxation, another sensitive political issue, was beyond the reach of a state that found it difficult to know the basic comparative facts about harvests and prices. A vigorous effort to collect taxes, to requisition for mil-

itary garrisons, to relieve urban shortages, or any number of other measures might, given the crudeness of state intelligence, actually provoke a political crisis. Even when it did not jeopardize state security, the Babel of measurement produced gross inefficiencies and a pattern of either undershooting or overshooting fiscal targets.[50] No effective central monitoring or controlled comparisons were possible without standard, fixed units of measurement.

Simplification and Standardization of Measurement

> The conquerors of our days, peoples or princes, want their empire to possess a unified surface over which the superb eye of power can wander without encountering any inequality which hurts or limits its view. The same code of law, the same measures, the same rules, and if we could gradually get there, the same language; that is what is proclaimed as the perfection of the social organization. . . . The great slogan of the day is *uniformity*.
> —Benjamin Constant, *De l'esprit de conquête*

If scientific forestry's project of creating a simplified and legible forest encountered opposition from villagers whose usage rights were being challenged, the political opposition to standard and legible units of measurement was even more refractory. The power to establish and impose local measures was an important feudal prerogative with material consequences which the aristocracy and clergy would not willingly surrender. Testimony to their capacity to thwart standardization is evident in the long series of abortive initiatives by absolutist rulers who tried to insist on some degree of uniformity. The very particularity of local feudal practices and their impenetrability to would-be centralizers helped to underwrite the autonomy of local spheres of power.

Three factors, in the end, conspired to make what Kula calls the "metrical revolution" possible. First, the growth of market exchange encouraged uniformity in measures. Second, both popular sentiment and Enlightenment philosophy favored a single standard throughout France. Finally, the Revolution and especially Napoleonic state building actually enforced the metric system in France and the empire.

Large-scale commercial exchange and long-distance trade tend to promote common standards of measurement. For relatively small-scale trade, grain dealers could transact with several suppliers as long as they knew the measure each was using. They might actually profit from their superior grasp of the profusion of units, much as smugglers take advantage of small differences in taxes and tariffs. Beyond a certain point, however, much of commerce is composed of long chains of transactions, often over great distances, between anonymous buyers and sellers. Such trade is greatly simplified and made legible by standard weights and measures. Whereas artisanal products were typically made by a single producer according to the desires of a particular cus-

tomer and carried a price specific to that object, the mass-produced commodity is made by no one in particular and is intended for any purchaser at all. In a sense, the virtue of the mass commodity is its reliable uniformity. In proportion, then, as the volume of commerce grew and the goods exchanged became increasingly standardized (a ton of wheat, a dozen plow tips, twenty cart wheels), there was a growing tendency to accept widely agreed upon units of measurement. Officials and physiocrats alike were convinced that uniform measures were the precondition for creating a national market and promoting rational economic action.[51]

The perennial state project of unifying measures throughout the kingdom received a large degree of popular support in the eighteenth century, thanks to the réaction féodale. Aiming to maximize the return on their estates, owners of feudal domains, many of them arrivistes, achieved their goal in part by manipulating units of measurement. This sense of victimization was evident in the *cahiers* of grievances prepared for the meeting of the Estates General just before the Revolution. The cahiers of the members of the Third Estate consistently called for equal measures (although this was hardly their main grievance), whereas the cahiers of the clergy and nobility were silent, presumably indicating their satisfaction with the status quo on this issue. The following petition from Brittany is typical of the way in which an appeal for unitary measures could be assimilated to devotion to the Crown: "We beg them [the king, his family, and his chief minister] to join with us in checking the abuses being perpetrated by tyrants against that class of citizens which is kind and considerate and which, until this day has been unable to present its very grievances to the very foot of the throne, and now we call on the King to mete out justice, and *we express our most sincere desire for but one king, one law, one weight, and one measure.*"[52]

For centralizing elites, the universal meter was to older, particularistic measurement practices as a national language was to the existing welter of dialects. Such quaint idioms would be replaced by a new universal gold standard, just as the central banking of absolutism had swept away the local currencies of feudalism. The metric system was at once a means of administrative centralization, commercial reform, and cultural progress. The academicians of the revolutionary republic, like the royal academicians before them, saw the meter as one of the intellectual instruments that would make France "revenue-rich, militarily potent, and *easily administered.*"[53] Common measures, it was supposed, would spur the grain trade, make land more productive (by permitting easier comparisons of price and productivity), and, not incidentally, lay the groundwork for a national tax code.[54] But the reformers also had in mind a genuine cultural revolution. "As mathematics was the language of science, so would the metric system be the

language of commerce and industry," serving to unify and transform French society.[55] A rational unit of measurement would promote a rational citizenry.

The simplification of measures, however, depended on that other revolutionary political simplification of the modern era: the concept of a uniform, homogeneous citizenship. As long as each estate operated within a separate legal sphere, as long as different categories of people were unequal in law, it followed that they might also have unequal rights with respect to measures.[56] The idea of equal citizenship, the abstraction of the "unmarked" citizen, can be traced to the Enlightenment and is evident in the writings of the Encyclopedists.[57] For the Encyclopedists, the cacophony among measurements, institutions, inheritance laws, taxation, and market regulations was the great obstacle to the French becoming a single people. They envisioned a series of centralizing and rationalizing reforms that would transform France into a national community where the same codified laws, measures, customs, and beliefs would everywhere prevail. It is worth noting that this project promotes the concept of *national* citizenship—a national French citizen perambulating the kingdom and encountering exactly the same fair, equal conditions as the rest of his compatriots. In place of a welter of incommensurable small communities, familiar to their inhabitants but mystifying to outsiders, there would rise a single national society perfectly legible from the center. The proponents of this vision well understood that what was at stake was not merely administrative convenience but also the transformation of a people: "The uniformity of customs, viewpoints, and principles of action will, inevitably, lead to a greater community of habits and predispositions."[58] The abstract grid of equal citizenship would create a new reality: the French citizen.

The homogenization of measures, then, was part of a larger, emancipatory simplification. At one stroke the equality of all French people before the law was guaranteed by the state; they were no longer mere subjects of their lords and sovereign but bearers of inalienable rights as citizens.[59] All the previous "natural" distinctions were now "denaturalized" and nullified, at least in law.[60] In an unprecedented revolutionary context where an entirely new political system was being created from first principles, it was surely no great matter to legislate uniform weights and measures. As the revolutionary decree read: "The centuries old dream of the masses of only one just measure has come true! The Revolution has given the people the meter."[61]

Proclaiming the universal meter was far simpler than ensuring that it became the daily practice of French citizens. The state could insist on the exclusive use of its units in the courts, in the state school system, and in such documents as property deeds, legal contracts, and tax codes. Outside these official spheres, the metric system made its way only very slowly. In spite of a decree for confiscating *toise* sticks in

shops and replacing them with meter sticks, the populace continued to use the older system, often marking their meter sticks with the old measures. Even as late as 1828 the new measures were more a part of *le pays légal* than of *le pays réel*. As Chateaubriand remarked, "Whenever you meet a fellow who, instead of talking *arpents*, *toises*, and *pieds*, refers to hectares, meters, and centimeters, rest assured, the man is a prefect."[62]

Land Tenure: Local Practice and Fiscal Shorthand

The revenue of the early modern state came mainly from levies on commerce and land, the major sources of wealth. For commerce, this implied an array of excise taxes, tolls and market duties, licensing fees, and tariffs. For landed wealth, this meant somehow attaching every parcel of taxable property to an individual or an institution responsible for paying the tax on it. As straightforward as this procedure seems in the context of the modern state, its achievement was enormously difficult for at least two reasons. First, the actual practices of customary land tenure were frequently so varied and intricate as to defy any one-to-one equation of taxpayer and taxable property. And second, as was the case with standardizing measurement, there were social forces whose interests could only be damaged by the unified and transparent set of property relations desired by the state's fiscal agents. In the end, the centralizing state succeeded in imposing a novel and (from the center) legible property system, which, as had the work of the scientific foresters, not only radically abridged the practices that the system described but at the same time transformed those practices to align more closely with their shorthand, schematic reading.

An Illustration

> *Negara mawi tata, desa mawi cara* (The capital has its order, the village its customs).
> —*Javanese proverb*

A hypothetical case of customary land tenure practices may help demonstrate how difficult it is to assimilate such practices to the barebones schema of a modern cadastral map. The patterns I will describe are an amalgam of practices I have encountered in the literature of or in the course of fieldwork in Southeast Asia, and although the case is hypothetical, it is not unrealistic.

Let us imagine a community in which families have usufruct rights to parcels of cropland during the main growing season. Only certain crops, however, may be planted, and every seven years the usufruct

land is redistributed among resident families according to each family's size and its number of able-bodied adults. After the harvest of the main-season crop, all cropland reverts to common land where any family may glean, graze their fowl and livestock, and even plant quickly ma-turing, dry-season crops. Rights to graze fowl and livestock on pasture-land held in common by the village is extended to all local families, but the number of animals that can be grazed is restricted according to family size, especially in dry years when forage is scarce. Families not using their grazing rights can give them to other villagers but not to outsiders. Everyone has the right to gather firewood for normal family needs, and the village blacksmith and baker are given larger allot-ments. No commercial sale from village woodlands is permitted.

Trees that have been planted and any fruit they may bear are the property of the family who planted them, no matter where they are now growing. Fruit fallen from such trees, however, is the property of anyone who gathers it. When a family fells one of its trees or a tree is felled by a storm, the trunk belongs to the family, the branches to the immediate neighbors, and the "tops" (leaves and twigs) to any poorer villager who carries them off. Land is set aside for use or leasing out by widows with children and dependents of conscripted males. Usufruct rights to land and trees may be let to anyone in the village; the only time they may be let to someone outside the village is if no one in the community wishes to claim them.

After a crop failure leading to a food shortage, many of these arrangements are readjusted. Better-off villagers are expected to as-sume some responsibility for poorer relatives—by sharing their land, by hiring them, or by simply feeding them. Should the shortage per-sist, a council composed of heads of families may inventory food supplies and begin daily rationing. In cases of severe shortages or famine, the women who have married into the village but have not yet borne children will not be fed and are expected to return to their native village. This last practice alerts us to the inequalities that often prevail in local customary tenure; single women, junior males, and anyone defined as falling outside the core of the community are clearly disadvantaged.

This description could be further elaborated. It is itself a simpli-fication, but it does convey some of the actual complexity of property relations in contexts where local customs have tended to prevail. To describe the usual practices in this fashion, as if they were laws, is it-self a distortion. Customs are better understood as a living, negotiated tissue of practices which are continually being adapted to new ecolog-ical and social circumstances—including, of course, power relations. Customary systems of tenure should not be romanticized; they are usu-ally riven with inequalities based on gender, status, and lineage. But because they are strongly local, particular, and adaptable, their plas-

ticity can be the source of microadjustments that lead to shifts in prevailing practice.

Imagine a lawgiver whose only concern was to respect land practices. Imagine, in other words, a written system of positive law that attempted to represent this complex skein of property relations and land tenure. The mind fairly boggles at the clauses, sub-clauses, and sub-sub-clauses that would be required to reduce these practices to a set of regulations that an administrator might understand, never mind enforce. And even if the practices could be codified, the resulting code would necessarily sacrifice much of their plasticity and subtle adaptability. The circumstances that might provoke a new adaptation are too numerous to foresee, let alone specify, in a regulatory code. That code would in effect freeze a living process. Changes in the positive code designed to reflect evolving practice would represent at best a jerky and mechanical adaptation.

And what of the *next* village, and the village after that? Our hypothetical code-giver, however devilishly clever and conscientious, would find that the code devised to fit one set of local practices would not travel well. Each village, with its own particular history, ecology, cropping patterns, kinship alignments, and economic activity, would require a substantially new set of regulations. At the limit, there would be at least as many legal codes as there were communities.

Administratively, of course, such a cacophony of local property regulations would be a nightmare. The nightmare is experienced not by those whose particular practices are being represented but by those state officials who aspire to a uniform, homogeneous, national administrative code. Like the "exotic" units of weights and measures, local land tenure practice is perfectly legible to all who live within it from day to day. Its details may often be contested and far from satisfactory to all its practitioners, but it is completely familiar; local residents have no difficulty in grasping its subtleties and using its flexible provisions for their own purposes. State officials, on the other hand, cannot be expected to decipher and then apply a new set of property hieroglyphs for each jurisdiction. Indeed, the very concept of the modern state presupposes a vastly simplified and uniform property regime that is legible and hence manipulable from the center.

My use of the term "simple" to describe modern property law, whose intricacies provide employment to armies of legal professionals, will seem grossly misplaced. It is surely the case that property law has in many respects become an impenetrable thicket for ordinary citizens. The use of the term "simple" in this context is thus both relative and perspectival. Modern freehold tenure is tenure that is mediated through the state and therefore readily decipherable only to those who have sufficient training and a grasp of the state statutes.[63] Its relative simplicity is lost on those who cannot break the code, just

as the relative clarity of customary tenure is lost on those who live outside the village.

The fiscal or administrative goal toward which all modern states aspire is to measure, codify, and simplify land tenure in much the same way as scientific forestry reconceived the forest. Accommodating the luxuriant variety of customary land tenure was simply inconceivable. The historical solution, at least for the liberal state, has typically been the heroic simplification of individual freehold tenure. Land is owned by a legal individual who possesses wide powers of use, inheritance, or sale and whose ownership is represented by a uniform deed of title enforced through the judicial and police institutions of the state. Just as the flora of the forest were reduced to Normalbäume, so the complex tenure arrangements of customary practice are reduced to freehold, transferrable title. In an agrarian setting, the administrative landscape is blanketed with a uniform grid of homogeneous land, each parcel of which has a legal person as owner and hence taxpayer. How much easier it then becomes to assess such property and its owner on the basis of its acreage, its soil class, the crops it normally bears, and its assumed yield than to untangle the thicket of common property and mixed forms of tenure.

The crowning artifact of this mighty simplification is the cadastral map. Created by trained surveyors and mapped to a given scale, the cadastral map is a more or less complete and accurate survey of all landholdings. Since the driving logic behind the map is to create a manageable and reliable format for taxation, the map is associated with a property register in which each specified (usually numbered) lot on the map is linked to an owner who is responsible for paying its taxes. The cadastral map and property register are to the taxation of land as the maps and tables of the scientific forester were to the fiscal exploitation of the forest.

The Code Rural *That Almost Was*

The rulers of postrevolutionary France confronted a rural society that was a nearly impenetrable web of feudal *and* revolutionary practices. It was inconceivable that they could catalogue its complexities, let alone effectively eliminate them, in the short run. Ideologically, for example, their commitment to equality and liberty was contradicted by customary rural contracts like those used by craft guilds, which still employed the terms "master" (*maître*) and "servant" (*serviteur*). As rulers of a new nation—not a kingdom—they were likewise offended by the absence of an overall legal framework for social relations. For some, a new civil code covering all Frenchmen seemed as if it would be sufficient.[64] But for bourgeois owners of rural property who, along with their noble neighbors, had been threatened by the local uprisings

of the Revolution and La Grand Peur and, more generally, by the aggressiveness of an emboldened and autonomous peasantry, an explicit *code rural* seemed necessary to underwrite their security.

In the end, no postrevolutionary rural code attracted a winning coalition, even amid a flurry of Napoleonic codes in nearly all other realms. For our purposes, the history of the stalemate is instructive. The first proposal for a code, which was drafted between 1803 and 1807, would have swept away most traditional rights (such as common pasturage and free passage through others' property) and essentially recast rural property relations in the light of bourgeois property rights and freedom of contract.[65] Although the proposed code prefigured certain modern French practices, many revolutionaries blocked it because they feared that its hands-off liberalism would allow large landholders to recreate the subordination of feudalism in a new guise.[66]

A reexamination of the issue was then ordered by Napoleon and presided over by Joseph Verneilh Puyrasseau. Concurrently, Député Lalouette proposed to do precisely what I supposed, in the hypothetical example, was impossible. That is, he undertook to systematically gather information about all local practices, to classify and codify them, and then to sanction them by decree. The decree in question would become the code rural. Two problems undid this charming scheme to present the rural populace with a rural code that simply reflected its own practices. The first difficulty was in deciding which aspects of the literally "infinite diversity" of rural production relations were to be represented and codified.[67] Even in a particular locality, practices varied greatly from farm to farm and over time; any codification would be partly arbitrary and artificially static. To codify local practices was thus a profoundly political act. Local notables would be able to sanction their preferences with the mantle of law, whereas others would lose customary rights that they depended on. The second difficulty was that Lalouette's plan was a mortal threat to all the state centralizers and economic modernizers for whom a legible, national property regime was the precondition of progress. As Serge Aberdam notes, "The Lalouette project would have brought about exactly what Merlin de Douai and the bourgeois, revolutionary jurists always sought to avoid."[68] Neither Lalouette's nor Verneilh's proposed code was ever passed, because they, like their predecessor in 1807, seemed to be designed to strengthen the hand of the landowners.

The Illegibility of Communal Tenure

The premodern and early modern state, as we have noted, dealt more with communities than with individuals when it came to taxes. Some apparently individual taxes, such as the notorious Russian "soul tax," which was collected from all subjects, were actually paid directly

by the communities or indirectly through the nobles whose subjects they were. Failure to deliver the required sum usually led to collective punishment.[69] The only agents of taxation who regularly reached to the level of the household and its cultivated fields were the local nobility and clergy in the course of collecting feudal dues and the religious tithe. For its part, the state had neither the administrative tools nor the information to penetrate to this level.

