

multiplied at geometric rates . . . at the same time the power of consumption—even under the influence of stimuli damned as unsocial and tending toward profligacy [e.g., advertising and built-in obsolescence (frequent style changes)]—has expanded only at a comparatively slow arithmetic rate.”

While Americans may have had doubts about the doctrine of mass production, they by no means were willing to scrap it in favor of the Gandhi formula. Already their desire for style and novelty, coupled with increased purchasing power in the 1920s, had forced even Henry Ford to change his system of mass production. When pushed by the Depression, the greater part of Americans looked for solutions in the sphere of “mass consumption.” The 1930s witnessed the publication of an extensive amount of literature on the “economics of consumption.” As history would have it, the prophets of mass production were proven at least temporarily correct as the United States pulled itself out of the Depression by the mass consumption of war material and, after the war, by the golden age of American consumption in the 1950s and 1960s.

The Social Construction of the Automobile in the Rural United States

RONALD KLINE AND TREVOR PINCH

SCOT [The Social Construction of Technology] emphasizes the “interpretative flexibility” of an artifact. Different social groups associate different meanings with artifacts leading to interpretative flexibility appearing over the artifact. The same artifact can mean different things to different social groups of users. For young men riding the bicycle for sporting purposes the high-wheeler meant the “macho machine” as opposed to the meaning given to it by women and elderly men who wanted to use the bike for transport. For this latter group . . . the high-wheeler was the “unsafe machine” (because of its habit of throwing people over the handle bars—known as “doing a header”). Such meanings can get embedded in new artifacts, and developmental paths can be traced which reinforce this meaning (e.g., placing even larger wheels on bicycles to enable them to go even faster). Interpretative flexibility, however, does not continue forever. “Closure” and stabilization occur, such that some artifacts appear to have fewer problems and become increasingly the dominant form of the technology. This, it should be noted, may not result in all rivals vanishing, and often two very different technologies can exist side by side (for example, jet planes and propeller planes). Also this process of closure and stabilization need not be final. New problems can emerge and interpretative flexibility may reappear. . . .

The first motor cars, like the bicycle before them, made a dramatic impression on rural American life. When they first appeared in the countryside in the early years of this century, driven by rich city folk out for a spin, they often met a hostile reception. Indeed, farmers joined small-town residents, suburbanites, and even irate city dwellers in many parts of the country in hurling such epithets as “red devil” and “devil wagon” at the dangerous, speeding car—names that soon symbolized the rising

From Ronald Kline and Trevor Pinch, “Users as Agents of Technological Change: The Social Construction of the Automobile in the Rural United States,” *Technology and Culture*, October 1996. Copyright © 1996 by The Society for the History of Technology. Reprinted by permission of The University of Chicago Press.

clamor of rural protest. Motorists and automobile journals countered with the traditional antirural insults of "hayseed" and "rube," but also coined such new phrases as "autophobe" and "motorphobe" for all critics of the car—whether they lived in the city, town, or country. A group in St. Louis even defied the widespread opposition to "scorchers" in 1905 by calling themselves the Red Devil Automobile Club.

The main antagonism between farmers and the early car and its drivers seems to have stemmed from the dramatic effects which the cars had upon livestock. Horses reared at the car's noisy approach, often breaking away or upsetting buggies; chickens crossed the road for the last time. . . .

Many farm women complained that recklessly driven autos prevented them from driving their horse-drawn buggies on country roads. . . .

. . . Apart from the car's speed, many country folk were unimpressed with it as a means of transportation. It was a common sight to see farmers with their horses towing a car that had broken down or pulling a car out of muddy country roads—a source of income for some farmers and of moral satisfaction to those who despised the "devil wagon." Adding to the antagonism were the types of car drivers—urban, upper class—the farmers encountered. Another, later, source of criticism was the damage which the cars were thought capable of inflicting on the fabric of rural life. Farm people had built up a whole network of crucial institutions such as schools and churches based upon the transport system of the horse and buggy. The car with its much longer range threatened such institutions. Children could go to consolidated schools further away, other churches than the local one came within range. Worse, with the option of visiting friends or family in a nearby town for the day, or the other temptations which such a visit offered, why go to church at all?

