Shop Class as Soulcraft

An Inquiry into the Value of Work

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1

A Brief Case for the Useful Arts

In schools, we create artificial learning environments for our children that they know to be contrived and undeserving of their full attention and engagement. Without the opportunity to learn through the hands, the world remains abstract, and distant, and the passions for learning will not be engaged.

—A CERTAIN SHOP TEACHER WHOSE NAME I HAVE LOST

Tom Hull teaches welding, machine shop, auto shop, sheet metal work, and computer-aided drafting at Marshfield High School in Coos Bay, Oregon. He is also president of the Technology Educators of Oregon. Asked about the current state of his profession, he says a lot of schools shut down their shop class programs in the 1990s, when there was a big push for computer literacy. To pay for the new computers, electives were cut. Shop was especially attractive as a target: it is expensive and potentially dangerous. Further, as Hull says, "you can't shove fifty students at a time into a shop class, like you can a PE class." In California, three-quarters of high school shop programs have disappeared since the early 1980s, according to the California Industrial and Technology Education Association.[1] There are efforts in North Carolina, Florida, and California to

revive shop, but finding people competent to teach it has become difficult. "We have a generation of students that can answer questions on standardized tests, know factoids, but they can't do anything," according to Jim Aschwanden, executive director of the California Agricultural Teachers' Association.[2]

Meanwhile, people in the trades are constantly howling about their inability to find workers. The slack has been taken up to some extent by community colleges that offer shop class. Tom Thompson, of Oregon's Department of Education, says there is anecdotal evidence to suggest that one of the fastest-growing segments of the student body at community colleges is people who already have a four-year degree and return to get a marketable trade skill. There are also for-profit schools such as Universal Technical Institute and Wyoming Technical Institute that draw students from around the country. Both graduate about 95 percent of their students, and about 98 percent of those who graduate get jobs in their first year after finishing.

Hull sends out a quarterly newsletter to the graduates of his shop programs. It is like a nineteenth-century almanac, a combination of useful information and intellectual inquiry, as well as examples of human uplift. The newsletter includes shop tips (for example, clever ways to clamp an irregularly shaped object in preparation for welding), book reviews, digressions on aesthetics, and success stories in which he profiles the careers of his former students. A recent issue featured Kyle Cox, a welder and fabricator for Tarheel Aluminum. Hull caught up with his former student as he fabricated an all-aluminum pile-driving barge on the docks in Charleston. Cox says the job changes every

day, and that's what he loves about it. He also likes being "useful to the world."

One of Hull's recent columns reflected on the Fibonacci sequence, an infinite series of numbers where the ratio between adjacent pairs approaches a certain value known as the golden ratio, found throughout nature. Hull writes, "the sequence portrays a human characteristic as well, as the ratio is not immediately achieved, but gets closer and closer, and not by some steady slope to perfection but by *self-correcting oscillations*" about the ideal value. This seems to capture the kind of iterated self-criticism, in light of some ideal that is never quite attained, whereby the craftsman advances in his art. You give it your best, learn from your mistakes, and the next time get a little closer to the image you started with in your head. Hull clearly has a humanist's view of what is now called "Career and Technical Education," and plays a major role in the lives of his students. He says his work as a shop teacher is "the best job I can imagine."

Many educators find their work fulfilling. Is there something about the useful arts in particular that can elicit such devotion? For one gets the sense that Hull takes himself to be pointing his students not just to a livelihood but to some more comprehensive view of what a good life looks like.

The Psychic Satisfactions of Manual Work

I started working as an electrician's helper shortly before I turned fourteen. I wasn't attending school at that time and

worked full-time until I was fifteen, then kept the trade up during the summers while in high school and college, with steadily increasing responsibility.[3] When I couldn't get a job with my college degree in physics, I was glad to have something to fall back on, and went into business for myself, in Santa Barbara.

I never ceased to take pleasure in the moment, at the end of a job, when I would flip the switch. "And there was light." It was an experience of agency and competence. The effects of my work were visible for all to see, so my competence was real for others as well; it had a social currency. I was sometimes quieted at the sight of a gang of conduit entering a large panel in an industrial setting, bent into nestled, flowing curves, with varying offsets, that somehow all terminated in the same plane. This was a skill so far beyond my abilities that I felt I was in the presence of some genius, and the man who bent that conduit surely imagined this moment of recognition as he worked. As a residential and light-commercial electrician, most of my work got covered up inside walls. Still, I felt pride in meeting the aesthetic demands of a workmanlike installation. Maybe another electrician would see it someday. Even if not, I felt responsible to my better self. Or rather, to the thing itself—craftsmanship has been said to consist simply in the desire to do something well, for its own sake. If the primary satisfaction is intrinsic and private in this way, there is nonetheless a sort of self-disclosing that takes place. As the philosopher Alexandre Kojève writes,