The limitations on state knowledge were partly due to the complexity and variability of local production. This was not the most important reason, however. The collective form of taxation meant that it was generally in the interest of local officials to misrepresent their situation in order to minimize the local tax and conscription burden. To this end, they might minimize the local population, systematically understate the acreage under cultivation, hide new commercial profits, exaggerate crop losses after storms and droughts, and so on.[70] The point of the cadastral map and land register was precisely to eliminate this fiscal feudalism and rationalize the fiscal take of the state. Just as the scientific forester needed an inventory of trees to realize the commercial potential of the forest, so the fiscal reformer needed a detailed inventory of landownership to realize the maximum, sustainable revenue yield.[71]

Assuming that the state had the will to challenge the resistance of the local nobles and elites and the financial resources to undertake a full cadastral survey (which was both time-consuming and expensive), it faced other obstacles as well. In particular, some communal forms of tenure simply could not be adequately represented in cadastral form. Rural living in seventeenth- and early eighteenth-century Denmark, for example, was organized by *ejerlav*, whose members had certain rights for using local arable, waste, and forest land. It would have been impossible in such a community to associate a household or individual with a particular holding on a cadastral map. The Norwegian large farm (*gard*) posed similar problems. Each household held rights to a given proportion of the value (*skyld*) of the farm, not to the plot of land; none of the joint owners could call a specific part of the farm his own.[72] Although it was possible to estimate the arable land of each community and, making some assumptions about crop yields and subsistence needs, arrive at a plausible tax burden, these villagers derived a substantial part of their livelihood from the commons by fishing, forestry, collecting resin, hunting, and making charcoal. Monitoring this kind of income was almost impossible. Nor would crude estimates of the value of the commons solve the problem, for the inhabitants of nearby villages often shared one another's commons (even though the practice was outlawed). The mode of production in such communities was simply incompatible with the assumption of individual freehold tenure implicit in a cadastral map. It was claimed, although the evi-
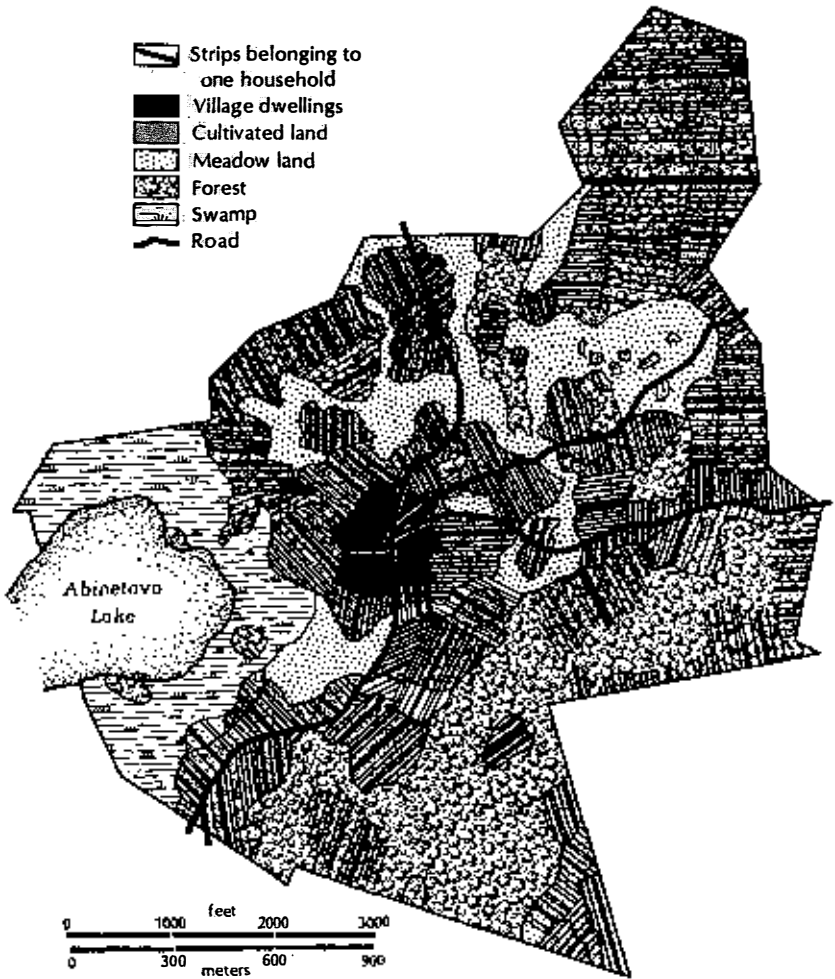
dence is not convincing, that common property was less productive than freehold property.[73] The state's case against communal forms of land tenure, however, was based on the correct observation that it was fiscally illegible and hence fiscally less productive. Rather than trying, like the hapless Lalouette, to bring the map into line with reality, the historical resolution has generally been for the state to impose a property system in line with its fiscal grid.

As long as common property was abundant and had essentially no fiscal value, the illegibility of its tenure was no problem. But the moment it became scarce (when "nature" became "natural resources"), it became the subject of property rights in law, whether of the state or of the citizens. The history of property in this sense has meant the inexorable incorporation of what were once thought of as free gifts of nature: forests, game, wasteland, prairie, subsurface minerals, water and watercourses, air rights (rights to the air above buildings or surface area), breathable air, and even genetic sequences, into a property regime. In the case of common-property farmland, the imposition of freehold property was clarifying not so much for the local inhabitants— the customary structure of rights had always been clear enough to them —as it was for the tax official and the land speculator. The cadastral map added documentary intelligence to state power and thus provided the basis for the synoptic view of the state and a supralocal market in land.[74]

An example may help to clarify the process of installing a new, more legible property regime. The case of two prerevolutionary Russian villages provides a nearly textbook example of state attempts to create individual tenure in keeping with its convictions about agricultural growth and administrative order. Most of rural Russia, even after the emancipation of 1861, was a model of fiscal illegibility. Communal forms of tenure prevailed, and the state had little or no knowledge of who cultivated which strips of land or what their yields and income were.

Novoselok village had a varied economy of cultivation, grazing, and forestry, whereas Khotynitsa village was limited to cultivation and some grazing (figures 3 and 4). The complex welter of strips was designed to ensure that each village household received a strip of land in every ecological zone. An individual household might have as many as ten to fifteen different plots constituting something of a representative sample of the village's ecological zones and microclimates. The distribution spread a family's risks prudently, and from time to time the land was reshuffled as families grew or shrunk.[75]

It was enough to make the head of a cadastral surveyor swim. At first glance it seems as if the village itself would need a staff of professional surveyors to get things right. But in practice the system, called interstripping, was quite simple to those who lived it. The strips of land

Strips belonging to
   one household
Village dwellings
Cultivated land
Meadow land
Forest
Swamp
Road

Abinetovo Lake

feet
0   1000   2000   3000

0   300   600   900
         meters

3. Novoselok village before the Stolypin Reform

were generally straight and parallel so that a readjustment could be made by moving small stakes along just one side of a field, without having to think of areal dimensions. Where the other end of the field was not parallel, the stakes could be shifted to compensate for the fact that the strip lay toward the narrower or wider end of the field. Irregular fields were divided, not according to area, but according to yield. To the eye—and certainly to those involved in cadastral mapping—the pattern seemed convoluted and irrational. But to those familiar with it, it was simple enough and worked admirably for their purposes.

Village dwellings
Arable land
Alluvial meadow
Sands
Clay
Quarry
Road

Strips belonging to one household

STATE (rented by the villagers) OWNED

foker

feet
0   1000   2000   3000

0   300   600   900
meters
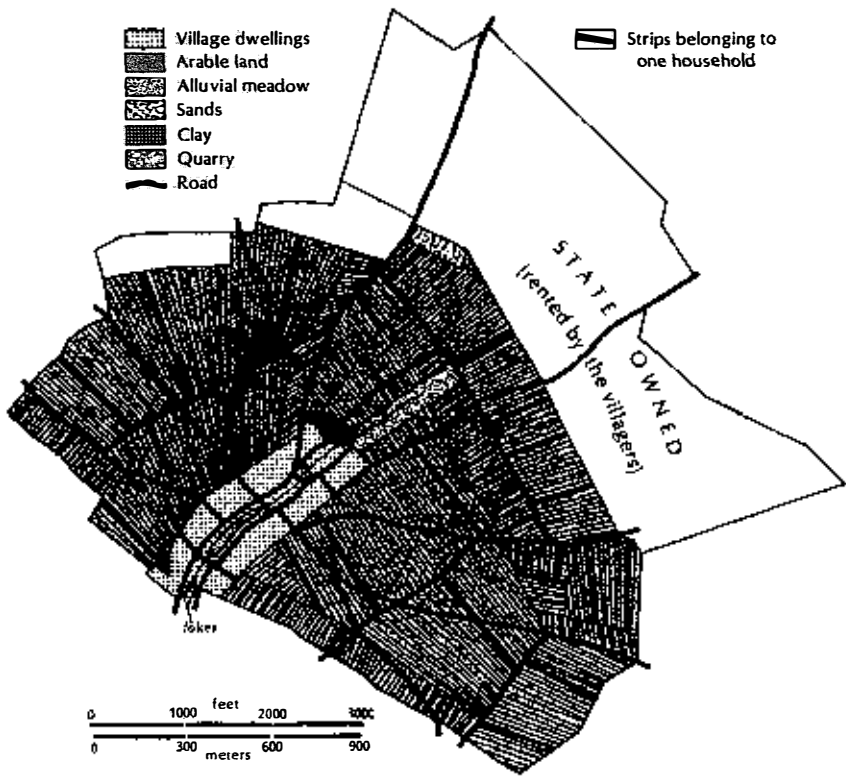
4. Khotynitsa village before the Stolypin Reform

The dream of state officials and agrarian reformers, at least since emancipation, was to transform the open-field system into a series of consolidated, independent farmsteads on what they took to be the western European model. They were driven by the desire to break the hold of the community over the individual household and to move from collective taxation of the whole community to a tax on individual landholders. As in France, fiscal goals were very much connected to reigning ideas of agricultural progress. Under Count Sergei Witte and Petr Stolypin, as George Yaney notes, plans for reform shared a common vision of how things were and how they needed to be: "First tableau: poor peasants, crowded together in villages, suffering from hunger, running into each other with their plows on their tiny strips. Second tableau: agriculture specialist agent leads a few progressive

Khutor boundaries
Consolidated plot belonging to one household
Cultivated land
Meadow land
Forest
Swamp
Road

Abinetovo Lake

feet
0   1000   2000   3000
0   300   600   900
meters
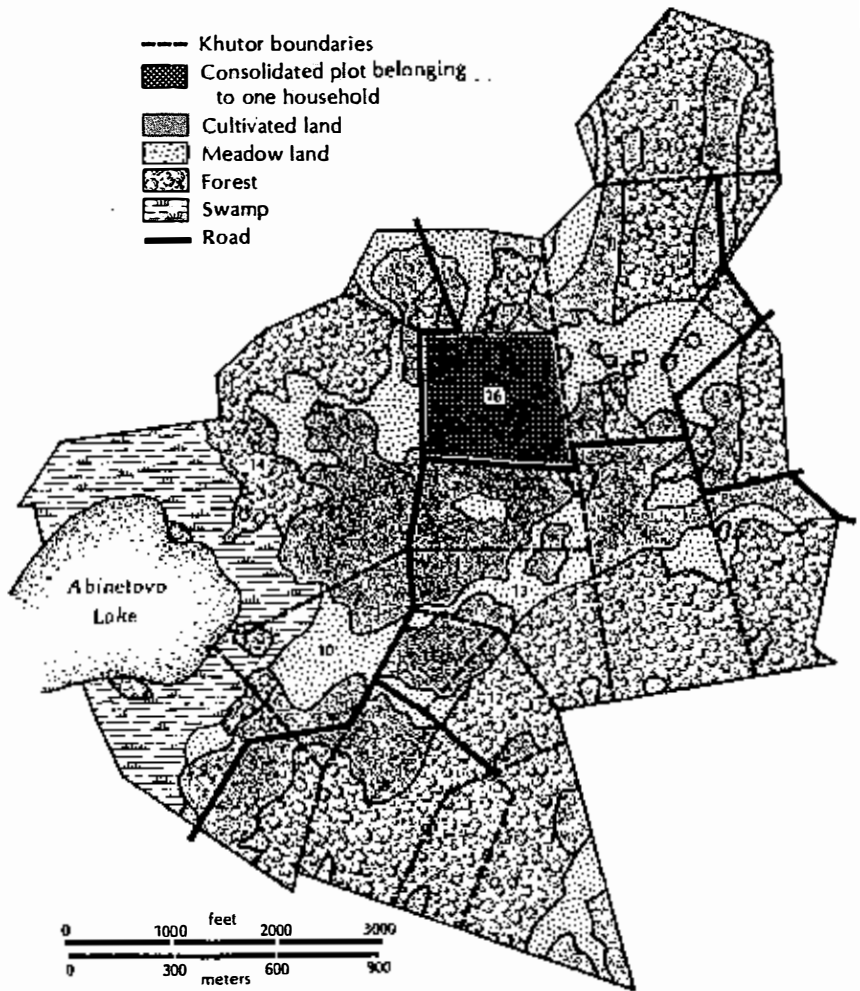
5. Novoselok village after the Stolypin Reform

peasants off to new lands, leaving those remaining more room. Third tableau: departing peasants, freed from restraints of strips, set up khutor [integral farmsteads with dwellings] on new fields and adapt latest methods. Those who remain, freed of village and family restraints, plunge into a demand economy—all are richer, more productive, the cities get fed, and the peasants are not proletarianized."[76] It was abundantly clear that the prejudicial attitude toward interstripping was based as much on the autonomy of the Russian village, its illegibility to outsiders, and prevailing dogma about scientific agriculture as it was

- Khutor boundaries ▦ Meadow ▦ Consolidated plot
- Otrub boundaries ▨ Sands ▦ belonging to one
▦ Village dwellings ▦ Clay household of Fig. 4
▦ Arable land ▦ Quarry
▦ Alluvial Meadow ▬ Road

lnkes

0   1000   feet 2000   3000
0   300   meters 600   900

6. Khotynitsa village after the Stolypin Reform

on hard evidence.[77] The state officials and agrarian reformers reasoned that, once given a consolidated, private plot, the peasant would suddenly want to get rich and would organize his household into an efficient workforce and take up scientific agriculture. The Stolypin Reform therefore went forward, and cadastral order was brought to both villages in the wake of the reform (figures 5 and 6).

In Novoselok village, seventeen independent farmsteads (*khutor*) were created in a way that aimed to give each household a share of meadow, arable, and forest. In Khotynitsa village, ten khutor were created as well as seventy-eight farms (*otrub*), whose owners continued to dwell in the village center. As a cadastral matter, the new farms were mappable, easily legible from above and outside, and, since each was owned by an identifiable person, assessable.

Taken alone, the maps shown in figures 5 and 6 are misleading. Such model villages suggest efficient cadastral teams working their way diligently through the countryside and turning open-field chaos into tidy lit-

tle farms. Reality was something else. In fact, the dream of orderly, rectangular fields was approximated only on newly settled land, where the surveyor faced little geographical or social resistance.[78] Elsewhere, the reformers were generally thwarted, despite tremendous pressure to produce integral farms. There were unauthorized consolidations, although they were forbidden; there were also "paper consolidations," in which the new farmers continued to farm their strips as before.[79] The best evidence that the agricultural property system had in fact not become legible to central tax officials was the immensely damaging procurement policies pursued by the czarist government during World War I. No one knew what a reasonable levy on grain or draft animals might be; as a result, some farmers were ruined, while others managed to hoard grain and livestock.[80] The same experience of forced procurement without adequate knowledge of landholdings and wealth was repeated again after the October Revolution during the period of War Communism.[81]

The Cadastral Map as Objective Information for Outsiders

The value of the cadastral map to the state lies in its abstraction and universality. In principle, at least, the same objective standard can be applied throughout the nation, regardless of local context, to produce a complete and unambiguous map of all landed property. The completeness of the cadastral map depends, in a curious way, on its abstract sketchiness, its lack of detail—its thinness. Taken alone, it is essentially a geometric representation of the borders or frontiers between parcels of land. What lies inside the parcel is left blank—unspecified—since it is not germane to the map plotting itself.

Surely many things about a parcel of land are far more important than its surface area and the location of its boundaries. What kind of soil it has, what crops can be grown on it, how hard it is to work, and how close it is to a market are the first questions a potential buyer might ask. These are questions a tax assessor would also want to ask. From a capitalist perspective, the physical dimensions of land are beside the point. But these other qualities can become relevant (especially to the state) only after the terrain to which they apply has been located and measured. And unlike identifying location and dimension, identifying these qualities involves judgments that are complex, susceptible to fraud, and easily overtaken by events. Crop rotations and yields may change, new tools or machines may transform cultivation, and markets may shift. The cadastral survey, by contrast, is precise, schematic, general, and uniform. Whatever its other defects, it is the precondition of a tax regimen that comprehensively links every patch of land with its owner—the taxpayer.[82] In this spirit, the survey for a 1807 Dutch land tax (inspired by Napoleonic France) stressed that all

surveyors were to use the same measurements, surveyors' instruments were to be periodically inspected to ensure conformity, and all maps were to be drawn up on a uniform scale of 1:2,880.[83]

Land maps in general and cadastral maps in particular are designed to make the local situation legible to an outsider. For purely local purposes, a cadastral map was redundant. Everyone knew who held, say, the meadow by the river, the value of the fodder it yielded, and the feudal dues it carried; there was no need to know its precise dimensions. A substantial domain might have the kind of prose map, or *terrier*, that one finds in old deeds ("from the large oak tree, north 120 feet to the river bank, thence . . ."), with a notation about the holder's obligations to the domain. One imagines such a document proving valuable to a young heir, new to the management of a domain. But a proper map seems to have come into use especially when a brisk market in land developed. The Netherlands was thus a leader in land mapping because of its early commercialization and because each speculator who invested in the draining of land by windmill wanted to know in advance precisely what plot of the newly opened land he would be entitled to. The map was especially crucial to the new bourgeois owners of landed estates, for it allowed them to survey a large territory at a glance. Its miniaturization helped it to serve as an aide-mémoire when the property consisted of many small parcels or the owner was not intimately familiar with the terrain.

As early as 1607, an English surveyor, John Norden, sold his services to the aristocracy on the premise that the map was a substitute for the tour of inspection: "A plot rightly drawne by true information, discribeth so the lively image of a manor, and every branch and member of the same, as the lord sitting in his chayre, may see what he hath, and where and how he lyeth, and in whole use and occupation of every particular is upon suddaine view."[84] A national tax administration requires the same logic: a legible, bureaucratic formula which a new official can quickly grasp and administer from the documents in his office.

What Is Missing in This Picture?