The early antagonism was such that rural people resorted to both legal and illegal means to stop the influx of cars. Counties in West Virginia and Pennsylvania passed laws that banned autos; Vermont required a person to carry a red flag and walk ahead of the car. A flurry of legislation around 1908 required cars to slow down for horse-drawn vehicles, or stop if the horse appeared frightened. Lucrative "speed traps" also date from this period. Legislatures withheld support from road improvement schemes. The threat was perceived to be such that, as in the case of the bicycle, many farmers took the law into their own hands. The press reported numerous cases of farm men attacking motorists from 1902 to 1907, a period of widespread auto touring. Farmers shot a chauffeur in the back in Minnesota, stoned a motorist in Indiana, shot at a car passing a horse-drawn buggy in South Carolina, and assaulted a chauffeur in Wisconsin. New York farmers hit a motorist with a galvanized iron pail on Long Island, pushed a lawn mower into an auto's path, whipped a motorist for no apparent reason, and delayed a hill-climbing contest near Rochester by fighting with onlookers.

Farm men took these actions partly because they viewed country roads, which they built and maintained, in a proprietary manner. Yet many of them detested the "devil wagon" so much that they sabotaged their own roads to try and stop the growing menace. In 1905, Connecticut farmers spread a tire-cutting slag on roads (supposedly to fill in ruts!), and Minnesota farmers plowed up roads near Rochester. As late as 1909, Indiana farmers, tired of being awakened by revellers returning from a night of drinking in nearby roadhouses, weakened bridges and barricaded roads. In the same year, farmers near Sacramento, California, dug ditches across several roads

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and caught thirteen autos in their traps. Rural people booby-trapped other roads with an innovative assortment of rakes, saws, glass, tacks, and ropes or barbed wire strung across the road. Groups such as the Farmers' Anti-Automobile League near Evanston, Illinois, the Anti-Automobile Club of Grover, Missouri, and the Farmers' Protective Association in Harrison Township, Ohio, were formed to organize rural opposition to the car. The Illinois league had a twenty-member vigilante committee to mete out justice to reckless drivers.

In terms of SCOT we can say that these actions, termed an "anti-auto crusade" by one historian, showed the existence of an important relevant social group. For them the car was not the fond object of joy later encapsulated in such names as the "flivver" (so called apparently because the vibration of the car was considered to be good for the liver) or the "Tin Lizzie" (another nickname for the Model T)—it was the "Devil Wagon." Did this meaning of the car for this social group lead to a radical interpretative flexibility? The answer must be yes. By attempting to destroy cars directly and make roads impassible to cars, this social group was trying to affect perhaps in the most dramatic direct way possible the development of the artifact. If they had succeeded the car might have taken a very different form—it would have been a short distance city vehicle only. Railroads would have remained the main form of transportation to rural areas—modern America would look very different.

The anticar movement failed because of a combination of circumstances. Faced with the saturation of the urban luxury car market manufacturers developed a large rural market by producing more affordable cars designed to navigate country roads. The inexpensive Model T, to take the most successful example, sat high off the ground (also making repair easier) and had a high horsepower-to-weight ratio and a three-point suspension. The introduction of the Model T in late 1908 also came at a time of growing support for the car among farm leaders. The National Grange had passed a resolution that summer stating that the "motor vehicle is a permanent feature of modern life" and had a right to use rural roads. The Grange followed the lead of the influential Midwestern paper, *Wallace's Farmer*, which had begun to promote the gasoline automobile in January 1908 using the same methods it employed for any new technology it favored: advertisements, editorials, articles, and requests for readers' experiences. The paper's editor stated in February that "farmers have had their fun—and sometimes it was not fun, either—with the users of the automobile." Although farm people had justifiably "called it the rich man's plaything" and had sworn at it for disrupting rural life, they had begun to value cars and to buy them for themselves. The *Rural New Yorker*, a former critic of the automobile, started to promote it in 1909. *Wallace's Farmer* thought highly of two types of cars: the technologically out-of-date but inexpensive buggy car, whose high wheels cleared the hump in rutted country roads; and a touring car with a removable tonneau (backseat) that could be easily converted into a small truck. Manufacturers of both types flourished for a brief time, thus helping to introduce the automobile into the countryside. Roads were also improved. Gradually, the advantages of the car became all too clear-cut. The car promised to end the relative isolation of farm life. And the possible income to be derived from wealthy city people did not go unnoticed. Tourism thrived, as did repair shops. Farm men, many of whom had operated steam engines and stationary gasoline engines, were well-placed to become car users. As buggy cars, convertibles, and the Model T spread into rural areas, the anticar movement vanished. By 1920, in

fact, the U.S. Census reported that a larger percentage of farm households owned an automobile than did nonfarm households (30 percent to 24 percent). Thus the radical meaning of car as "devil wagon" did not stabilize.