> *The man who works recognizes his own product in the World that has actually been transformed by his work: he recognizes himself in it, he sees in it his own human reality,*

> *in it he discovers and reveals to others the objective reality of his humanity, of the originally abstract and purely subjective idea he has of himself.*[4]

The satisfactions of manifesting oneself concretely in the world through manual competence have been known to make a man quiet and easy. They seem to relieve him of the felt need to offer chattering *interpretations* of himself to vindicate his worth. He can simply point: the building stands, the car now runs, the lights are on. Boasting is what a boy does, because he has no real effect in the world. But the tradesman must reckon with the infallible judgment of reality, where one's failures or shortcomings cannot be interpreted away. His well-founded pride is far from the gratuitous "self-esteem" that educators would impart to students, as though by magic.

Many people would be reluctant to bestow the term "craftsmanship" on the work of an electrician, and reserve the word for those who make finely wrought objects. This seems a fair reservation, and I see no need to quarrel with it.[5] My own experience in making craft objects is limited to that of a hobbyist, but is perhaps worth relating. People who make their own furniture will tell you that it is hard to justify economically, and yet they persist. Shared memories attach to the material souvenirs of our lives, and producing them is a kind of communion, with others and with the future. I once built a mahogany coffee table on which I spared no expense of effort. At that time I had no immediate prospect of becoming a father, yet

I imagined a child who would form indelible impressions of this table and know that it was his father's work. I imagined the table fading into the background of a future life, the defects in its execution as well as inevitable stains and scars becoming a surface textured enough that memory and sentiment might cling to it, in unnoticed accretions. More fundamentally, as Hannah Arendt writes, the durable objects of use produced by men "give rise to the familiarity of the world, its customs and habits of intercourse between men and things as well as between men and men." "The reality and reliability of the human world rest primarily on the fact that we are surrounded by things more permanent than the activity by which they were produced, and potentially even more permanent than the lives of their authors."[6]

All material things turn to dust, ultimately, so perhaps "permanance" isn't quite the right idea to invoke here. The moral significance of work that grapples with material things may lie in the simple fact that such things lie outside the self. A washing machine, for example, surely exists to serve our needs, but in contending with one that is broken, you have to ask what *it* needs. At such a moment, technology is no longer a means by which our mastery of the world is extended, but an affront to our usual self-absorption. Constantly seeking self-affirmation, the narcissist views everything as an extension of his will, and therefore has only a tenuous grasp on the world of objects as something independent. He is prone to magical thinking and delusions of omnipotence.[7] A repairman, on the other hand, puts himself in the service of others, and fixes the things they depend on. His relationship to objects enacts a more solid sort

of command, based on real understanding. For this very reason, his work also chastens the easy fantasy of mastery that permeates modern culture. The repairman has to begin each job by getting outside his own head and noticing things; he has to look carefully and listen to the ailing machine.

The repairman is called in when the smooth operation of our world has been disrupted, and at such moments our dependence on things normally taken for granted (for example, a toilet that flushes) is brought to vivid awareness. For this very reason, the repairman's presence may make the narcissist uncomfortable. The problem isn't so much that he is dirty, or uncouth. Rather, he seems to pose a challenge to our self-understanding that is somehow fundamental. We're not as free and independent as we thought. Street-level work that disrupts the infrastructure (the sewer system below or the electrical grid above) brings our *shared* dependence into view. People may inhabit very different worlds even in the same city, according to their wealth or poverty. Yet we all live in the same physical reality, ultimately, and owe a common debt to the world.

Because craftsmanship refers to objective standards that do not issue from the self and its desires, it poses a challenge to the ethic of consumerism, as the sociologist Richard Sennett argued in *The Culture of the New Capitalism.* The craftsman is proud of what he has made, and cherishes it, while the consumer discards things that are perfectly serviceable in his restless pursuit of the new.[8] The craftsman is then more possessive, more tied to what is present, the dead incarnation of past labor; the consumer is more free, more imaginative, and so more valorous according to those who would sell us things. Being able

to think materially about material goods, hence critically, gives one some independence from the manipulations of marketing, which as Sennett points out typically divert attention from *what a thing is* to a backstory intimated through associations, the point of which is to exaggerate minor differences between brands. Knowing the production narrative, or at least being able to plausibly imagine it, renders the social narrative of the advertisement less potent. The craftsman has an impoverished fantasy life compared to the ideal consumer; he is more utilitarian and less given to soaring hopes. But he is also more independent.