Administrative man recognizes that the world he perceives is a drastically simplified model of the buzzing, blooming confusion that constitutes the real world. He is content with the gross simplification because he believes that the real world is mostly empty—that most of the facts of the real world have no great relevance to any particular situation he is facing and that most significant chains of causes and consequences are short and simple.
—Herbert Simon

Isaiah Berlin, in his study of Tolstoy, compared the hedgehog, who knew "one big thing," to the fox, who knew many things. The scientific

forester and the cadastral official are like the hedgehog. The sharply focused interest of the scientific foresters in commercial lumber and that of the cadastral officials in land revenue constrain them to finding clear-cut answers to one question. The naturalist and the farmer, on the other hand, are like the fox. They know a great many things about forests and cultivable land. Although the forester's and cadastral official's range of knowledge is far narrower, we should not forget that their knowledge is systematic and synoptic, allowing them to see and understand things a fox would not grasp.[85] What I want to emphasize here, however, is how this knowledge is gained at the expense of a rather static and myopic view of land tenure.

The cadastral map is very much like a still photograph of the current in a river. It represents the parcels of land as they were arranged and owned at the moment the survey was conducted. But the current is always moving, and in periods of major social upheaval and growth, a cadastral survey may freeze a scene of great turbulence.[86] Changes are taking place on field boundaries; land is being subdivided or consolidated by inheritance or purchase; new canals, roads, and railways are being cut; land use is changing; and so forth. Inasmuch as these particular changes directly affect tax assessments, there are provisions for recording them on the map or in a title register. The accumulation of annotations and marginalia at some point render the map illegible, whereupon a more up-to-date but still static map must be drawn and the process repeated.

No operating land-revenue system can stop at the mere identification of parcel and ownership. Other schematic facts, themselves static, must be created to arrive at some judgment of a sustainable tax burden. Land may be graded by soil class, how well it is watered, what crops are grown on it, and its presumed average yield, which is often checked by sample crop-cuttings. These facts are themselves changing, or they are averages that may mask great variation. Like the still photo of the cadastral map, they grow more unrealistic with time and must be reexamined.

These state simplifications, like all state simplifications, are always far more static and schematic than the actual social phenomena they presume to typify. The farmer rarely experiences an average crop, an average rainfall, or an average price for his crops. Much of the long history of rural tax revolts in early modern Europe and elsewhere can be illuminated by the lack of fit between an unyielding fiscal claim, on one hand, and an often wildly fluctuating capacity of the rural population to meet that claim, on the other.[87] And yet, even the most equitable, well-intentioned cadastral system cannot be uniformly administered except on the basis of stable units of measurement and calculation. It can no more reflect the actual complexity of a farmer's experience than the

scientific forester's schemes can reflect the complexity of the naturalist's forest.[88]

Governed by a practical, concrete objective, the cadastral lens also ignored anything lying outside its sharply defined field of vision. This was reflected in a loss of detail in the survey itself. Surveyors, one recent Swedish study found, made the fields more geometrically regular than they in fact were. Ignoring small jogs and squiggles made their job easier and did not materially affect the outcome.[89] Just as the commercial forester found it convenient to overlook minor forest products, so the cadastral official tended to ignore all but the main commercial use of a field. The fact that a field designated as growing wheat or hay might also be a significant source of bedding straw, gleanings, rabbits, birds, frogs, and mushrooms was not so much unknown as ignored lest it needlessly complicate a straightforward administrative formula.[90] The most significant instance of myopia, of course, was that the cadastral map and assessment system considered only the dimensions of the land and its value as a productive asset or as a commodity for sale. Any value that the land might have for subsistence purposes or for the local ecology was bracketed as aesthetic, ritual, or sentimental values.

Transformation and Resistance

> The cadastral map is an instrument of control which both reflects and consolidates the power of those who commission it. . . . The cadastral map is partisan: where knowledge is power, it provides comprehensive information to be used to the advantage of some and the detriment of others, as rulers and ruled were well aware in the tax struggles of the 18th and 19th centuries. Finally, the cadastral map is active: in portraying one reality, as in the settlement of the new world or in India, it helps obliterate the old.
> —Roger J. P. Kain and Elizabeth Baigent, *The Cadastral Map*

The shorthand formulas through which tax officials must apprehend reality are not mere tools of observation. By a kind of fiscal Heisenberg principle, they frequently have the power to transform the facts they take note of.

The door-and-window tax established in France under the Directory and abolished only in 1917 is a striking case in point.[91] Its originator must have reasoned that the number of windows and doors in a dwelling was proportional to the dwelling's size. Thus a tax assessor need not enter the house or measure it but merely count the doors and windows. As a simple, workable formula, it was a brilliant stroke, but it was not without consequences. Peasant dwellings were subsequently designed or renovated with the formula in mind so as to have as few openings as possible. While the fiscal losses could be recouped by rais-

ing the tax per opening, the long-term effects on the health of the rural population lasted for more than a century.

The novel state-imposed form of land tenure was far more revolutionary than a door-and-window tax. It established a whole new institutional nexus. However simple and uniform the new tenure system was to an administrator, it flung villagers willy-nilly into a world of title deeds, land offices, fees, assessments, and applications. They faced powerful new specialists in the form of land clerks, surveyors, judges, and lawyers whose rules of procedure and decisions were unfamiliar.

Where the new tenure system was a colonial imposition—that is, where it was totally unfamiliar, where it was imposed by alien conquerors using an unintelligible language and institutional context, and where local practices bore no resemblance to freehold tenure—the consequences were far-reaching. The permanent settlement in India, for example, created a new class who, because they paid the taxes on the land, became full owners with rights of inheritance and sale where none had existed earlier.[92] At the same time, literally millions of cultivators, tenants, and laborers lost their customary rights of access to the land and its products. Those in the colonies who first plumbed the mysteries of the new tenure administration enjoyed unique opportunities. Thus the Vietnamese *secrétaires* and *interprètes* who served as intermediaries between the French officials in the Mekong Delta and their Vietnamese subjects were in a position to make great fortunes. By concentrating on the legal paperwork, such as title deeds, and the appropriate fees, they occasionally became landlords to whole villages of cultivators who had imagined they had opened common land free for the taking. The new intermediaries, of course, might occasionally use their knowledge to see their compatriots safely through the new legal thicket. Whatever their conduct, their fluency in a language of tenure specifically designed to be legible and transparent to administrators, coupled with the illiteracy of the rural population to whom the new tenure was indecipherable, brought about a momentous shift in power relations.[93] What was simplifying to an official was mystifying to most cultivators.

Freehold title and standard land measurement were to central taxation and the real-estate market what central bank currency was to the marketplace.[94] By the same token, they threatened to destroy a great deal of local power and autonomy. It is no wonder, then, that they should have been so vigorously resisted. In the eighteenth-century European context, any general cadastral survey was by definition a gambit of centralization; the local clergy and nobility were bound to see both their own taxing powers and the exemptions they enjoyed menaced. Commoners were likely to see it as a pretext for an additional local tax. Jean-Baptiste Colbert, the great "centralizer" of absolutism, proposed to conduct a national cadastral survey of France, but he was

thwarted in 1679 by the combined opposition of the aristocracy and clergy. After the Revolution more than a century later, the radical François-Noël Babeuf, in his "Projet de cadastre perpetuel," dreamed of a perfectly egalitarian land reform in which everyone would get an equal parcel.[95] He too was thwarted.

We must keep in mind not only the capacity of state simplifications to transform the world but also the capacity of the society to modify, subvert, block, and even overturn the categories imposed upon it. Here it is useful to distinguish what might be called facts on paper from facts on the ground. As Sally Falk Moore and many others have emphasized, the land-office records may serve as the basis for taxation, but they may have little to do with the actual rights to the land. Paper owners may not be the effective owners.[96] Russian peasants, as we saw, might register a "paper" consolidation while continuing to interstrip. Land invasions, squatting, and poaching, if successful, represent the exercise of de facto property rights which are not represented on paper. Certain land taxes and tithes have been evaded or defied to the point where they have become dead letters.[97] The gulf between land tenure facts on paper and facts on the ground is probably greatest at moments of social turmoil and revolt. But even in more tranquil times, there will always be a shadow land-tenure system lurking beside and beneath the official account in the land-records office. We must never assume that local practice conforms with state theory.

All centralizing states recognized the value of a uniform, comprehensive cadastral map. Carrying out the mapmaking, however, was another matter. As a rule of thumb, cadastral mapping was earlier and more comprehensive where a powerful central state could impose itself on a relatively weak civil society. Where, by contrast, civil society was well organized and the state relatively weak, cadastral mapping was late, often voluntary, and fragmentary. Thus Napoleonic France was mapped much earlier than England, where the legal profession managed for a long time to stymie this threat to its local, income-earning function. It followed from the same logic that conquered colonies ruled by fiat would often be cadastrally mapped before the metropolitan nation that ordered it. Ireland may have been the first. After Cromwell's conquest, as Ian Hacking notes, "Ireland was completely surveyed for land, buildings, people, and cattle under the directorship of William Petty, in order to facilitate the rape of that nation by the English in 1679."[98]

Where the colony was a thinly populated settler-colony, as in North America or Australia, the obstacles to a thorough, uniform cadastral grid were minimal. There it was a question less of mapping preexisting patterns of land use than of surveying parcels of land that would be given or sold to new arrivals from Europe and of ignoring indigenous peoples and their common-property regimes.[99] Thomas Jefferson, with

7. The survey landscape, Castleton, North Dakota

an eye trained by Enlightenment rationalism, imagined dividing the United States west of the Ohio River into "hundreds"—squares measuring ten miles by ten miles—and requiring settlers to take the parcels of land as so designated.

The geometrical clarity of Jefferson's proposal was not merely an aesthetic choice; he claimed that irregular lots facilitated fraud. To reinforce his case, he cited the experience of Massachusetts, where actual landholdings were 10 percent to 100 percent greater than what had

been granted by deed.[100] Not only did the regularity of the grid create legibility for the taxing authority, but it was a convenient and cheap way to package land and market it in homogeneous units. The grid facilitated the commoditization of land as much as the calculation of taxes and boundaries. Administratively, it was also disarmingly simple. Land could be registered and titled from a distance by someone who possessed virtually no local knowledge.[101] Once it was in place, the scheme had some of the impersonal, mechanical logic of the foresters' tables. But in practice, land titling in Jefferson's plan (which was modified by Congress to provide for rectangular lots and townships that were thirty-six square miles) did not always follow the prescribed pattern.

The Torrens system of land titling, developed in Australia and New Zealand in the 1860s, provided a lithographed, presurveyed grid representing allotments that were registered to settlers on a first-come, first-served basis. It was the quickest and most economical means yet devised to sell land, and it was later adopted in many British colonies. The more homogeneous and rigid the geometric grid, however, the more likely it was to run afoul of the natural features of the nonconforming landscape. The possibilities for surprises was nicely captured in this satirical verse from New Zealand.

> Now the road through Michael's section
>   though it looked well on the map
> For the use it was intended
>   wasn't really worth a rap
> And at night was not unlikely
>   to occasion some mishap.
>
> It was nicely planned on paper
>   and was ruled without remorse
> Over cliffs, and spurs and gullies
>   with a straight and even course
> Which precluded locomotion
>   on part of man or horse.[102]

The cadastral survey was but one technique in the growing armory of the utilitarian modern state.[103] Where the premodern state was content with a level of intelligence sufficient to allow it to keep order, extract taxes, and raise armies, the modern state increasingly aspired to "take in charge" the physical and human resources of the nation and make them more productive. These more positive ends of statecraft required a much greater knowledge of the society. And an inventory of land, people, incomes, occupations, resources, and deviance was the logical place to begin. "The need for the increasingly bureaucratic state to organize itself and control its resources gave an impulse to the collection

of vital and other statistics; to forestry and rational agriculture; to surveying and exact cartography; and to public hygiene and climatology."[104]

Although the purposes of the state were broadening, what the state wanted to know was still directly related to those purposes. The nineteenth-century Prussian state, for example, was very much interested in the ages and sexes of immigrants and emigrants but not in their religions or races; what mattered to the state was keeping track of possible draft dodgers and maintaining a supply of men of military age.[105] The state's increasing concern with productivity, health, sanitation, education, transportation, mineral resources, grain production, and investment was less an abandonment of the older objectives of statecraft than a broadening and deepening of what those objectives entailed in the modern world.

2 Cities, People, and Language

> And the Colleges of the Cartographers set up a Map of the Empire which had
> the size of the Empire itself and coincided with it point by point. . . . Succeed-
> ing generations understood that this Widespread Map was Useless, and not
> without Impiety they abandoned it to the Inclemencies of the Sun and the
> Winters.
> — Suarez Miranda, *Viajes de varones prudentes (1658)*

An aerial view of a town built during the Middle Ages or the oldest
quarters (*medina*) of a Middle Eastern city that has not been greatly
tampered with has a particular look. It is the look of disorder. Or, to
put it more precisely, the town conforms to no overall abstract form.
Streets, lanes, and passages intersect at varying angles with a density
that resembles the intricate complexity of some organic processes. In
the case of a medieval town, where defense needs required walls and
perhaps moats, there may be traces of inner walls superseded by
outer walls, much like the growth rings of a tree. A representation of
Bruges in about 1500 illustrates the pattern (figure 8). What definition
there is to the city is provided by the castle green, the marketplace,
and the river and canals that were (until they silted up) the lifeblood
of this textile-trading city.

The fact that the layout of the city, having developed without any
overall design, lacks a consistent geometric logic does not mean that it
was at all confusing to its inhabitants. One imagines that many of its
cobbled streets were nothing more than surfaced footpaths traced by
repeated use. For those who grew up in its various quarters, Bruges
would have been perfectly familiar, perfectly legible. Its very alleys and
lanes would have closely approximated the most common daily move-
ments. For a stranger or trader arriving for the first time, however, the
town was almost certainly confusing, simply because it lacked a repet-
itive, abstract logic that would allow a newcomer to orient herself. The
cityscape of Bruges in 1500 could be said to privilege local knowledge
over outside knowledge, including that of external political authori-

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8. Bruges circa 1500, from a painting in the Town Hall, Bruges

ties.[1] It functioned spatially in much the same way a difficult or unintelligible dialect would function linguistically. As a semipermeable membrane, it facilitated communication within the city while remaining stubbornly unfamiliar to those who had not grown up speaking this special geographic dialect.

Historically, the relative illegibility to outsiders of some urban neighborhoods (or of their rural analogues, such as hills, marshes, and forests) has provided a vital margin of political safety from control by outside elites. A simple way of determining whether this margin exists is to ask if an outsider would have needed a local guide (a native tracker) in order to find her way successfully. If the answer is yes, then the community or terrain in question enjoys at least a small measure of insulation from outside intrusion. Coupled with patterns of local solidarity, this insulation has proven politically valuable in such disparate contexts as eighteenth- and early nineteenth-century urban riots over bread prices in Europe, the Front de Libération Nationale's tenacious resistance to the French in the Casbah of Algiers,[2] and the politics of the bazaar that helped to bring down the Shah of Iran. Illegibility, then, has been and remains a reliable resource for political autonomy.[3]

Stopping short of redesigning cities in order to make them more legible (a subject that we shall soon explore), state authorities endeav-

ored to map complex, old cities in a way that would facilitate policing and control. Most of the major cities of France were thus the subject of careful military mapping (*reconnaissances militaires*), particularly after the Revolution. When urban revolts occurred, the authorities wanted to be able to move quickly to the precise locations that would enable them to contain or suppress the rebellions effectively.[4]

States and city planners have striven, as one might expect, to overcome this spatial unintelligibility and to make urban geography transparently legible from without. Their attitude toward what they regarded as the higgledy-piggledy profusion of unplanned cities was not unlike the attitude of foresters to the natural profusion of the unplanned forest. The origin of grids or geometrically regular settlements may lie in a straightforward military logic. A square, ordered, formulaic military camp on the order of the Roman *castra* has many advantages. Soldiers can easily learn the techniques of building it; the commander of the troops knows exactly in which disposition his subalterns and various troops lie; and any Roman messenger or officer who arrives at the camp will know where to find the officer he seeks. On a more speculative note, a far-flung, polyglot empire may find it symbolically useful to have its camps and towns laid out according to formula as a stamp of its order and authority. Other things being equal, the city laid out according to a simple, repetitive logic will be easiest to administer and to police.

Whatever the political and administrative conveniences of a geometric cityscape, the Enlightenment fostered a strong aesthetic that looked with enthusiasm on straight lines and visible order. No one expressed the prejudice more clearly than Descartes: "These ancient cities that were once mere *straggling* villages and have become in the course of time great cities are commonly quite *poorly laid out* compared to those *well-ordered towns that an engineer lays out on a vacant plane* as it suits his fancy. And although, upon considering one-by-one the buildings in the former class of towns, one finds as much art or more than one finds in the latter class of towns, still, upon seeing how the buildings are arranged—*here a large one, there a small one*—and how *they make the streets crooked and uneven,* one will say that *it is chance more than the will of some men using their reason that has arranged them thus.*"[5]

Descartes's vision conjures up the urban equivalent of the scientific forest: streets laid out in straight lines intersecting at right angles, buildings of uniform design and size, the whole built according to a single, overarching plan.

The elective affinity between a strong state and a uniformly laid out

city is obvious. Lewis Mumford, the historian of urban form, locates the modern European origin of this symbiosis in the open, legible baroque style of the Italian city-state. He claims, in terms that Descartes would have found congenial, "It was one of the triumphs of the baroque mind to organize space, to make it continuous, reduce it to measure and order."[6] More to the point, the baroque redesigning of medieval cities— with its grand edifices, vistas, squares, and attention to uniformity, proportion, and perspective—was intended to reflect the grandeur and awesome power of the prince. Aesthetic considerations frequently, won out over the existing social structure and the mundane functioning of the city. "Long before the invention of bulldozers," Mumford adds, "the Italian military engineer developed, through his professional specialization in destruction, a bulldozing habit of mind: one that sought to clear the ground of encumbrances, so as to make a clear beginning on its own inflexible mathematical lines."[7]

The visual power of the baroque city was underwritten by scrupulous attention to the military security of the prince from internal as well as external enemies. Thus both Alberti and Palladio thought of main thoroughfares as military roads (viae militaires). Such roads had to be straight, and, in Palladio's view, "the ways will be more convenient if they are made everywhere equal: that is to say that there will be *no part in them where armies may not easily march.*"[8]

There are, of course, many cities approximating Descartes's model. For obvious reasons, most have been planned from the ground up as new, often utopian cities.[9] Where they have not been built by imperial decrees, they have been designed by their founding fathers to accommodate more repetitive and uniform squares for future settlement.[10] A bird's-eye view of central Chicago in the late nineteenth century (William Penn's Philadelphia or New Haven would do equally well) serves as an example of the grid city (figure 9).