The main social groups of relevance to understanding the development of the rural car are manufacturers, farm men, and farm women. In studying a technology which had already stabilized in regard to its fundamental design—by 1909 the "large, front-engined, rear-drive automobile" of system Panhard—it is clear that one social group initially had more influence than any other in terms of giving a meaning to the artifact: the manufacturers. Because they produced the car, the automobile manufacturers exerted great influence on the form the technology initially took. But their position, although influential, was not overwhelmingly so. New manufacturers could (and did) produce new and different cars with different users in mind. Furthermore, although manufacturers may have inscribed a particular meaning to the artifact they were not able to control how that artifact was used once it got into the hands of the users. Users precisely as users can embed new meanings into the technology.

This happened with the adaptation of the car into rural life. As early as 1903, farm families started to define the car as more than a transportation device. In particular, they saw it as a general source of power. George Schmidt, a Kansas farmer, advised readers of the *Rural New Yorker* in 1903 "to block up the hind axle and run a belt over the one wheel of the automobile and around the wheel on a [corn] sheller, grinder, saw, pump, or any other machine that the engine is capable of running, and see how the farmer can save money and be in style with any city man." T. A. Pottinger, an Illinois farm man, wrote *Wallace's Farmer* in 1909 that the ideal farm car should have a detachable backseat, which could turn the vehicle into a small truck, and that it should be able to provide "light power, such as running a corn sheller, an ensilage cutter, or doing light grinding." The car was also used for domestic work, such as powering washing machines. . . . Although the car was sometimes used to assist in traditional "women's work" (e.g., by running the butter churn and cream separator), farm men—rather than farm women—more commonly used the car to provide stationary power, and mainly for "men's work"—that is, to run agricultural machinery. Corn shellers, water pumps, hay balers, fodder and ensilage cutters, wood saws, hay and grain hoists, cider presses, and corn grinders were all powered by the auto. A rancher even used a Cadillac to shear his sheep. A Maine farm man put a car to so many multiple usages in 1915 the tax assessors did not know whether they should classify the car as a pleasure vehicle or a piece of agriculture machinery. In addition to providing a stationary source of power, cars found a wide variety of unexpected uses in their mobile form. Farm men used them as snowmobiles, tractors, and agricultural transport vehicles. Indeed, it seems from the earliest days of the car's introduction onto farms that farmers were acutely aware of its potential, whether simply to transport fodder or to power a feed chopper. Adapting the auto to the myriad tasks of farm life was common enough practice that seven of twenty-three New York farm families who participated in a recent oral history project recalled that they or their neighbors had used the car as a hay rake, pickup truck, or power source. One farm man, eighty-eight-year-old Winfred Arnold, remembered that his neighbors used the car to power jobs around the farm, but he himself could afford to use stationary gasoline engines.

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In these instances, rural users of the car have reintroduced what we would call "interpretative flexibility," but . . . this flexibility was not at the design stage. New meanings are being given to the car by the new emerging social group of users—in this case, technically competent farm men. To the urban user the car meant transport. For the rural users we have identified, the car, as well as being a form of transport, could be a farm tool, a stationary source of power, or part of a domestic technology, or perhaps all of these.