This would seem to be significant for any political typology. Political theorists from Aristotle to Thomas Jefferson have questioned the republican virtue of the artisan, finding him too narrow in his concerns to be moved by the public good. Yet this assessment was made before the full flowering of mass communication and mass conformity, which pose a different set of problems for the republican character: enervation of judgment and erosion of the independent spirit. If the modern personality is being reorganized on a predicate of passive consumption, this is bound to affect our political culture.

Since the standards of craftsmanship issue from the logic of things rather than the art of persuasion, practiced submission to them perhaps gives the craftsman some psychic ground to stand on against fantastic hopes aroused by demagogues, whether commercial or political. Plato makes a distinction between technical skill and rhetoric on the grounds that rhetoric "has no account to give of the real nature of things, and so can-

not tell the cause of any of them."[9] The craftsman's habitual deference is not toward the New, but toward the objective standards of his craft. However narrow in its application, this is a rare appearance in contemporary life—a disinterested, articulable, and publicly affirmable idea of the good. Such a strong ontology is somewhat at odds with the cutting-edge institutions of the new capitalism, and with the educational regime that aims to supply those institutions with suitable workers—pliable generalists unfettered by any single set of skills.

Today, in our schools, the manual trades are given little honor. The egalitarian worry that has always attended tracking students into "college prep" and "vocational ed" is overlaid with another: the fear that acquiring a specific skill set means that one's life is *determined.* In college, by contrast, many students don't learn anything of particular application; college is the ticket to an *open* future. Craftsmanship entails learning to do one thing really well, while the ideal of the new economy is to be able to learn new things, celebrating potential rather than achievement. Somehow, every worker in the cutting-edge workplace is now supposed to act like an "intrapreneur," that is, to be actively involved in the continuous redefinition of his own job. Shop class presents an image of stasis that runs directly counter to what Sennett identifies as "a key element in the new economy's idealized self: the capacity to surrender, to give up possession of an established reality." This stance toward "established reality," which can only be called psychedelic, is best not indulged around a table saw. It is dissatisfied with what Arendt calls the "reality and reliability" of the world. It is a strange sort

of ideal, attractive only to a peculiar sort of self—insecurity about the basic character of the world is no fun for most people.

As Sennett argues, most people take pride in being good at something specific, which happens through the accumulation of experience. Yet the flitting disposition is pressed upon workers from above by the current generation of management revolutionaries, for whom the ethic of craftsmanship is actually something to be rooted out from the workforce. Craftsmanship means dwelling on a task for a long time and going deeply into it, because you want to get it right. In managementspeak, this is called being "ingrown." The preferred role model is the management consultant, who swoops in and out and whose very pride lies in his lack of particular expertise. Like the ideal consumer, the management consultant presents an image of soaring freedom, in light of which the manual trades appear cramped and paltry: the plumber with his butt crack, peering under the sink.

With such images in their heads, parents don't want their children to become plumbers. Yet that filthy plumber under the sink might be charging somebody eighty dollars an hour. This fact *ought*, at least, to induce an experience of cognitive dissonance in the parent who regards his child as smart and wants him to become a knowledge worker. If he accepts the basic premise of a knowledge economy that someone being paid a lot of money must *know* something, he may begin to wonder what is really going on under that sink, and entertain a suspicion against the widely accepted dichotomy of knowledge work *versus* manual work. In fact, that dichotomy rests on some fundamental misconceptions. I'd like to offer an alternative account, one that will give due credit to the cognitive richness of manual work. In pursuing these questions, we arrive at insights that help to explain why work that is straightforwardly useful can also be intellectually absorbing.

The Cognitive Demands of Manual Work

In *The Mind at Work,* Mike Rose provides "cognitive biographies" of several trades, and depicts the learning process in a wood shop class. He writes that "our testaments to physical work are so often focused on the values such work exhibits rather than on the thought it requires. It is a subtle but pervasive omission. . . . It is as though in our cultural iconography we are given the muscled arm, sleeve rolled tight against biceps, but no thought bright behind the eye, no image that links hand and brain."[10]

Skilled manual labor entails a systematic encounter with the material world, precisely the kind of encounter that gives rise to natural science. From its earliest practice, craft knowledge has entailed knowledge of the "ways" of one's materials—that is, knowledge of their nature, acquired through disciplined perception. At the beginning of the Western tradition, *sophia* (wisdom) meant "skill" for Homer: the technical skill of a carpenter, for example. Through pragmatic engagement, the carpenter learns the different species of wood, their fitness for such needs as load bearing and water holding, their dimensional stability with changes in the weather, and their varying resistance to rot

and insects. The carpenter also gains a knowledge of universals, such as the right angle, the plumb, and the level, which are indispensable for sound construction. It is in the crafts that nature first becomes a thematic object of study, and that study is grounded by a regard for human utility.