From an administrator's vantage point, the ground plan of Chicago is nearly utopian. It offers a quick appreciation of the ensemble, since the entirety is made up of straight lines, right angles, and repetitions.[11] Even the rivers seem scarcely to interrupt the city's relentless symmetry. For an outsider—or a policeman—finding an address is a comparatively simple matter; no local guides are required. The knowledge of local citizens is not especially privileged vis-à-vis that of outsiders. If, as is the case in upper Manhattan, the cross streets are consecutively numbered and are intersected by longer avenues, also consecutively numbered, the plan acquires even greater transparency.[12] The aboveground order of a grid city facilitates its underground order in the layout of water pipes, storm drains, sewers, electric cables, natural
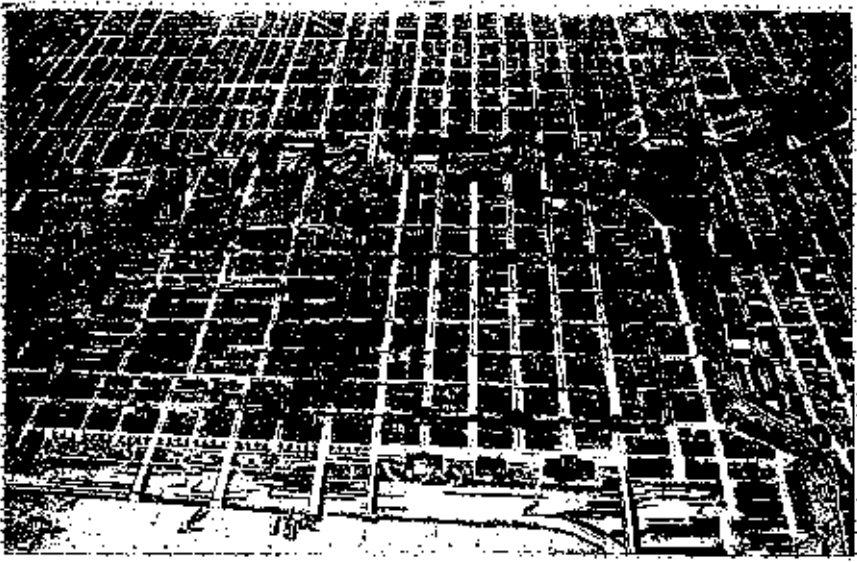
9. Map of downtown Chicago, circa 1893

gas lines, and subways — an order no less important to the administrators of a city. Delivering mail, collecting taxes, conducting a census, moving supplies and people in and out of the city, putting down a riot or insurrection, digging for pipes and sewer lines, finding a felon or conscript (providing he is at the address given), and planning public transportation, water supply, and trash removal are all made vastly simpler by the logic of the grid.

Three aspects of this geometric order in human settlement bear emphasis. The first is that the order in question is most evident, not at street level, but rather from above and from outside. Like a marcher in a parade or like a single riveter in a long assembly line, a pedestrian in the middle of this grid cannot instantly perceive the larger design of the city. The symmetry is either grasped from a representation — it is in fact what one would expect if one gave a schoolchild a ruler and a blank piece of paper — or from the vantage point of a helicopter hovering far above the ground: in short, a God's-eye view, or the view of an absolute ruler. This spatial fact is perhaps inherent in the process of urban or architectural planning itself, a process that involves miniaturization and scale models upon which patron and planner gaze down, exactly as if they were in a helicopter.[13] There is, after all, no other way of visually imagining what a large-scale construction project will look like when it is completed except by a miniaturization of this

kind. It follows, I believe, that such plans, which have the scale of toys, are judged for their sculptural properties and visual order, often from a perspective that no or very few human observers will ever replicate.

The miniaturization imaginatively achieved by scale models of cities or landscapes was practically achieved with the airplane. The mapping tradition of the bird's-eye view, evident in the map of Chicago, was no longer a mere convention. By virtue of its great distance, an aerial view resolved what might have seemed ground-level confusion into an apparently vaster order and symmetry. It would be hard to exaggerate the importance of the airplane for modernist thought and planning. By offering a perspective that flattened the topography as if it were a canvas, flight encouraged new aspirations to "synoptic vision, rational control, planning, and spatial order."[14]

A second point about an urban order easily legible from outside is that the grand plan of the ensemble has no necessary relationship to the order of life as it is experienced by its residents. Although certain state services may be more easily provided and distant addresses more easily located, these apparent advantages may be negated by such perceived disadvantages as the absence of a dense street life, the intrusion of hostile authorities, the loss of the spatial irregularities that foster coziness, gathering places for informal recreation, and neighborhood feeling. The formal order of a geometrically regular urban space is just that: formal order. Its visual regimentation has a ceremonial or ideological quality, much like the order of a parade or a barracks. The fact that such order works for municipal and state authorities in administering the city is no guarantee that it works for citizens. Provisionally, then, we must remain agnostic about the relation between formal spatial order and social experience.

The third notable aspect of homogeneous, geometrical, uniform property is its convenience as a standardized commodity for the market. Like Jefferson's scheme for surveying or the Torrens system for titling open land, the grid creates regular lots and blocks that are ideal for buying and selling. Precisely because they are abstract units detached from any ecological or topographical reality, they resemble a kind of currency which is endlessly amenable to aggregation and fragmentation. This feature of the grid plan suits equally the surveyor, the planner, and the real-estate speculator. Bureaucratic and commercial logic, in this instance, go hand in hand. As Mumford notes, "The beauty of this mechanical pattern, from the commercial standpoint, should be plain. This plan offers the engineer none of those special problems that irregular parcels and curved boundary lines present. An office boy could figure out the number of square feet involved in a street opening or in

a sale of land: even a lawyer's clerk could write a description of the necessary deed of sale, merely by filling in with the proper dimensions the standard document. With a T-square and a triangle, finally, the municipal engineer could, without the slightest training as either an architect or a sociologist, 'plan' a metropolis, with its standard lots, its standard blocks, its standard width streets. . . . The very absence of more specific adaptation to landscape or to human purpose only increased, by its very indefiniteness, *its general usefulness for exchange*."[15]

The vast majority of Old World cities are, in fact, some historical amalgam of a Bruges and a Chicago. Although more than one politician, dictator, and city planner have devised plans for the total recasting of an existing city, these dreams came at such cost, both financial and political, that they have rarely left the drawing boards. Piecemeal planning, by contrast, is far more common. The central, older core of many cities remains somewhat like Bruges, whereas the newer outskirts are more likely to exhibit the marks of one or more plans. Sometimes, as in the sharp contrast between old Delhi and the imperial capital of New Delhi, the divergence is formalized.

Occasionally, authorities have taken draconian steps to retrofit an existing city. The redevelopment of Paris by the prefect of the Seine, Baron Haussmann, under Louis Napoleon was a grandiose public works program stretching from 1853 to 1869. Haussmann's vast scheme absorbed unprecedented amounts of public debt, uprooted tens of thousands of people, and could have been accomplished only by a single executive authority not directly accountable to the electorate.

The logic behind the reconstruction of Paris bears a resemblance to the logic behind the transformation of old-growth forests into scientific forests designed for unitary fiscal management. There was the same emphasis on simplification, legibility, straight lines, central management, and a synoptic grasp of the ensemble. As in the case of the forest, much of the plan was achieved. One chief difference, however, was that Haussmann's plan was devised less for fiscal reasons than for its impact on the conduct and sensibilities of Parisians. While the plan did create a far more legible fiscal space in the capital, this was a byproduct of the desire to make the city more governable, prosperous, healthy, and architecturally imposing.[16] The second difference was, of course, that those uprooted by the urban planning of the Second Empire could, and did, strike back. As we shall see, the retrofitting of Paris foreshadows many of the paradoxes of authoritarian high-modernist planning that we will soon examine in greater detail.

The plan reproduced in figure 10 shows the new boulevards constructed to Haussmann's measure as well as the prerevolutionary inner
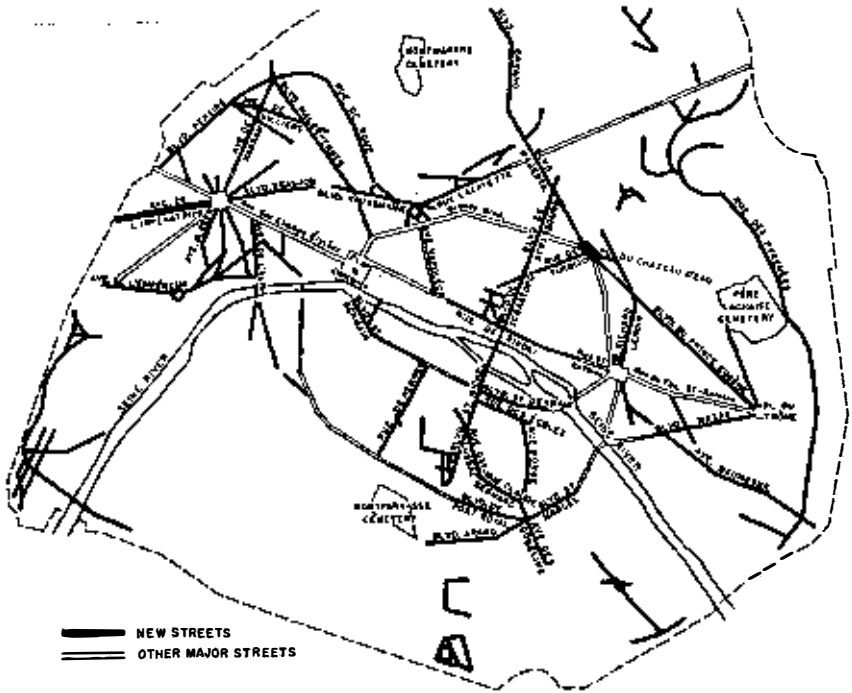
10. Map of Paris, 1870, showing the principal new streets built between 1850 and 1870

boulevards, which were widened and straightened.[17] But the retrofit, seen merely as a new street map, greatly underestimates the transformation. For all the demolition and construction required, for all the new legibility added to the street plan, the new pattern bore strong traces of an accommodation with "old-growth" Paris. The outer boulevards, for example, follow the line of the older customs (*octroi*) wall of 1787. But Haussmann's scheme was far more than a traffic reform. The new legibility of the boulevards was accompanied by changes that revolutionized daily life: new aqueducts, a much more effective sewage system, new rail lines and terminals, centralized markets (Les Halles), gas lines and lighting, and new parks and public squares.[18] The new Paris created by Louis Napoleon became, by the turn of the century, a widely admired public works miracle and shrine for would-be planners from abroad.

At the center of Louis Napoleon's and Haussmann's plans for Paris lay the military security of the state. The redesigned city was, above

all, to be made safe against popular insurrections. As Haussmann wrote, "The order of this Queen-city is one of the main pre-conditions of general [public] security."[19] Barricades had gone up nine times in the twenty-five years before 1851. Louis Napoleon and Haussmann had seen the revolutions of 1830 and 1848; more recently, the June Days and resistance to Louis Napoleon's coup represented the largest insurrection of the century. Louis Napoleon, as a returned exile, was well aware of how tenuous his hold on power might prove.

The geography of insurrection, however, was not evenly distributed across Paris. Resistance was concentrated in densely packed, working-class *quartiers*, which, like Bruges, had complex, illegible street plans.[20] The 1860 annexation of the "inner suburbs" (located between the customs wall and the outer fortifications and containing 240,000 residents) was explicitly designed to gain mastery over a *ceinture sauvage* that had thus far escaped police control. Haussmann described this area as a "dense belt of suburbs, given over to twenty different administrations, built at random, covered by an inextricable network of narrow and tortuous public ways, alleys, and dead-ends, where a nomadic population without any real ties to the land [property] and without any effective surveillance, grows at a prodigious speed."[21] Within Paris itself, there were such revolutionary *foyers* as the Marais and especially the Faubourg Saint-Antoine, both of which had been determined centers of resistance to Louis Napoleon's coup d'état.

The military control of these insurrectionary spaces—spaces that had not yet been well mapped—was integral to Haussmann's plan.[22] A series of new avenues between the inner boulevards and the customs wall was designed to facilitate movement between the barracks on the outskirts of the city and the subversive districts. As Haussmann saw it, his new roads would ensure multiple, direct rail and road links between each district of the city and the military units responsible for order there.[23] Thus, for example, new boulevards in northeastern Paris allowed troops to rush from the Courbevoie barracks to the Bastille and then to subdue the turbulent Faubourg Saint-Antoine.[24] Many of the new rail lines and stations were located with similar strategic goals in mind. Where possible, insurrectionary quartiers were demolished or broken up by new roads, public spaces, and commercial development. Explaining the need for a loan of 50 million francs to begin the work, Léon Faucher emphasized state security needs: "The interests of public order, no less than those of salubrity, demand that a wide swath be cut as soon as possible across this district of barricades."[25]

The reconstruction of Paris was also a necessary public-health mea-

sure. And here the steps that the hygienists said would make Paris more healthful would at the same time make it more efficient econom- ically and more secure militarily. Antiquated sewers and cesspools, the droppings of an estimated thirty-seven thousand horses (in 1850), and the unreliable water supply made Paris literally pestilential. The city had the highest death rate in France and was most susceptible to viru- lent epidemics of cholera; in 1831, the disease killed 18,400 people, in- cluding the prime minister. And it was in those districts of revolution- ary resistance where, because of crowding and lack of sanitation, the rates of mortality were highest.[26] Haussmann's Paris was, for those who were not expelled, a far healthier city; the greater circulation of air and water and the exposure to sunlight reduced the risk of epidemics just as the improved circulation of goods and labor (healthier labor, at that) contributed to the city's economic well-being. A utilitarian logic of labor productivity and commercial success went hand in hand with strategic and public-health concerns.

The politico-aesthetic tastes of the driving force behind the trans- formation of Paris, Louis Napoleon himself, were also decisive. When Haussmann was appointed prefect of the Seine, Louis Napoleon handed him a map that provided for the central market, the Bois de Bologne, and many of the streets eventually built. There is no doubt that Louis Napoleon's plans drew heavily from the ideas of the Saint Simonists in their visionary journal *Le globe* and from the model urban communi- ties sketched by Fourier and Cabet.[27] Their grandiose designs appealed to his own determination to have the new grandeur of the capital city serve as testimony to the grandeur of the regime.

As happens in many authoritarian modernizing schemes, the politi- cal tastes of the ruler occasionally trumped purely military and func- tional concerns. Rectilinear streets may have admirably assisted the mo- bilization of troops against insurgents, but they were also to be flanked by elegant facades and to terminate in imposing buildings that would impress visitors.[28] Uniform modern buildings along the new boulevards may have represented healthier dwellings, but they were often no more than facades. The zoning regulations were almost exclusively concerned with the visible surfaces of buildings, but behind the facades, builders could build crowded, airless tenements, and many of them did.[29]

The new Paris, as T. J. Clark has observed, was intensely visualized: "Part of Haussmann's purpose was to give modernity a shape, and he seemed at the time to have a measure of success in doing so; he built a set of forms in which the city appeared to be visible, even intelligible: Paris, to repeat the formula, was becoming a spectacle."[30]

Legibility, in this case, was achieved by a much more pronounced

segregation of the population by class and function. Each fragment of Paris increasingly took on a distinctive character of dress, activity, and wealth—bourgeois shopping district, prosperous residential quarter, industrial suburb, artisan quarter, bohemian quarter. It was a more easily managed and administered city and a more "readable" city because of Haussmann's heroic simplifications.

As in most ambitious schemes of modern order, there was a kind of evil twin to Haussmann's spacious and imposing new capital. The hierarchy of urban space in which the rebuilt center of Paris occupied pride of place presupposed the displacement of the urban poor toward the periphery.[31] Nowhere was this more true than in Belleville, a popular working-class quarter to the northeast which grew into a town of sixty thousand people by 1856. Many of its residents had been disinherited by Haussmann's demolitions; some called it a community of outcasts. By the 1860s, it had become a suburban equivalent of what the Faubourg Saint-Antoine had been earlier—an illegible, insurrectionary *foyer*. "The problem was not that Belleville was not a community, but that it became the sort of community which the bourgeoisie feared, which the police could not penetrate, which the government could not regulate, where the popular classes, with all their unruly passions and political resentments, held the upper hand."[32] If, as many claim, the Commune of Paris in 1871 was partly an attempt to reconquer the city ("la reconquete de la Ville par la Ville")[33] by those exiled to the periphery by Haussmann, then Belleville was the geographical locus of that sentiment. The Communards, militarily on the defensive in late May 1871, retreated toward the northeast and Belleville, where, at the Belleville town hall, they made their last stand. Treated as a den of revolutionaries, Belleville was subjected to a brutal military occupation.

Two diagnostic ironies marked the suppression of the Commune. The first was that the strategic design of Haussmann was triumphant. The boulevards and rail lines that the Second Empire had hoped would foil a popular insurrection had proved their value. "Thanks to Haussmann, the Versailles army could move in one fell swoop from the Place du Chateau d'eau to Belleville."[34] The second irony was that, just as the Faubourg Saint-Antoine had been effaced by Haussmann's demolitions, so too was much of the newly offending quarter obliterated by the building of the Eglise Sacré Coeur, built "in the guilty town . . . as restitution made on the site of the crime."[35]

The Creation of Surnames

Some of the categories that we most take for granted and with which we now routinely apprehend the social world had their origin in state projects of standardization and legibility. Consider, for example, something as fundamental as permanent surnames.

A vignette from the popular film *Witness* illustrates how, when among strangers, we do rely on surnames as key navigational aids.[36] The detective in the film is attempting to locate a young Amish boy who may have witnessed a murder. Although the detective has a surname to go on, he is thwarted by several aspects of Amish traditionalism, including the antique German dialect spoken by the Amish. His first instinct is, of course, to reach for the telephone book—a list of proper names and addresses—but the Amish don't have telephones. Furthermore, he learns, the Amish have a very small number of last names. His quandary reminds us that the great variety of surnames and given names in the United States allows us to identify unambiguously a large number of individuals whom we may never have met. A world without such names is bewildering; indeed, the detective finds Amish society so opaque that he needs a native tracker to find his way.