The remarkable interpretative flexibility of the rural car has a strong tie to the *structure* of gender relations between farm men and women. Most generalizations about social groups as large and culturally diverse as farm men and farm women are highly problematic, but gender relationships on farms during this period appear to have been fairly stable. As head of both farm and family in the 19th century, men were in a position to control the productive and reproductive labor necessary to sustain a large family and, increasingly, to farm on a commercial basis. By the turn of the century, farm women appear to have gained more control over their public and domestic lives as gender relations changed with "modernization," but many traditional sexual divisions of labor remained. On most family farms, men (husband, sons, and hired hands) performed what were regarded as the main income-producing activities in the field, barn, and machine shop; women (wife, daughters, and hired help) performed "supportive" tasks (from both men's and women's points of view) in the house, garden, and poultry shed. Men and women often shared tasks in the dairy. Although many farm women worked in the field at harvest time and at other periods of labor shortages, they usually viewed this economic function, as well as their income from selling vegetables, eggs, and dairy products, in terms of "helping out" the man in the field so that the farmstead could stand on its feet economically. For the same reason, women before World War II seem to have accepted the mechanization of "men's" jobs in the field before the mechanization of "their" work in the house, but not without some protest.

Within this flexible and historically variable gender *structure* were gender *identities* among farm men and women that help explain the social construction of the rural automobile. Many farm men, especially in the Midwest, saw themselves as proficient mechanics who could operate, maintain, repair, and redesign most machines on the farm, from steam engines and threshers in the field to water pumps in the kitchen. Although the social construction of masculinity has varied historically, competence in the operation and repair of machinery formed a defining element of masculinity (and thus gender identity) for many male groups in this period, including linotype operators, other craftsmen, small entrepreneurs, and farm men. Women might pump water, drive the horse and buggy to town, and occasionally operate field machinery, but men fixed a leaky pump, oiled and greased the buggy, and redesigned a hay binder to work over hilly ground. Technical competence helped to define their gender position as a form of masculinity and reinforced the rural gender system.

Consequently, the gasoline automobile, which was already *symbolically* inscribed for masculine use by Henry Ford and other manufacturers, came onto farmsteads headed, in general, by men partly because of their technical competence. Farm people usually viewed the early car as the latest highly sophisticated piece of farm machinery—and it generally became the province of men. Male and female

access to the driver's seat varied widely in farm families. At one extreme, some women drove the car to the exclusion of men. Alice Guyer, an Indiana farm woman, recalled that her father "had trouble with them, and he just gave up the driving to my older sister." Bertha Pampel remembered that "my dad never did drive. My mother did all the driving." At the other extreme, some farm women who had been proficient with the horse and buggy never mastered the car and thus became more dependent on men and less technically competent. Laura Drake, another Indiana farm woman, recalled that her family had a car when she was growing up, "but we weren't allowed to touch it. Nobody touched that [car] but him [her father]. "At least two of the twenty-three families interviewed recently in New York said that a mother or daughter did not learn to drive.

A motor-wise farm woman was rare enough to be news. A New York woman told a reporter in 1915 that she was "thoroughly familiar with the machine," and then proceeded to fix a flat tire by vulcanizing it. In general, however, farm journals and oral histories indicate that farm men, rather than farm women, maintained, repaired, and tinkered with the new addition to the farmstead, especially because repair facilities were few and far between in this period. Although the average farm man was probably not an expert auto mechanic, most observers thought farm men could maintain and repair cars better than city men. The farm man's technical competence, rooted in his masculine identity, enabled him to reopen the black box of the car (by reinterpreting its function), jack up its rear wheels, and power all kinds of "men's" work on the farm and, less frequently, the "woman's" cream separator, water pump, or washing machine. . . . Our evidence overwhelmingly shows that farm men, not farm women, reconfigured the car in order to use it in an alternative manner. We have found only one exception—that of an independent "woman farmer" who used her car to pull a hay rake in 1918.

Farm men also converted the car from a passenger vehicle to a produce truck. Showing off further, they returned the car to its original configuration, as defined by the manufacturer, and either drove family members to town and church, or handed it over, in this more symbolically feminine form of usage, to women to operate—sometimes to go to town to get parts to repair field machinery.

The mutual interactions between the artifact, social groups, and intergroup power relations are clearly evident in this case. The gender identity of farm men, formed by defining it in contrast to the constructed femininity of farm women, enabled men to interpret the car flexibly and to socially construct it as a stationary power source. This social construction, in turn, reinforced technical competence as masculine, thus reinforcing farm men's gender identity vis-a-vis farm women. Thus gender not only shaped the motor car, but gender identities were also themselves in turn shaped by using the motor car.