Customary naming practices throughout much of the world are enormously rich. Among some peoples, it is not uncommon for individuals to have different names during different stages of life (infancy, childhood, adulthood) and in some cases after death; added to these are names used for joking, rituals, and mourning and names used for interactions with same-sex friends or with in-laws. Each name is specific to a certain phase of life, social setting, or interlocutor. A single individual will frequently be called by several different names, depending on the stage of life and the person addressing him or her. To the question "What is your name?" which has a more unambiguous answer in the contemporary West, the only plausible answer is "It depends."[37]

For the insider who grows up using these naming practices, they are both legible and clarifying. Each name and the contexts of its use convey important social knowledge. Like the network of alleys in Bruges, the assortment of local weights and measures, and the intricacies of customary land tenure, the complexity of naming has some direct and often quite practical relations to local purposes. For an outsider, however, this byzantine complexity of names is a formidable obstacle to understanding local society. Finding someone, let alone situating him or her in a kinship network or tracing the inheritance of property, becomes a major undertaking. If, in addition, the population in question has reason to conceal its identity and its activities from ex-

ternal authority, the camouflage value of such naming practices is considerable.

The invention of permanent, inherited patronyms was, after the administrative simplification of nature (for example, the forest) and space (for example, land tenure), the last step in establishing the necessary preconditions of modern statecraft. In almost every case it was a state project, designed to allow officials to identify, unambiguously, the majority of its citizens. When successful, it went far to create a legible people.[38] Tax and tithe rolls, property rolls, conscription lists, censuses, and property deeds recognized in law were inconceivable without some means of fixing an individual's identity and linking him or her to a kin group. Campaigns to assign permanent patronyms have typically taken place, as one might expect, in the context of a state's exertions to put its fiscal system on a sounder and more lucrative footing. Fearing, with good reason, that an effort to enumerate and register them could be a prelude to some new tax burden or conscription, local officials and the population at large often resisted such campaigns.

If permanent surnames were largely a project of official legibility, then they should have appeared earliest in those societies with precocious states. China provides a striking example.[39] By roughly the fourth century B.C. (although the exact timing and comprehensiveness are in dispute), the Qin dynasty had apparently begun imposing surnames on much of its population and enumerating them for the purposes of taxes, forced labor, and conscription.[40] This initiative may well have been the origin of the term "laobaixing," meaning, literally, "the old one hundred surnames," which in modern China has come to mean "the common people." Before this, the fabled Chinese patrilineage, while established among ruling houses and related lines, was absent among commoners. They did not have surnames, nor did they even imitate elite practices in this respect. The assigning of patronyms by family was integral to state policy promoting the status of (male) family heads, giving them legal jurisdiction over their wives, children, and juniors and, not incidentally, holding them accountable for the fiscal obligations of the entire family.[41] This (Qin) policy required registering the entire population, after which the "hodgepodge of terms by which people were called were all classified as *hsing* [surname], to be passed down to their patrilineal descendants indefinitely."[42] On this account, both the establishment of permanent patronyms and the creation of the patrilineal family itself can be attributed to early state simplification.

Until at least the fourteenth century, the great majority of Europeans did not have permanent patronymics.[43] An individual's name was typically his given name, which might well suffice for local identi-

fication. If something more were required, a second designation could be added, indicating his occupation (in the English case, smith, baker), his geographical location (hill, edgewood), his father's given name, or a personal characteristic (short, strong). These secondary designations were not permanent surnames; they did not survive their bearers, unless by chance, say, a baker's son went into the same trade and was called by the same second designation.

We can learn something about the creation of permanent patronyms in Europe by the documentation left behind from the failed census (*catasto*) of the Florentine state in 1427.[44] The catasto was an audacious attempt to rationalize the state's revenues and military strength by specifying its subjects and their wealth, residences, landholdings, and ages.[45] Close study of these records demonstrates, first, that, as in the Chinese case, state initiative created new surnames rather than simply recording existing surnames. It is thus often impossible to know whether a state-recorded surname has any social existence outside the role of the text in which it is inscribed. Second, the variable imposition of permanent surnames within a territory—in this case Tuscany—serves as a rough-and-ready gauge of state capacity.

Family names in early fifteenth-century Tuscany were confined to a very few powerful, property-owning lineages (such as the Strozzi). For such lineages, a surname was a way of achieving social recognition as a "corporate group," and kin and affines adopted the name as a way of claiming the backing of an influential lineage. Beyond this narrow segment of society and a small urban patriciate that copied its practices, there were no permanent family names.

How, in this case, was the catasto office to pinpoint and register an individual, let alone his location, his property, and his age? When making his declaration, a typical Tuscan provided not only his own given name but those of his father and perhaps his grandfather as well, in quasi-biblical fashion (Luigi, son of Giovanni, son of Paolo). Given the limited number of baptismal names and the tendency of many families to repeat names in alternate generations, even this sequence might not suffice for unambiguous identification. The subject might then add his profession, his nickname, or a personal characteristic. There is no evidence that any of these designations was a permanent patronym, although this exercise and others like it might have eventually served to crystallize surnames, at least for documentary purposes. In the final analysis, the Florentine state was inadequate to the administrative feat intended by the catasto. Popular resistance, the noncompliance of many local elites, and the arduousness and cost of the census exercise doomed the project, and officials returned to the earlier fiscal system.

What evidence we have suggests that second names of any kind became rarer as distance from the state's fiscal reach increased. Whereas one-third of the households in Florence declared a second name, the proportion dropped to one-fifth for secondary towns and to one-tenth in the countryside. It was not until the seventeenth century that family names crystallized in the most remote and poorest areas of Tuscany— the areas that would have had the least contact with officialdom.

A comparable connection between state building and the invention of permanent patronyms exists for fourteenth- and fifteenth-century England. As in Tuscany, in England only wealthy aristocratic families tended to have fixed surnames. In the English case such names referred typically to families' places of origin in Normandy (for example, Baumont, Percy, Disney) or to the places in England that they held in fief from William the Conqueror (for example, Gerard de Sussex). For the rest of the male population, the standard practice of linking only father and son by way of identification prevailed.[46] Thus, William Robertson's male son might be called Thomas Williamson (son of William), while Thomas's son, in turn, might be called Henry Thompson (Thomas's son). Note that the grandson's name, by itself, bore no evidence of his grandfather's identity, complicating the tracing of descent through names alone. A great many northern European surnames, though now permanent, still bear, like a fly caught in amber, particles that echo their antique purpose of designating who a man's father was (Fitz–, O'–, –sen, –son, –s, Mac–, –vich).[47] At the time of their establishment, last names often had a kind of local logic to them: John who owned a mill became John Miller; John who made cart wheels became John Wheelwright; John who was physically small became John Short. As their male descendants, whatever their occupations or stature, retained the patronyms, the names later assumed an arbitrary cast.

The development of the personal surname (literally, a name added to another name, and not to be confused with a permanent patronym) went hand in hand with the development of written, official documents such as tithe records, manorial dues rolls, marriage registers, censuses, tax records, and land records.[48] They were necessary to the successful conduct of any administrative exercise involving large numbers of people who had to be individually identified and who were not known personally by the authorities. Imagine the dilemma of a tithe or capitation-tax collector faced with a male population, 90 percent of whom bore just six Christian names (John, William, Thomas, Robert, Richard, and Henry). Some second designation was absolutely essential for the records, and, if the subject suggested none, it was invented for him by the recording clerk. These second designations and the rolls

of names that they generated were to the legibility of the population what uniform measurement and the cadastral map were to the legibility of real property. While the subject might normally prefer the safety of anonymity, once he was forced to pay the tax, it was then in his interest to be accurately identified in order to avoid paying the same tax twice. Many of these fourteenth-century surnames were clearly nothing more than administrative fictions designed to make a population fiscally legible. Many of the subjects whose "surnames" appear in the documents were probably unaware of what had been written down, and, for the great majority, the surnames had no social existence whatever outside the document.[49] Only on very rare occasions does one encounter an entry, such as "William Carter, tailor," that implies that we may be dealing with a permanent patronym.

The increasing intensity of interaction with the state and statelike structures (large manors, the church) exactly parallels the development of permanent, heritable patronyms. Thus, when Edward I clarified the system of landholding, establishing primogeniture and hereditary copyhold tenure for manorial land, he provided a powerful incentive for the adoption of permanent patronyms. Taking one's father's surname became, for the eldest son at least, part of a claim to the property on the father's death.[50] Now that property claims were subject to state validation, surnames that had once been mere bureaucratic fantasies took on a social reality of their own. One imagines that for a long time English subjects had in effect two names—their local name and an "official," fixed patronym. As the frequency of interaction with impersonal administrative structures increased, the official name came to prevail in all but a man's intimate circle. Those subjects living at a greater distance, both socially and geographically, from the organs of state power, as did the Tuscans, acquired permanent patronyms much later. The upper classes and those living in the south of England thus acquired permanent surnames before the lower classes and those living in the north did. The Scottish and Welsh acquired them even later.[51]

State naming practices, like state mapping practices, were inevitably associated with taxes (labor, military service, grain, revenue,) and hence aroused popular resistance. The great English peasant rising of 1381 (often called the Wat Tyler Rebellion) is attributed to an unprecedented decade of registrations and assessments of poll taxes.[52] For English as well as for Tuscan peasants, a census of all adult males could not but appear ominous, if not ruinous.

The imposition of permanent surnames on colonial populations offers us a chance to observe a process, telescoped into a decade or less,

that in the West might have taken several generations. Many of the same state objectives animate both the European and the colonial exercises, but in the colonial case, the state is at once more bureaucratized and less tolerant of popular resistance. The very brusqueness of colonial naming casts the purposes and paradoxes of the process in sharp relief.

Nowhere is this better illustrated than in the Philippines under the Spanish.[53] Filipinos were instructed by the decree of November 21, 1849, to take on permanent Hispanic surnames. The author of the decree was Governor (and Lieutenant General) Narciso Claveria y Zaldua, a meticulous administrator as determined to rationalize names as he had been determined to rationalize existing law, provincial boundaries, and the calendar.[54] He had observed, as his decree states, that Filipinos generally lacked individual surnames, which might "distinguish them by families," and that their practice of adopting baptismal names drawn from a small group of saints' names resulted in great "confusion." The remedy was the *catalogo*, a compendium not only of personal names but also of nouns and adjectives drawn from flora, fauna, minerals, geography, and the arts and intended to be used by the authorities in assigning permanent, inherited surnames. Each local official was to be given a supply of surnames sufficient for his jurisdiction, "taking care that the distribution be made by letters [of the alphabet]."[55] In practice, each town was given a number of pages from the alphabetized catalogo, producing whole towns with surnames beginning with the same letter. In situations where there has been little in-migration in the past 150 years, the traces of this administrative exercise are still perfectly visible across the landscape: "For example, in the Bikol region, the entire alphabet is laid out like a garland over the provinces of Albay, Sorsogon, and Catanduanes which in 1849 belonged to the single jurisdiction of Albay. Beginning with *A* at the provincial capital, the letters *B* and *C* mark the towns along the coast beyond Tabaco to Tiwi. We return and trace along the coast of Sorsogon the letters *E* to *L;* then starting down the Iraya Valley at Daraga with *M*, we stop with *S* to Polangui and Libon, and finish the alphabet with a quick tour around the island of Catanduanes."[56]

The confusion for which the decree is the antidote is largely that of the administrator and the tax collector. Universal last names, they believe, will facilitate the administration of justice, finance, and public order as well as make it simpler for prospective marriage partners to calculate their degree of consanguinity.[57] For a utilitarian state builder of Claveria's temper, however, the ultimate goal was a complete and legible list of subjects and taxpayers. This is abundantly clear from the

short preamble to the decree: "In view of the extreme usefulness and practicality of this measure, the time has come to issue a directive for the formation of a civil register [formerly a clerical function], which may not only fulfill and ensure the said objectives, but may also serve as a basis for the statistics of the country, guarantee the collection of taxes, the regular performance of personal services, and the receipt of payment for exemptions. It likewise provides exact information of the movement of the population, thus avoiding unauthorized migrations, hiding taxpayers, and other abuses."[58]

Drawing on the accurate lists of citizens throughout the colony, Claveria envisioned each local official constructing a table of eight columns specifying tribute obligations, communal labor obligations, first name, surname, age, marital status, occupation, and exemptions. A ninth column, for updating the register, would record alterations in status and would be submitted for inspection every month. Because of their accuracy and uniformity, these registers would allow the state to compile the precise statistics in Manila that would make for fiscal efficiency. The daunting cost of assigning surnames to the entire population and building a complete and discriminating list of taxpayers was justified by forecasting that the list, while it might cost as much as twenty thousand pesos to create, would yield one hundred thousand or two hundred thousand pesos in continuing annual revenue.

What if the Filipinos chose to ignore their new last names? This possibility had already crossed Claveria's mind, and he took steps to make sure that the names would stick. Schoolteachers were ordered to forbid their students to address or even know one another by any name except the officially inscribed family name. Those teachers who did not apply the rule with enthusiasm were to be punished. More efficacious perhaps, given the minuscule school enrollment, was the proviso that forbade priests and military and civil officials from accepting any document, application, petition, or deed that did not use the official surnames. All documents using other names would be null and void.

Actual practice, as one might expect, fell considerably short of Claveria's administrative utopia of legible and regimented taxpayers. The continued existence of such non-Spanish surnames as Magsaysay or Macapagal suggests that part of the population was never mustered for this exercise. Local officials submitted incomplete returns or none at all. And there was another serious problem, one that Claveria had foreseen but inadequately provided for. The new registers rarely recorded, as they were supposed to, the previous names used by the registrants. This meant that it became exceptionally difficult for officials to trace back property and taxpaying to the period before the

transformation of names. The state had in effect blinded its own hind-sight by the very success of its new scheme.

With surnames, as with forests, land tenure, and legible cities, ac-tual practice never achieved anything like the simplified and uniform perfection to which its designers had aspired. As late as 1872, an at-tempt at taking a census proved a complete fiasco, and it was not tried again until just before the revolution of 1896. Nevertheless, by the twentieth century, the vast majority of Filipinos bore the surnames that Claveria had dreamed up for them. The increasing weight of the state in people's lives and the state's capacity to insist on its rules and its terms ensured that.

Universal last names are a fairly recent historical phenomenon. Tracking property ownership and inheritance, collecting taxes, main-taining court records, performing police work, conscripting soldiers, and controlling epidemics were all made immeasurably easier by the clarity of full names and, increasingly, fixed addresses. While the utili-tarian state was committed to a complete inventory of its population, liberal ideas of citizenship, which implied voting rights and conscrip-tion, also contributed greatly to the standardization of naming prac-tices. The legislative imposition of permanent surnames is particularly clear in the case of Western European Jews who had no tradition of last names. A Napoleonic decree "concernant les Juifs qui n'ont pas de nom de famille et de prénoms fixes," in 1808, mandated last names.[59] Aus-trian legislation of 1787, as part of the emancipation process, required Jews to choose last names or, if they refused, to have fixed last names chosen for them. In Prussia the emancipation of the Jews was contin-gent upon the adoption of surnames.[60] Many of the immigrants to the United States, Jews and non-Jews alike, had no permanent surnames when they set sail. Very few, however, made it through the initial pa-perwork without an official last name that their descendants carry still.

The process of creating fixed last names continues in much of the Third World and on the "tribal frontiers" of more developed coun-tries.[61] Today, of course, there are now many other state-impelled stan-dard designations that have vastly improved the capacity of the state to identify an individual. The creation of birth and death certificates, more specific addresses (that is, more specific than something like "John-on-the-hill"), identity cards, passports, social security numbers, photographs, fingerprints, and, most recently, DNA profiles have super-seded the rather crude instrument of the permanent surname. But the surname was a first and crucial step toward making individual citizens officially legible, and along with the photograph, it is still the first fact on documents of identity.

The Directive for a Standard, Official Language

The great cultural barrier imposed by a separate language is perhaps the most effective guarantee that a social world, easily accessible to insiders, will remain opaque to outsiders.[62] Just as the stranger or state official might need a local guide to find his way around sixteenth-century Bruges, he would need a local interpreter in order to understand and be understood in an unfamiliar linguistic environment. A distinct language, however, is a far more powerful basis for autonomy than a complex residential pattern. It is also the bearer of a distinctive history, a cultural sensibility, a literature, a mythology, a musical past.[63] In this respect, a unique language represents a formidable obstacle to state knowledge, let alone colonization, control, manipulation, instruction, or propaganda.

Of all state simplifications, then, the imposition of a single, official language may be the most powerful, and it is the precondition of many other simplifications. This process should probably be viewed, as Eugen Weber suggests in the case of France, as one of domestic colonization in which various foreign provinces (such as Brittany and Occitanie) are linguistically subdued and culturally incorporated.[64] In the first efforts made to insist on the use of French, it is clear that the state's objective was the legibility of local practice. Officials insisted that every legal document—whether a will, document of sale, loan instrument, contract, annuity, or property deed—be drawn up in French. As long as these documents remained in local vernaculars, they were daunting to an official sent from Paris and virtually impossible to bring into conformity with central schemes of legal and administrative standardization. The campaign of linguistic centralization was assured of some success since it went hand in hand with an expansion of state power. By the late nineteenth century, dealing with the state was unavoidable for all but a small minority of the population. Petitions, court cases, school documents, applications, and correspondence with officials were all of necessity written in French. One can hardly imagine a more effective formula for immediately devaluing local knowledge and privileging all those who had mastered the official linguistic code. It was a gigantic shift in power. Those at the periphery who lacked competence in French were rendered mute and marginal. They were now in need of a local guide to the new state culture, which appeared in the form of lawyers, *notaires*, schoolteachers, clerks, and soldiers.[65]

A cultural project, as one might suspect, lurked behind the linguistic centralization. French was seen as the bearer of a national civiliza-

tion; the purpose of imposing it was not merely to have provincials digest the Code Napoleon but also to bring them Voltaire, Racine, Parisian newspapers, and a national education. As Weber provocatively puts it, "There can be no clearer expression of imperialist sentiment, a white man's burden of Francophony, whose first conquests were to be right at home."[66] Where the command of Latin had once defined participation in a wider culture for a small elite, the command of standard French now defined full participation in French culture. The implicit logic of the move was to define a hierarchy of cultures, relegating local languages and their regional cultures to, at best, a quaint provincialism. At the apex of this implicit pyramid was Paris and its institutions: ministries, schools, academies (including the guardian of the language, l'Académie Française). The relative success of this cultural project hinged on both coercion and inducements. "It was centralization," says Alexandre Sanguinetti, "which permitted the making of France despite the French, or in the midst of their indifference. . . . France is a deliberate political construction for whose creation the central power has never ceased to fight."[67] Standard (Parisian) French and Paris were not only focal points of power; they were also magnets. The growth of markets, physical mobility, new careers, political patronage, public service, and a national educational system all meant that facility in French and connections to Paris were the paths of social advancement and material success. It was a state simplification that promised to reward those who complied with its logic and to penalize those who ignored it.

The Centralization of Traffic Patterns

The linguistic centralization impelled by the imposition of Parisian French as the official standard was replicated in a centralization of traffic. Just as the new dispensation in language made Paris the hub of communication, so the new road and rail systems increasingly favored movement to and from Paris over interregional or local traffic. State policy resembled, in computer parlance, a "hardwiring" pattern that made the provinces far more accessible, far more legible, to central authorities than even the absolutist kings had imagined.

Let us contrast, in an overly schematic way, a relatively uncentralized network of communication, on one hand, with a relatively centralized network, on the other. If mapped, the uncentralized pattern would be the physical image of the actual movements of goods and people along routes *not* created by administrative fiat. Such movements would not be random; they would reflect both the ease of travel
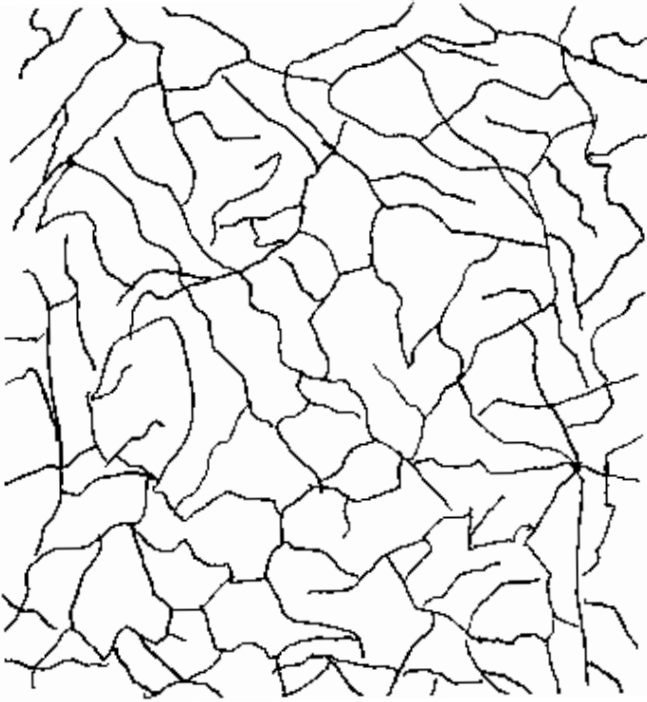
11. Paths created by use and topography

along valleys, by watercourses, and around defiles and also the loca-
tion of important resources and ritual sites. Weber captures the wealth
of human activities that animate these movements across the land-
scape: "They served professional pursuits, like the special trails fol-
lowed by glassmakers, carriers or sellers of salt, potters, or those that
led to forges, mines, quarries, and hemp fields, or those along which
flax, hemp, linen, and yarn were taken to market. There were pilgrim-
age routes and procession trails."[68]

If we can imagine, for the sake of argument, a place where physical
resources are evenly distributed and there are no great physical barri-
ers to movement (such as mountains or swamps), then a map of paths
in use might form a network resembling a dense concentration of cap-
illaries (figure 11). The tracings would, of course, never be entirely
random. Market towns based on location and resources would consti-
tute small hubs, as would religious shrines, quarries, mines, and other
important sites.[69] In the French case as well, the network of roads
would have long reflected the centralizing ambitions of local lords and
the nation's monarchs. The point of this illustrative idealization, how-
ever, is to depict a landscape of communication routes that is only
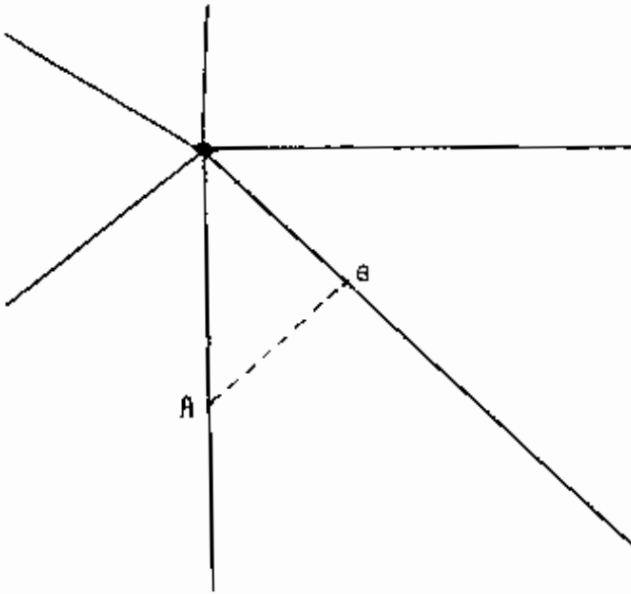
12. Centralized traffic hub

lightly marked by state centralization. It would resemble in many ways the cityscape of late fourteenth-century Bruges, shown earlier.

Beginning with Colbert, the state-building modernizers of France were bent on superimposing on this pattern a carefully planned grid of administrative centralization.[70] Their scheme, never entirely realized, was to align highways, canals, and ultimately rail lines to radiate out from Paris like the spokes of a wheel (figure 12). The similarity between this grid and the *tire-aire* of the well-managed state forest as conceived by Colbert was not accidental. They were both devised to maximize access and to facilitate central control. And the kind of simplification involved was, again, entirely relative to location. For an official at the hub, it was now much easier to go to A or to B along the new routes. The layout was designed "to serve the government and the cities and lacking a network of supporting thoroughfares had little to do with popular habit or need. Administrative highways, a historian of the center called them, [were] made for troops to march on and for tax revenues to reach the treasury."[71] For anyone wanting to travel or move goods between A and B, however, things were not so simple. Just as all documents had to "pass through" the official legal language, so too did much of the commercial traffic have to pass through the capital.

The driving intellectual force behind this *esprit géométrique* was, and has remained, the renowned engineers of the Corps des Ponts et

Chaussées.[72] Victor Legrand, the director of Ponts et des Chaussées, was the originator of the *belle idée* of seven grand lines of junction linking Paris to points from the Atlantic to the Mediterranean. His plan became known as the Legrand Star and was proposed first for canals and then, with greater effect, for railroads (among them the Gare du Nord and Gare de l'Est).[73]

As a centralizing aesthetic, the plan defied the canons of commercial logic or cost-effectiveness. The first phase of the grid, the line from Paris east to Strasbourg and the frontier, ran straight through the plateau of Brie rather than following the centers of population along the Marne. By refusing to conform to the topography in its quest of geometric perfection, the railway line was ruinously expensive compared to English or German railroads. The army had also adopted the Ponts et Chaussées logic, believing that direct rail lines to the borders would be militarily advantageous. They were proven tragically wrong in the Franco-Prussian War of 1870–71.[74]

This retrofitting of traffic patterns had enormous consequences, most of which were intended: linking provincial France and provincial French citizens to Paris and to the state and facilitating the deployment of troops from the capital to put down civil unrest in any department in the nation. It was aimed at achieving, for the military control of the nation, what Haussmann had achieved in the capital itself. It thus empowered Paris and the state at the expense of the provinces, greatly affected the economics of location, expedited central fiscal and military control, and severed or weakened lateral cultural and economic ties by favoring hierarchical links. At a stroke, it marginalized outlying areas in the way that official French had marginalized local dialects.

Conclusion

Officials of the modern state are, of necessity, at least one step—and often several steps—removed from the society they are charged with governing. They assess the life of their society by a series of typifications that are always some distance from the full reality these abstractions are meant to capture. Thus the foresters' charts and tables, despite their synoptic power to distill many individual facts into a larger pattern, do not quite capture (nor are they meant to) the real forest in its full diversity. Thus the cadastral survey and the title deed are a rough, often misleading representation of actual, existing rights to land use and disposal. The functionary of any large organization "sees" the human activity that is of interest to him largely through the simplified approximations of documents and statistics: tax proceeds, lists

of taxpayers, land records, average incomes, unemployment numbers, mortality rates, trade and productivity figures, the total number of cases of cholera in a certain district.

These typifications are indispensable to statecraft. State simplifications such as maps, censuses, cadastral lists, and standard units of measurement represent techniques for grasping a large and complex reality; in order for officials to be able to comprehend aspects of the ensemble, that complex reality must be reduced to schematic categories. The only way to accomplish this is to reduce an infinite array of detail to a set of categories that will facilitate summary descriptions, comparisons, and aggregation. The invention, elaboration, and deployment of these abstractions represent, as Charles Tilly has shown, an enormous leap in state capacity—a move from tribute and indirect rule to taxation and direct rule. Indirect rule required only a minimal state apparatus but rested on local elites and communities who had an interest in withholding resources and knowledge from the center. Direct rule sparked widespread resistance and necessitated negotiations that often limited the center's power, but for the first time, it allowed state officials direct knowledge of and access to a previously opaque society.

Such is the power of the most advanced techniques of direct rule, that it discovers new social truths as well as merely summarizing known facts. The Center for Disease Control in Atlanta is a striking case in point. Its network of sample hospitals allowed it to first "discover"—in the epidemiological sense—such hitherto unknown diseases as toxic shock syndrome, Legionnaires' disease, and AIDS. Stylized facts of this kind are a powerful form of state knowledge, making it possible for officials to intervene early in epidemics, to understand economic trends that greatly affect public welfare, to gauge whether their policies are having the desired effect, and to make policy with many of the crucial facts at hand.[75] These facts permit discriminating interventions, some of which are literally lifesaving.

The techniques devised to enhance the legibility of a society to its rulers have become vastly more sophisticated, but the political motives driving them have changed little. Appropriation, control, and manipulation (in the nonpejorative sense) remain the most prominent. If we imagine a state that has no reliable means of enumerating and locating its population, gauging its wealth, and mapping its land, resources, and settlements, we are imagining a state whose interventions in that society are necessarily crude. A society that is relatively opaque to the state is thereby insulated from some forms of finely tuned state interventions, both welcomed (universal vaccinations) and resented (per-

sonal income taxes). The interventions it does experience will typically be mediated by local trackers who know the society from inside and who are likely to interpose their own particular interests. Without this mediation—and often with it—state action is likely to be inept, greatly overshooting or undershooting its objective.

An illegible society, then, is a hindrance to any effective intervention by the state, whether the purpose of that intervention is plunder or public welfare. As long as the state's interest is largely confined to grabbing a few tons of grain and rounding up a few conscripts, the state's ignorance may not be fatal. When, however, the state's objective requires changing the daily habits (hygiene or health practices) or work performance (quality labor or machine maintenance) of its citizens, such ignorance can well be disabling. A thoroughly legible society eliminates local monopolies of information and creates a kind of national transparency through the uniformity of codes, identities, statistics, regulations, and measures. At the same time it is likely to create new positional advantages for those at the apex who have the knowledge and access to easily decipher the new state-created format.

The discriminating interventions that a legible society makes possible can, of course, be deadly as well. A sobering instance is wordlessly recalled by a map produced by the City Office of Statistics of Amsterdam, then under Nazi occupation, in May 1941 (figure 13).[76] Along with lists of residents, the map was the synoptic representation that guided the rounding up of the city's Jewish population, sixty-five thousand of whom were eventually deported.

The map is titled "The Distribution of Jews in the Municipality." Each dot represents ten Jews, a scheme that makes the heavily Jewish districts readily apparent. The map was compiled from information obtained not only through the order for people of Jewish extraction to register themselves but also through the population registry ("exceptionally comprehensive in the Netherlands")[77] and the business registry. If one reflects briefly on the kind of detailed information on names, addresses, and ethnic backgrounds (determined perhaps by names in the population registry or by declaration) and the cartographic exactitude required to produce this statistical representation, the contribution of legibility to state capacity is evident. The Nazi authorities, of course, supplied the murderous purpose behind the exercise, but the legibility provided by the Dutch authorities supplied the means to its efficient implementation.[78] That legibility, I should emphasize, merely amplifies the capacity of the state for discriminating interventions—a capacity that in principle could as easily have been deployed to feed the Jews as to deport them.
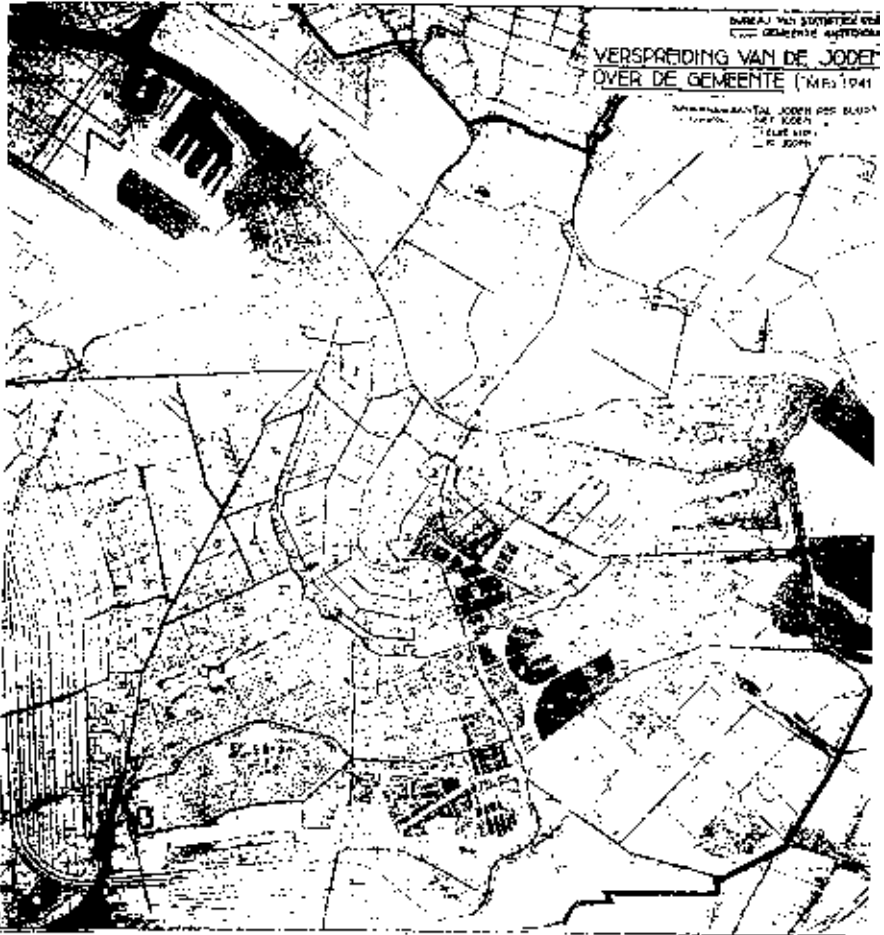
13. Map produced by the City Office of Statistics of Amsterdam and entitled "The Distribution of Jews in the Municipality (May 1941)"

Legibility implies a viewer whose place is central and whose vision is synoptic. State simplifications of the kind we have examined are designed to provide authorities with a schematic view of their society, a view not afforded to those without authority. Rather like U.S. highway patrolmen wearing mirrored sunglasses, the authorities enjoy a quasi-monopolistic picture of selected aspects of the whole society. This privileged vantage point is typical of all institutional settings where command and control of complex human activities is paramount. The monastery, the barracks, the factory floor, and the administrative bureaucracy (private or public) exercise many statelike functions and often mimic its information structure as well.

State simplifications can be considered part of an ongoing "project of legibility," a project that is never fully realized. The data from which such simplifications arise are, to varying degrees, riddled with inaccuracies, omissions, faulty aggregations, fraud, negligence, political distortion, and so on. A project of legibility is immanent in any statecraft that aims at manipulating society, but it is undermined by intrastate rivalries, technical obstacles, and, above all, the resistance of its subjects.

State simplifications have at least five characteristics that deserve emphasis. Most obviously, state simplifications are observations of only those aspects of social life that are of official interest. They are *interested*, utilitarian facts. Second, they are also nearly always written (verbal or numerical) *documentary* facts. Third, they are typically *static* facts.[79] Fourth, most stylized state facts are also *aggregate* facts. Aggregate facts may be impersonal (the density of transportation networks) or simply a collection of facts about individuals (employment rates, literacy rates, residence patterns). Finally, for most purposes, state officials need to group citizens in ways that permit them to make a collective assessment. Facts that can be aggregated and presented as averages or distributions must therefore be *standardized* facts. However unique the actual circumstances of the various individuals who make up the aggregate, it is their sameness or, more precisely, their differences along a standardized scale or continuum that are of interest.

The process by which standardized facts susceptible to aggregation are manufactured seems to require at least three steps. The first, indispensable step is the creation of common units of measurement or coding. Size classes of trees, freehold tenure, the metric system for measuring landed property or the volume of grain, uniform naming practices, sections of prairie land, and urban lots of standard sizes are among the units created for this purpose. In the next step, each item or instance falling within a category is counted and classified according to the new unit of assessment. A particular tree reappears as an instance of a certain size class of tree; a particular plot of agricultural land reappears as coordinates in a cadastral map; a particular job reappears as an instance of a category of employment; a particular person reappears bearing a name according to the new formula. Each fact must be recuperated and brought back on stage, as it were, dressed in a new uniform of official weave—as part of "a series in a total classificatory grid."[80] Only in such garb can these facts play a role in the culmination of the process: the creation of wholly new facts by aggregation, following the logic of the new units. One arrives, finally, at synoptic facts that are useful to officials: so many thousands of trees in a given size class, so many

thousands of men between the ages of eighteen and thirty-five, so many farms in a given size class, so many students whose surnames begin with the letter A, so many people with tuberculosis. Combining several metrics of aggregation, one arrives at quite subtle, complex, heretofore unknown truths, including, for example, the distribution of tubercular patients by income and urban location.