How did farm women fare in this process? The evidence is not clear on this point. Some historians maintain that farm women gained independence by using the car to extend their sphere of influence and redefine their gender roles. By marketing their products more widely, they gained more economic power at home, and by using the car to visit friends and relatives, they were not tied so closely to the farmstead. Many contemporaries professed this view, especially such "modernizers" as home economists, editors of farm journals, and auto manufacturers who publicly espoused a Country Life ideology of saving the supposedly overworked farm woman. Many farm

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women praised the automobile. In response to muckraking concerns about the overworked farm woman, "Mrs." Arthur Hewins in Massachusetts wrote in 1920 that the car reduced her workload. "In our 'Lizzie' I carry the milk three miles to the creamery every morning, Sundays included. . . . I have time to go for pleasure rides, and once or twice a week we go to the 'movies' in the nearest town, which is nine miles away."

Other historians argue that farm women travelled further, but stayed within their traditional, supportive gender roles when they shopped for domestic goods or went to town in an emergency to buy parts to fix the tractor. In this argument, using the car reinforced rural gender roles, as it had for suburban women. Does farm women's use of the car support historian Ruth Cowan's thesis of household technology leading to "more work for mother"? Did the use of the car by full-time homeworkers on the farm tend to save the work of their helpers, promote a higher standard of living, and restructure work patterns, as it had for their sisters in the city and suburbs? We note first of all that the time-use studies that help support Cowan's thesis apply to farm women (in fact, the home economists who conducted the pre-1945 studies focussed on the "problem" of the overworked farm women). But these studies provide much more information about time spent on household work than on using the automobile, and the farm women surveyed were probably atypically well-to-do and had adopted the urban domestic ideal to a great extent. Nevertheless, these 2,000 women, the vast majority of whose families owned automobiles, still worked a full week in the house, dairy, garden, and poultry pen.

An Ohio man's story of a farm woman and her car unwittingly provides one explanation of why the auto did not lead to more leisure. L. B. Pierce wrote the *Rural New Yorker* in 1919 that one morning, a farm woman cooked that night's dinner in a "fireless cooker" (an insulated box in which a boiled dinner could cook all day), drove forty-one miles to visit her daughter in Cleveland, shopped in the city in the afternoon, then drove home in time to put a late supper on the table from the fireless cooker. Before the family had a car, which the woman also used to run a butter and egg route, she would have had to skimp on her after-breakfast work and her husband would have had to get his own dinner. "After the car was bought she could wash the breakfast dishes, sweep the kitchen and then get to her customers as early as before, and generally get home in time to serve the dinner which the fireless cooker had been preparing in the basement." The car thus enabled this farm woman to do more work—to expand her egg business and still perform the tasks expected of her within the (expanded) sphere of "woman's work" on the farm, including shopping for bargains in the city and maintaining kinship ties.

The gender relations and associated meanings involved with the automobile in the countryside were quite stable over time compared with the other meanings of the car we have identified. The anticar meanings were obviously intense, but also transient, and disappeared for the most part when manufacturers introduced cars that were economical and met the criticism of the "anti's." Other social meanings, which defined the car as destroying the rural fabric of general stores, one-room schools, and local churches, eventually disappeared precisely because the countryside was transformed in the very manner feared by the critics. Between 1920 and 1940, the car had become a means to increase the radius of rural life to include larger towns, schools, and churches in the orbit of farm men and women.

In contrast, gender relations and associated meanings remained fairly stable. The interpretative flexibility of the early auto reinforced them, as we have seen. The auto's replacements for farm work, the truck and tractor, did not upset the gender structure either, even though women showed during World War I that they could drive a tractor, just like their sisters proved they could do factory work during the crisis. For instance, some urban women learned to drive and maintain tractors in the American Woman's Land Army—a voluntary organization that hired out "farmerette" squads to farms during the war—and farm women drove tractors at home to meet the "manpower" shortage. Yet when the war ended, farming by horse, car, or tractor was still considered to be primarily men's work. Gender relations were also not much affected by rural electrification, which—along with a general farm prosperity after World War II—enabled farm women to buy "urban" appliances like electric washing machines, ranges, irons, and refrigerators. Historian Katherine Jellison has argued that one result of this mechanization of housework, and an increased consumerism and the replacement of hired men by tractors after World War II, was to decrease women's work in the house, garden, poultry barn, and dairy, thus giving them the option of operating tractors in the field or using the auto to take a job in town. But the new technologies did not transform gender relations markedly since women were still viewed as "helping out," as supporting men's work on the farm. Indeed, Jellison's evidence indicates that country people wove these artifacts into the fabric of their society, that they shaped them within the flexible, yet durable, system of rural gender relations. . . .