To call such elaborate artifacts of knowledge "state simplifications" risks being misleading. They are anything but simple-minded, and they are often wielded with great sophistication by officials. Rather, the term "simplification" is meant in two quite specific senses. First, the knowledge that an official needs must give him or her a synoptic view of the ensemble; it must be cast in terms that are replicable across many cases. In this respect, such facts must lose their particularity and reappear in schematic or simplified form as a member of a class of facts.[81] Second, in a meaning closely related to the first, the grouping of synoptic facts necessarily entails collapsing or ignoring distinctions that might otherwise be relevant.

Take, for example, simplifications about employment. The working lives of many people are exceptionally complex and may change from day to day. For the purposes of official statistics, however, being "gainfully employed" is a stylized fact; one is or is not gainfully employed. Also, available characterizations of many rather exotic working lives are sharply restricted by the categories used in the aggregate statistics.[82] Those who gather and interpret such aggregate data understand that there is a certain fictional and arbitrary quality to their categories and that they hide a wealth of problematic variation. Once set, however, these thin categories operate unavoidably as if all similarly classified cases were in fact homogeneous and uniform. All Normalbäume in a given size range are the same; all soil in a defined soil class is statistically identical; all autoworkers (if we are classifying by industry) are alike; all Catholics (if we are classifying by religious faith) are alike. There is, as Theodore Porter notes in his study of mechanical objectivity, a "strong incentive to prefer precise and standardizable measures to highly accurate ones," since accuracy is meaningless if the identical procedure cannot reliably be performed elsewhere.[83]

To this point, I have been making a rather straightforward, even banal point about the simplification, abstraction, and standardization that are necessary for state officials' observations of the circumstances of some or all of the population. But I want to make a further claim, one analogous to that made for scientific forestry: the modern state, through its officials, attempts with varying success to create a terrain and a population with precisely those standardized characteristics that

will be easiest to monitor, count, assess, and manage. The utopian, immanent, and continually frustrated goal of the modern state is to reduce the chaotic, disorderly, constantly changing social reality beneath it to something more closely resembling the administrative grid of its observations. Much of the statecraft of the late eighteenth and nineteenth centuries was devoted to this project. "In the period of movement from tribute to tax, from indirect rule to direct rule, from subordination to assimilation," Tilly remarks, "states generally worked to homogenize their populations and break down their segmentation by imposing common languages, religions, currencies, and legal systems, as well as promoting the construction of connected systems of trade, transportation, and communication."[84]

As the scientific forester may dream of a perfectly legible forest planted with same-aged, single-species, uniform trees growing in straight lines in a rectangular flat space cleared of all underbrush and poachers,[85] so the exacting state official may aspire to a perfectly legible population with registered, unique names and addresses keyed to grid settlements; who pursue single, identifiable occupations; and all of whose transactions are documented according to the designated formula and in the official language. This caricature of society as a military parade ground is overdrawn, but the grain of truth that it embodies may help us understand the grandiose plans we will examine later.[86] The aspiration to such uniformity and order alerts us to the fact that modern statecraft is largely a project of internal colonization, often glossed, as it is in imperial rhetoric, as a "civilizing mission." The builders of the modern nation-state do not merely describe, observe, and map; they strive to shape a people and landscape that will fit their techniques of observation.[87]

This tendency is perhaps one shared by many large hierarchical organizations. As Donald Chisholm, in reviewing the literature on administrative coordination, concludes, "central coordinating schemes do work effectively under conditions where the task environment is known and unchanging, where it can be treated as a closed system."[88] The more static, standardized, and uniform a population or social space is, the more legible it is, and the more amenable it is to the techniques of state officials. I am suggesting that many state activities aim at transforming the population, space, and nature under their jurisdiction into the closed systems that offer no surprises and that can best be observed and controlled.

State officials can often make their categories stick and impose their simplifications, because the state, of all institutions, is best equipped to insist on treating people according to its schemata. Thus categories

that may have begun as the artificial inventions of cadastral surveyors, census takers, judges, or police officers can end by becoming categories that organize people's daily experience precisely because they are embedded in state-created institutions that structure that experience.[89] The economic plan, survey map, record of ownership, forest management plan, classification of ethnicity, passbook, arrest record, and map of political boundaries acquire their force from the fact that these synoptic data are the points of departure for reality as state officials apprehend and shape it. In dictatorial settings where there is no effective way to assert another reality, fictitious facts-on-paper can often be made eventually to prevail on the ground, because it is on behalf of such pieces of paper that police and army are deployed.

These paper records are the operative facts in a court of law, in an administrative dossier, and before most functionaries. In this sense, there are virtually no other facts for the state than those that are contained in documents standardized for that purpose. An error in such a document can have far more power—and for far longer—than can an unreported truth. If, for example, you want to defend your claim to real property, you are normally obliged to defend it with a document called a property deed, and to do so in the courts and tribunals created for that purpose. If you wish to have any standing in law, you must have a document that officials accept as evidence of citizenship, be that document a birth certificate, passport, or identity card. The categories used by state agents are not merely means to make their environment legible; they are an authoritative tune to which most of the population must dance.

Part 2

Transforming Visions

3 Authoritarian High Modernism

Then, as this morning on the dock, again I saw, as if for the first time in my life, the impeccably straight streets, the glistening glass of the pavement, the divine parallelepipeds of the transparent dwellings, the square harmony of the grayish blue rows of Numbers. And it seemed to me that not past generations, but I myself, had won a victory over the old god and the old life.
—Eugene Zamiatin, *We*

Modern science, which displaced and replaced God, removed that obstacle [limits on freedom]. It also created a vacancy: the office of the supreme legislator-cum-manager, of the designer and administrator of the world order, was now horrifyingly empty. It had to be filled or else. . . . The emptiness of the throne was throughout the modern era a standing and tempting invitation to visionaries and adventurers. The dream of an all-embracing order and harmony remained as vivid as ever, and it seemed now closer than ever, more than ever within human reach. It was now up to mortal earthlings to bring it about and to secure its ascendancy.
—Zygmunt Bauman, *Modernity and the Holocaust*

All the state simplifications that we have examined have the character of maps. That is, they are designed to summarize precisely those aspects of a complex world that are of immediate interest to the mapmaker and to ignore the rest. To complain that a map lacks nuance and detail makes no sense unless it omits information necessary to its function. A city map that aspired to represent every traffic light, every pothole, every building, and every bush and tree in every park would threaten to become as large and as complex as the city that it depicted.[1] And it certainly would defeat the purpose of mapping, which is to abstract and summarize. A map is an instrument designed for a purpose. We may judge that purpose noble or morally offensive, but the map itself either serves or fails to serve its intended use.

In case after case, however, we have remarked on the apparent power of maps to transform as well as merely to summarize the facts that they portray. This transformative power resides not in the map, of course, but rather in the power possessed by those who deploy the perspective of that particular map.[2] A private corporation aiming to maximize sustainable timber yields, profit, or production will map its world according to this logic and will use what power it has to ensure that the logic of its map prevails. The state has no monopoly on utilitarian simplifications. What the state does at least aspire to, though, is

a monopoly on the legitimate use of force. That is surely why, from the seventeenth century until now, the most transformative maps have been those invented and applied by the most powerful institution in society: the state.

Until recently, the ability of the state to impose its schemes on society was limited by the state's modest ambitions and its limited capacity. Although utopian aspirations to a finely tuned social control can be traced back to Enlightenment thought and to monastic and military practices, the eighteenth-century European state was still largely a machine for extraction. It is true that state officials, particularly under absolutism, had mapped much more of their kingdoms' populations, land tenures, production, and trade than their predecessors had and that they had become increasingly efficient in pumping revenue, grain, and conscripts from the countryside. But there was more than a little irony in their claim to absolute rule. They lacked the consistent coercive power, the fine-grained administrative grid, or the detailed knowledge that would have permitted them to undertake more intrusive experiments in social engineering. To give their growing ambitions full rein, they required a far greater hubris, a state machinery that was equal to the task, and a society they could master. By the mid–nineteenth century in the West and by the early twentieth century elsewhere, these conditions were being met.

I believe that many of the most tragic episodes of state development in the late nineteenth and twentieth centuries originate in a particularly pernicious combination of three elements. The first is the aspiration to the administrative ordering of nature and society, an aspiration that we have already seen at work in scientific forestry, but one raised to a far more comprehensive and ambitious level. "High modernism" seems an appropriate term for this aspiration.[3] As a faith, it was shared by many across a wide spectrum of political ideologies. Its main carriers and exponents were the avant-garde among engineers, planners, technocrats, high-level administrators, architects, scientists, and visionaries. If one were to imagine a pantheon or Hall of Fame of high-modernist figures, it would almost certainly include such names as Henri Comte de Saint-Simon, Le Corbusier, Walther Rathenau, Robert McNamara, Robert Moses, Jean Monnet, the Shah of Iran, David Lilienthal, Vladimir I. Lenin, Leon Trotsky, and Julius Nyerere.[4] They envisioned a sweeping, rational engineering of all aspects of social life in order to improve the human condition. As a conviction, high modernism was not the exclusive property of any political tendency; it had both right- and left-wing variants, as we shall see. The second element is the unrestrained use of the power of the modern state as an instru-

ment for achieving these designs. The third element is a weakened or prostrate civil society that lacks the capacity to resist these plans. The ideology of high modernism provides, as it were, the desire; the modern state provides the means of acting on that desire; and the incapacitated civil society provides the leveled terrain on which to build (dis)utopias.

We shall return shortly to the premises of high modernism. But here it is important to note that many of the great state-sponsored calamities of the twentieth century have been the work of rulers with grandiose and utopian plans for their society. One can identify a high-modernist utopianism of the right, of which Nazism is surely the diagnostic example.[5] The massive social engineering under apartheid in South Africa, the modernization plans of the Shah of Iran, villagization in Vietnam, and huge late-colonial development schemes (for example, the Gezira scheme in the Sudan) could be considered under this rubric.[6] And yet there is no denying that much of the massive, state-enforced social engineering of the twentieth century has been the work of progressive, often revolutionary elites. Why?

The answer, I believe, lies in the fact that it is typically progressives who have come to power with a comprehensive critique of existing society and a popular mandate (at least initially) to transform it. These progressives have wanted to use that power to bring about enormous changes in people's habits, work, living patterns, moral conduct, and worldview.[7] They have deployed what Václav Havel has called "the armory of holistic social engineering."[8] Utopian aspirations per se are not dangerous. As Oscar Wilde remarked, "A map of the world which does not include Utopia is not worth even glancing at, for it leaves out the one country at which Humanity is always landing."[9] Where the utopian vision goes wrong is when it is held by ruling elites with no commitment to democracy or civil rights and who are therefore likely to use unbridled state power for its achievement. Where it goes brutally wrong is when the society subjected to such utopian experiments lacks the capacity to mount a determined resistance.

What is high modernism, then? It is best conceived as a strong (one might even say muscle-bound) version of the beliefs in scientific and technical progress that were associated with industrialization in Western Europe and in North America from roughly 1830 until World War I. At its center was a supreme self-confidence about continued linear progress, the development of scientific and technical knowledge, the expansion of production, the rational design of social order, the growing satisfaction of human needs, and, not least, an increasing control over nature (including human nature) commensurate with scientific

understanding of natural laws.[10] *High* modernism is thus a particularly sweeping vision of how the benefits of technical and scientific progress might be applied—usually through the state—in every field of human activity.[11] If, as we have seen, the simplified, utilitarian *descriptions* of state officials had a tendency, through the exercise of state power, to bring the facts into line with their representations, then one might say that the high-modern state began with extensive *prescriptions* for a new society, and it intended to impose them.

It would have been hard not to have been a modernist of some stripe at the end of the nineteenth century in the West. How could one fail to be impressed—even awed—by the vast transformation wrought by science and industry?[12] Anyone who was, say, sixty years old in Manchester, England, would have witnessed in his or her lifetime a revolution in the manufacturing of cotton and wool textiles, the growth of the factory system, the application of steam power and other astounding new mechanical devices to production, remarkable break-throughs in metallurgy and transportation (especially railroads), and the appearance of cheap mass-produced commodities. Given the stun-ning advances in chemistry, physics, medicine, math, and engineering, anyone even slightly attentive to the world of science would have al-most come to expect a continuing stream of new marvels (such as the internal combustion engine and electricity). The unprecedented trans-formations of the nineteenth century may have impoverished and mar-ginalized many, but even the victims recognized that something revo-lutionary was afoot. All this sounds rather naive today, when we are far more sober about the limits and costs of technological progress and have acquired a postmodern skepticism about any totalizing dis-course. Still, this new sensibility ignores both the degree to which modernist assumptions prevail in our lives and, especially, the great enthusiasm and revolutionary hubris that were part and parcel of high modernism.

The Discovery of Society

The path from description to prescription was not so much an inadver-tent result of a deep psychological tendency as a deliberate move. The point of the Enlightenment view of legal codes was less to mirror the distinctive customs and practices of a people than to create a cultural community by codifying and generalizing the most rational of those customs and suppressing the more obscure and barbaric ones.[13] Estab-lishing uniform standards of weight and measurement across a king-dom had a greater purpose than just making trade easier; the new

standards were intended both to express and to promote a new cultural unity. Well before the tools existed to make good on this cultural revolution, Enlightenment thinkers such as Condorcet were looking ahead to the day when the tools would be in place. He wrote in 1782: "Those sciences, created almost in our own days, the object of which is man himself, the direct goal of which is the happiness of man, will enjoy a progress no less sure than that of the physical sciences, and this idea so sweet, that our descendants will surpass us in wisdom as in enlightenment, is no longer an illusion. In meditating on the nature of the moral sciences, one cannot help seeing that, as they are based like physical sciences on the observation of fact, they must follow the same method, acquire a language equally exact and precise, attaining the same degree of certainty."[14] The gleam in Condorcet's eye became, by the mid–nineteenth century, an active utopian project. Simplification and rationalization previously applied to forests, weights and measures, taxation, and factories were now applied to the design of society as a whole.[15] Industrial-strength social engineering was born. While factories and forests might be planned by private entrepreneurs, the ambition of engineering whole societies was almost exclusively a project of the nation-state.

This new conception of the state's role represented a fundamental transformation. Before then, the state's activities had been largely confined to those that contributed to the wealth and power of the sovereign, as the example of scientific forestry and cameral science illustrated. The idea that one of the central purposes of the state was the improvement of all the members of society—their health, skills and education, longevity, productivity, morals, and family life—was quite novel.[16] There was, of course, a direct connection between the old conception of the state and this new one. A state that improved its population's skills, vigor, civic morals, and work habits would increase its tax base and field better armies; it was a policy that any enlightened sovereign might pursue. And yet, in the nineteenth century, the welfare of the population came increasingly to be seen, not merely as a means to national strength, but as an end in itself.

One essential precondition of this transformation was the discovery of society as a reified object that was separate from the state and that could be scientifically described. In this respect, the production of statistical knowledge about the population—its age profiles, occupations, fertility, literacy, property ownership, law-abidingness (as demonstrated by crime statistics)—allowed state officials to characterize the population in elaborate new ways, much as scientific forestry permitted the forester to carefully describe the forest. Ian Hack-

ing explains how a suicide or homicide rate, for example, came to be seen as a characteristic of a people, so that one could speak of a "budget" of homicides that would be "spent" each year, like routine debits from an account, although the particular murderers and their victims were unknown.[17] Statistical facts were elaborated into social laws. It was but a small step from a simplified description of society to a design and manipulation of society, with its improvement in mind. If one could reshape nature to design a more suitable forest, why not reshape society to create a more suitable population?

The scope of intervention was potentially endless. Society became an object that the state might manage and transform with a view toward perfecting it. A progressive nation-state would set about engineering its society according to the most advanced technical standards of the new moral sciences. The existing social order, which had been more or less taken by earlier states as a given, reproducing itself under the watchful eye of the state, was for the first time the subject of active management. It was possible to conceive of an artificial, engineered society designed, not by custom and historical accident, but according to conscious, rational, scientific criteria. Every nook and cranny of the social order might be improved upon: personal hygiene, diet, child rearing, housing, posture, recreation, family structure, and, most infamously, the genetic inheritance of the population.[18] The working poor were often the first subjects of scientific social planning.[19] Schemes for improving their daily lives were promulgated by progressive urban and public-health policies and instituted in model factory towns and newly founded welfare agencies. Subpopulations found wanting in ways that were potentially threatening — such as indigents, vagabonds, the mentally ill, and criminals — might be made the objects of the most intensive social engineering.[20]

The metaphor of gardening, Zygmunt Bauman suggests, captures much of this new spirit. The gardener — perhaps a landscape architect specializing in formal gardens is the most appropriate parallel — takes a natural site and creates an entirely designed space of botanical order. Although the organic character of the flora limits what can be achieved, the gardener has enormous discretion in the overall arrangement and in training, pruning, planting, and weeding out selected plants. As an untended forest is to a long-managed scientific forest, so untended nature is to the garden. The garden is one of man's attempts to impose his own principles of order, utility, and beauty on nature.[21] What grows in the garden is always a small, consciously selected sample of what *might* be grown there. Similarly, social engineers consciously set out to design and maintain a more perfect social order. An Enlightenment belief in

the self-improvement of man became, by degrees, a belief in the per-
fectibility of social order.

One of the great paradoxes of social engineering is that it seems at
odds with the experience of modernity generally. Trying to jell a social
world, the most striking characteristic of which appears to be flux,
seems rather like trying to manage a whirlwind. Marx was hardly
alone in claiming that the "constant revolutionizing of production, un-
interrupted disturbance of all social relations, everlasting uncertainty
and agitation, distinguish the bourgeois epoch from all earlier times."[22]
The experience of modernity (in literature, art, industry, transporta-
tion, and popular culture) was, above all, the experience of disorient-
ing speed, movement, and change, which self-proclaimed modernists
found exhilarating and liberating.[23] Perhaps the most charitable way of
resolving this paradox is to imagine that what these designers of so-
ciety had in mind was roughly what designers of locomotives had in
mind with "streamlining." Rather than arresting social change, they
hoped to design a shape to social life that would minimize the friction
of progress. The difficulty with this resolution is that state social engi-
neering was inherently authoritarian. In place of multiple sources of
invention and change, there was a single planning authority; in place
of the plasticity and autonomy of existing social life, there was a fixed
social order in which positions were designated. The tendency toward
various forms of "social taxidermy" was unavoidable.

The Radical Authority of High Modernism

> The real thing is that this time we're going to get science applied to social
> problems and backed by the whole force of the state, just as war has been
> backed by the whole force of the state in the past.
> —C. S. Lewis, *That Hideous Strength*

The troubling features of high modernism derive, for the most part,
from its claim to speak about the improvement of the human condition
with the authority of scientific knowledge and its tendency to disallow
other competing sources of judgment.

First and foremost, high modernism implies a truly radical break
with history and tradition. Insofar as rational thought and scientific
laws could provide a single answer to every empirical question, noth-
ing ought to be taken for granted. All human habits and practices that
were inherited and hence not based on scientific reasoning—from the
structure of the family and patterns of residence to moral values and
forms of production—would have to be reexamined and redesigned.
The structures of the past were typically the products of myth, super-

stition, and religious prejudice. It followed that scientifically designed schemes for production and social life would be superior to received tradition.

The sources of this view are deeply authoritarian. If a planned social order is better than the accidental, irrational deposit of historical practice, two conclusions follow. Only those who have the scientific knowledge to discern and create this superior social order are fit to rule in the new age. Further, those who through retrograde ignorance refuse to yield to the scientific plan need to be educated to its benefits or else swept aside. Strong versions of high modernism, such as those held by Lenin and Le Corbusier, cultivated an Olympian ruthlessness toward the subjects of their interventions. At its most radical, high modernism imagined wiping the slate utterly clean and beginning from zero.[24]

High-modernist ideology thus tends to devalue or banish politics. Political interests can only frustrate the social solutions devised by specialists with scientific tools adequate to their analysis. As individuals, high modernists might well hold democratic views about popular sovereignty or classical liberal views about the inviolability of a private sphere that restrained them, but such convictions are external to, and often at war with, their high-modernist convictions.

Although high modernists came to imagine the refashioning of social habits and of human nature itself, they began with a nearly limitless ambition to transform nature to suit man's purposes — an ambition that remained central to their faith. How completely the utopian possibilities gripped intellectuals of almost every political persuasion is captured in the paean to technical progress of the *Communist Manifesto*, where Marx and Engels write of the "subjection of nature's forces to man, machinery, and the application of chemistry to agriculture and industry, steam navigation, railways, electric telegraphs, clearing of whole continents for cultivation, canalization of rivers, whole populations conjured out of the ground."[25] In fact, this promise, made plausible by capitalist development, was for Marx the point of departure for socialism, which would place the fruits of capitalism at the service of the working class for the first time. The intellectual air in the late nineteenth century was filled with proposals for such vast engineering projects as the Suez Canal, which was completed in 1869 with enormous consequences for trade between Asia and Europe. The pages of *Le globe*, the organ of utopian socialists of Saint-Simon's persuasion, featured an endless stream of discussions about massive projects: the construction of Panama Canal, the development of the United States, far-reaching schemes for energy and transportation. This belief that it

was man's destiny to tame nature to suit his interests and preserve his safety is perhaps the keystone of high modernism, partly because the success of so many grand ventures was already manifest.[26]

Once again the authoritarian and statist implications of this vision are clear. The very scale of such projects meant that, with few exceptions (such as the early canals), they demanded large infusions of monies raised through taxes or credit. Even if one could imagine them being financed privately in a capitalist economy, they typically required a vast public authority empowered to condemn private property, relocate people against their will, guarantee the loans or bonds required, and coordinate the work of the many state agencies involved. In a statist society, be it Louis Napoleon's France or Lenin's Soviet Union, such power was already built into the political system. In a nonstatist society, such tasks have required new public authorities or "super-agencies" having quasi-governmental powers for sending men to the moon or for constructing dams, irrigation works, highways, and public transportation systems.

The temporal emphasis of high modernism is almost exclusively on the future. Although any ideology with a large altar dedicated to progress is bound to privilege the future, high modernism carries this to great lengths. The past is an impediment, a history that must be transcended; the present is the platform for launching plans for a better future. A key characteristic of discourses of high modernism and of the public pronouncements of those states that have embraced it is a heavy reliance on visual images of heroic progress toward a totally transformed future.[27] The strategic choice of the future is freighted with consequences. To the degree that the future is known and achievable— a belief that the faith in progress encourages—the less future benefits are discounted for uncertainty. The practical effect is to convince most high modernists that the certainty of a better future justifies the many short-term sacrifices required to get there.[28] The ubiquity of five-year plans in socialist states is an example of that conviction. Progress is objectified by a series of preconceived goals—largely material and quantifiable—which are to be achieved through savings, labor, and investments in the interim. There may, of course, be no alternative to planning, especially when the urgency of a single goal, such as winning a war, seems to require the subordination of every other goal. The immanent logic of such an exercise, however, implies a degree of certainty about the future, about means-ends calculations, and about the meaning of human welfare that is truly heroic. That such plans have often had to be adjusted or abandoned is an indication of just how heroic are the assumptions behind them.

In this reading, high modernism ought to appeal greatly to the classes and strata who have most to gain—in status, power, and wealth—from its worldview. And indeed it is the ideology par excellence of the bureaucratic intelligentsia, technicians, planners, and engineers.[29] The position accorded to them is not just one of rule and privilege but also one of responsibility for the great works of nation building and social transformation. Where this intelligentsia conceives of its mission as the dragging of a technically backward, unschooled, subsistence-oriented population into the twentieth century, its self-assigned cultural role as educator of its people becomes doubly grandiose. Having a historic mission of such breadth may provide a ruling intelligentsia with high morale, solidarity, and the willingness to make (and impose) sacrifices. This vision of a great future is often in sharp contrast to the disorder, misery, and unseemly scramble for petty advantage that the elites very likely see in their daily foreground. One might in fact speculate that the more intractable and resistant the real world faced by the planner, the greater the need for utopian plans to fill, as it were, the void that would otherwise invite despair. The elites who elaborate such plans implicitly represent themselves as exemplars of the learning and progressive views to which their compatriots might aspire. Given the ideological advantages of high modernism as a discourse, it is hardly surprising that so many postcolonial elites have marched under its banner.[30]

Aided by hindsight as it is, this unsympathetic account of high-modernist audacity is, in one important respect, grossly unfair. If we put the development of high-modernist beliefs in their historical context, if we ask who the enemies of high modernism actually were, a far more sympathetic picture emerges. Doctors and public-health engineers who did possess new knowledge that could save millions of lives were often thwarted by popular prejudices and entrenched political interests. Urban planners who could in fact redesign urban housing to be cheaper, more healthful, and more convenient were blocked by real-estate interests and existing tastes. Inventors and engineers who had devised revolutionary new modes of power and transportation faced opposition from industrialists and laborers whose profits and jobs the new technology would almost certainly displace.

For nineteenth-century high modernists, the scientific domination of nature (including human nature) was emancipatory. It "promised freedom from scarcity, want and the arbitrariness of natural calamity," David Harvey observes. "The development of rational forms of social organization and rational modes of thought promised liberation from the irrationalities of myth, religion, superstition, release from the arbi-

trary use of power as well as from the dark side of our human natures."[31] Before we turn to later versions of high modernism, we should recall two important facts about their nineteenth-century forebears: first, that virtually every high-modernist intervention was undertaken in the name of and with the support of citizens seeking help and protection, and, second, that we are all beneficiaries, in countless ways, of these various high-modernist schemes.

Twentieth-Century High Modernism

The idea of a root-and-branch, rational engineering of entire social orders in creating realizable utopias is a largely twentieth-century phenomenon. And a range of historical soils have seemed particularly favorable for the flourishing of high-modernist ideology. Those soils include crises of state power, such as wars and economic depressions, and circumstances in which a state's capacity for relatively unimpeded planning is greatly enhanced, such as the revolutionary conquest of power and colonial rule.

The industrial warfare of the twentieth century has required unprecedented steps toward the total mobilization of the society and the economy.[32] Even quite liberal societies like the United States and Britain became, in the context of war mobilization, directly administered societies. The worldwide depression of the 1930s similarly propelled liberal states into extensive experiments in social and economic planning in an effort to relieve economic distress and to retain popular legitimacy. In the cases of war and depression, the rush toward an administered society has an aspect of *force majeure* to it. The postwar rebuilding of a war-torn nation may well fall in the same category.

Revolution and colonialism, however, are hospitable to high modernism for different reasons. A revolutionary regime and a colonial regime each disposes of an unusual degree of power. The revolutionary state has defeated the ancien régime, often has its partisans' mandate to remake the society after its image, *and* faces a prostrate civil society whose capacity for active resistance is limited.[33] The millennial expectations commonly associated with revolutionary movements give further impetus to high-modernist ambitions. Colonial regimes, particularly late colonial regimes, have often been sites of extensive experiments in social engineering.[34] An ideology of "welfare colonialism" combined with the authoritarian power inherent in colonial rule have encouraged ambitious schemes to remake native societies.

If one were required to pinpoint the "birth" of twentieth-century high modernism, specifying a particular time, place, and individual—

in what is admittedly a rather arbitrary exercise, given high modernism's many intellectual wellsprings—a strong case can be made for German mobilization during World War I and the figure most closely associated with it, Walther Rathenau. German economic mobilization was the technocratic wonder of the war. That Germany kept its armies in the field and adequately supplied long after most observers had predicted its collapse was largely due to Rathenau's planning.[35] An industrial engineer and head of the great electrical firm A.E.G (Allgemeine Elektricitäts-Gesellschaft), which had been founded by his father, Rathenau was placed in charge of the Office of War Raw Materials (Kriegsrohstoffabteilung).[36] He realized that the planned rationing of raw materials and transport was the key to sustaining the war effort. Inventing a planned economy step by step, as it were, Germany achieved feats—in industrial production, munitions and armament supply, transportation and traffic control, price controls, and civilian rationing—that had never before been attempted. The scope of planning and coordination necessitated an unprecedented mobilization of conscripts, soldiers, and war-related industrial labor. Such mobilization fostered the idea of creating "administered mass organizations" that would encompass the entire society.[37]

Rathenau's faith in pervasive planning and in rationalizing production had deep roots in the intellectual connection being forged between the physical laws of thermodynamics on one hand and the new applied sciences of work on the other. For many specialists, a narrow and materialist "productivism" treated human labor as a mechanical system which could be decomposed into energy transfers, motion, and the physics of work. The simplification of labor into isolated problems of mechanical efficiencies led directly to the aspiration for a scientific control of the entire labor process. Late nineteenth-century materialism, as Anson Rabinbach emphasizes, had an equivalence between technology and physiology at its metaphysical core.[38]

This productivism had at least two distinct lineages, one of them North American and the other European. An American contribution came from the influential work of Frederick Taylor, whose minute decomposition of factory labor into isolable, precise, repetitive motions had begun to revolutionize the organization of factory work.[39] For the factory manager or engineer, the newly invented assembly lines permitted the use of unskilled labor and control over not only the pace of production but the whole labor process. The European tradition of "energetics," which focused on questions of motion, fatigue, measured rest, rational hygiene, and nutrition, also treated the worker notionally as a machine, albeit a machine that must be well fed and kept in good

working order. In place of worker*s*, there was an abstract, standardized worker with uniform physical capacities and needs. Seen initially as a way of increasing wartime efficiency at the front and in industry, the Kaiser Wilhelm Institut für Arbeitsphysiologie, like Taylorism, was based on a scheme to rationalize the body.[40]

What is most remarkable about both traditions is, once again, how widely they were believed by educated elites who were otherwise poles apart politically. "Taylorism and technocracy were the watchwords of a three-pronged idealism: the elimination of economic and social crisis, the expansion of productivity through science, and the reenchantment of technology. The vision of society in which social conflict was eliminated in favor of technological and scientific imperatives could embrace liberal, socialist, authoritarian, and even communist and fascist solutions. Productivism, in short, was politically promiscuous."[41]

The appeal of one or another form of productivism across much of the right and center of the political spectrum was largely due to its promise as a technological "fix" for class struggle. If, as its advocates claimed, it could vastly increase worker output, then the politics of redistribution could be replaced by class collaboration, in which both profits and wages could grow at once. For much of the left, productivism promised the replacement of the capitalist by the engineer or by the state expert or official. It also proposed a single optimum solution, or "best practice," for any problem in the organization of work. The logical outcome was some form of slide-rule authoritarianism in the interest, presumably, of all.[42]

A combination of Rathenau's broad training in philosophy and economics, his wartime experience with planning, and the social conclusions that he thought were inherent in the precision, reach, and transforming potential of electric power allowed him to draw the broadest lessons for social organization. In the war, private industry had given way to a kind of state socialism; "gigantic industrial enterprises had transcended their ostensibly private owners and all the laws of property."[43] The decisions required had nothing to do with ideology; they were driven by purely technical and economic necessities. The rule of specialists and the new technological possibilities, particularly huge electric power grids, made possible a new social-industrial order that was both centralized and locally autonomous. During the time when war made necessary a coalition among industrial firms, technocrats, and the state, Rathenau discerned the shape of a progressive peacetime society. Inasmuch as the technical and economic requirements for reconstruction were obvious and required the same sort of collaboration in all countries, Rathenau's rationalist faith in planning had an

internationalist flavor. He characterized the modern era as a "new ma-
chine order . . . [and] a consolidation of the world into an unconscious
association of constraint, into an uninterrupted community of produc-
tion and harmony."[44]

The world war was the high-water mark for the political influence
of engineers and planners. Having seen what could be accomplished
in extremis, they imagined what they could achieve if the identical en-
ergy and planning were devoted to popular welfare rather than mass
destruction. Together with many political leaders, industrialists, labor
leaders, and prominent intellectuals (such as Philip Gibbs in England,
Ernst Jünger in Germany, and Gustave Le Bon in France), they con-
cluded that only a renewed and comprehensive dedication to technical
innovation and the planning it made possible could rebuild the Euro-
pean economies and bring social peace.[45]

Lenin himself was deeply impressed by the achievements of Ger-
man industrial mobilization and believed that it had shown how pro-
duction might be socialized. Just as Lenin believed that Marx had dis-
covered immutable social laws akin to Darwin's laws of evolution, so
he believed that the new technologies of mass production were scien-
tific laws and not social constructions. Barely a month before the Oc-
tober 1917 revolution, he wrote that the war had "accelerated the de-
velopment of capitalism to such a tremendous degree, converting
monopoly capitalism into *state*-monopoly capitalism, that *neither* the
proletariat *nor* the revolutionary petty-bourgeois democrats *can* keep
within the limits of capitalism."[46] He and his economic advisers drew
directly on the work of Rathenau and Mollendorf in their plans for the
Soviet economy. The German war economy was for Lenin "the ulti-
mate in modern, large-scale capitalist techniques, planning and orga-
nization"; he took it to be the prototype of a socialized economy.[47] Pre-
sumably, if the state in question were in the hands of representatives of
the working class, the basis of a socialist system would exist. Lenin's vi-
sion of the future looked much like Rathenau's, providing, of course,
we ignore the not so small matter of a revolutionary seizure of power.

Lenin was not slow to appreciate how Taylorism on the factory
floor offered advantages for the socialist control of production. Al-
though he had earlier denounced such techniques, calling them the
"scientific extortion of sweat," by the time of the revolution he had be-
come an enthusiastic advocate of systematic control as practiced in
Germany. He extolled "the principle of discipline, organization, and
harmonious cooperation based upon the most modern, mechanized in-
dustry, the most rigid system of accountability and control."[48]

The Taylor system, the last word of capitalism in this respect, like all capitalist progress, is a combination of the subtle brutality of bourgeois exploitation and a number of its great scientific achievements in the fields of analysing mechanical motions during work, the elimination of superfluous and awkward motions, the working out of correct methods of work, the introduction of the best system of accounting and control, etc. The Soviet Republic must at all costs adopt all that is valuable in the achievements of science and technology in this field. . . . We must organize in Russia the study and teaching of the Taylor system and systematically try it out and adapt it to our purposes.[49]

By 1918, with production falling, he was calling for rigid work norms and, if necessary, the reintroduction of hated piecework. The first All-Russian Congress for Initiatives in Scientific Management was convened in 1921 and featured disputes between advocates of Taylorism and those of energetics (also called ergonomics). At least twenty institutes and as many journals were by then devoted to scientific management in the Soviet Union. A command economy at the macrolevel and Taylorist principles of central coordination at the microlevel of the factory floor provided an attractive and symbiotic package for an authoritarian, high-modernist revolutionary like Lenin.

Despite the authoritarian temptations of twentieth-century high modernism, they have often been resisted. The reasons are not only complex; they are different from case to case. While it is not my intention to examine in detail all the potential obstacles to high-modernist planning, the particular barrier posed by liberal democratic ideas and institutions deserves emphasis. Three factors seem decisive. The first is the existence and belief in a private sphere of activity in which the state and its agencies may not legitimately interfere. To be sure, this zone of autonomy has had a beleaguered existence as, following Mannheim, more heretofore private spheres have been made the object of official intervention. Much of the work of Michel Foucault was an attempt to map these incursions into health, sexuality, mental illness, vagrancy, or sanitation and the strategies behind them. Nevertheless, the idea of a private realm has served to limit the ambitions of many high modernists, through either their own political values or their healthy respect for the political storm that such incursions would provoke.

The second, closely related factor is the private sector in liberal political economy. As Foucault put it: unlike absolutism and mercantilism, "political economy announces the unknowability for the sovereign of the totality of economic processes and, as a consequence, the *impossibility of an economic sovereignty*."[50] The point of liberal political economy was not only that a free market protected property and cre-

ated wealth but also that the economy was far too complex for it ever to be managed in detail by a hierarchical administration.[51]

The third and by far most important barrier to thoroughgoing high-modernist schemes has been the existence of working, representative institutions through which a resistant society could make its influence felt. Such institutions have thwarted the most draconian features of high-modernist schemes in roughly the same way that publicity and mobilized opposition in open societies, as Amartya Sen has argued, have prevented famines. Rulers, he notes, do not go hungry, and they are unlikely to learn about and respond readily to curb famine unless their institutional position provides strong incentives. The freedoms of speech, of assembly, and of the press ensure that widespread hunger will be publicized, while the freedoms of assembly and elections in representative institutions ensure that it is in the interest of elected officials' self-preservation to prevent famine when they can. In the same fashion, high-modernist schemes in liberal democratic settings must accommodate themselves sufficiently to local opinion in order to avoid being undone at the polls.

But high modernism, unimpeded by liberal political economy, is best grasped through the working out of its high ambitions and its consequences. It is to this practical terrain in urban planning and revolutionary discourse that we now turn.