Despite the increased availability of tractors, trucks, and gasoline engines, farm men and women owned many more automobiles than these technologies before World War II. Census data for the United States shows that automobiles were far and away the most popular form of inanimate power on the farm from 1920 to the war. A major reason was that during the agricultural economic crisis of the 1920s and 1930s, farm men and women preferred to use their autos, often purchased during the boom times of World War I, for multiple purposes like going to town, hauling produce, powering farm equipment, and even field work (for those who bought conversion kits or made their own). Large numbers of prosperous farms did, however, buy tractors, trucks, and gasoline engines. A survey of 538 well-to-do Minnesota farms in 1929 showed that over 90 percent of them had autos, two-thirds had stationary gasoline engines, nearly one-half had tractors, over one-third had electricity, and about one-third had trucks. The families used their autos almost equally for "farm" and "family" purposes, but the study did not mention any belt-power use of the car. The families made heavy use of tractors, gas engines, electric motors, and trucks to pull agricultural implements, provide belt power, and to haul farm products. More and more farms in the United States made these same technological choices after the federal government established a New Deal program in the 1930s that provided low-cost loans to purchase farm equipment. The program led to a large increase in the number of tractors on farms, thus helping to displace the rural auto as an all-purpose power source. . . .

It is clear that mutually constructed gender relationships and the transactional relationships between manufacturers, dealers, and buyers both constrained and enabled the design and usage of this technology. But the types of development processes we have identified sometimes followed paradoxical paths. Thus it was a masculinized gender position which enabled farm men to open up the black box of

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the car and for a time threaten the predominant meaning of the artifact. However, at the same time these new options reinforced predominant gender identities. For car manufacturers the new interpretative flexibility at first was a threat, but in the long run it helped to open up new and profitable markets as they and other manufacturers sold machines dedicated to each of the different usages we have identified. However, differentiation of usage and the creation of a new market is not always the response. The early attempts to manufacture an electric car for women failed and instead manufacturers adapted the gasoline car to make it more appealing to women (and men) users by inventing the electric starter and introducing the closed-in top and thereby created a larger market for an existing product. Thus the meaning of the car was changed in response to the social group of women, but whether the newly changed artifact significantly altered gender relations is, as historian Virginia Scharff shows, unlikely. However, the new (gasoline) car enabled different gender identities to be constructed. Women could do new sorts of things—it gave them a new freedom, and men did not have to be quite so manly (and risk life and limb cranking cars). Thus the meaning which using the technology gave to underlying gender identities shifted those identities somewhat.

. . . [W]e have attempted to show how artifacts and social groups are tied together during the course of technological development. We agree with recent scholars that users socially construct technology. Our approach has been to show how an explicit model of social construction can be used as a heuristic to tell a full story of users and technology. We have argued that such a story should examine the radical options for change and how other social groups respond to such options and thereby create new artifacts.

The interpretative flexibility we have described for the car disappeared by the early 1950s. Closure had occurred (once again) and farm people had stopped using their autos for grinding their grain, plowing their fields, or carrying their produce to town. Instead, they had begun to buy tractors and pickup trucks in large numbers—new artifacts that manufacturers developed partly in response to these novel interpretations of the car. The users, so easily overlooked in writing the story of technology, had made their mark.

Modern Times

JAMES J. FLINK

With the transfer of skills at Ford from men to specialized machines, the process that Harry Braverman had identified as the “degradation of work” turned highly skilled jobs into semiskilled and/or unskilled jobs. This revolutionized the workplace.

Fordism meant that neither physical strength nor the long apprenticeship required for becoming a competent craftsman were any longer prerequisites for industrial employment. The creativity and experience on the job that had been valued in the craftsman were considered liabilities in the assembly-line worker. “As to machinists, old-time, all-around men, perish the thought!” declared Horace Arnold and Fay

From James J. Flink, *The Automobile Age* (Cambridge, MA: MIT Press, 1988), pp. 117–128.