In the tradition that developed in the West, "wisdom" lost the concrete sense it originally had in Homer. In religious texts, on the one hand, "wisdom" tended toward the mystical. In science, on the other hand, "wisdom" remained connected to knowledge of nature, but with the advent of idealizations such as the frictionless surface and the perfect vacuum, science, too, adopted a paradoxically otherworldly ideal of *how* we come to know nature: through mental constructions that are more intellectually tractable than material reality, hence amenable to mathematical representation. Descartes, generally credited with inaugurating the scientific revolution, begins from radical doubt about the very existence of an external world, and builds up the principles of scientific inquiry from the foundation of a radically self-contained subject.

Yet this solipsistic ideal doesn't gibe perfectly with the history of science. For in fact, in areas of well-developed craft practices, technological developments typically preceded and gave rise to advances in scientific understanding, not vice versa. The steam engine is a good example. It was developed by mechanics who observed the relations between volume, pressure, and temperature. This was at a time when theoretical scientists were tied to the caloric theory of heat, which later turned out to be a conceptual dead end. The success of the steam engine con-

tributed to the development of what we now call classical thermodynamics. This history provides a nice illustration of a point made by Aristotle:

> *Lack of experience diminishes our power of taking a comprehensive view of the admitted facts. Hence those who dwell in intimate association with nature and its phenomena are more able to lay down principles such as to admit of a wide and coherent development; while those whom devotion to abstract discussions has rendered unobservant of facts are too ready to dogmatize on the basis of a few observations.*[11]

Many inventions capture a reflective moment in which some worker has made explicit the assumptions that are implicit in his skill. In a beautiful article, the cognitive scientists Mike Eisenberg and Ann Nishioka Eisenberg give real pedagogical force to this idea, and draw out its theoretical implications. They offer a computer program to facilitate making origami, or rather Archimedean solids, by unfolding these solids into two dimensions. But they then have their students actually make the solids, out of paper cut according to the computer's instructions. "Computational tools for crafting are entities poised somewhere between the abstract, untouchable world of software objects and the homey constraints of human dexterity; they are therefore creative exercises in making conscious those aspects of craft work . . . that are often more easily represented 'in the hand' than in language."[12] It is worth pausing to consider their efforts, as they have implications well beyond mathematics instruction.

In our early work with HyperGami, we often ran into situations in which the program provided us with a folding net that was mathematically correct—i.e., a technically correct unfolding of the desired solid—but otherwise disastrous. . . . Here, we are trying to create an approximation to a cone—a pyramid on a regular octagonal base. HyperGami provides us with a folding net that will, indeed, produce a pyramid; but typically, no paper crafter would come up with a net of this sort, since it is fiendishly hard to join together those eight tall triangles into a single vertex. In fact, this is an illustrative example of a more general idea—the difficulty of formalizing, in purely mathematical terms, what it means to produce a "realistic" (and not merely technically correct) solution to an algorithmic problem derived from human practice.

I take their point to be that a realistic solution must include ad hoc constraints known only through practice, that is, through embodied manipulations. Those constraints cannot be arrived at deductively, starting from mathematical entities. These experiments with origami help us to understand why certain aspects of mechanical work cannot be reduced to rule following.

When I first starting working in the bike shop, after quitting the think tank, I would come home from work and my wife would sniff at me. She'd say "carbs" or "brakes" as she learned to identify the various solvents used in cleaning different parts

of a motorcycle. Leaving a sensible trace, my workday was at least imaginable to her. But while the filth and odors were apparent, the amount of head scratching I'd done since breakfast was not. Mike Rose writes that in the practice of surgery, "dichotomies such as concrete versus abstract and technique versus reflection break down in practice. The surgeon's judgment is simultaneously technical and deliberative, and that mix is the source of its power."[13] This could be said of any manual skill that is diagnostic, including motorcycle repair. You come up with an imagined train of causes for manifest symptoms and judge their likelihood before tearing anything down. This imagining relies on a stock mental library, not of natural kinds or structures, like that of the surgeon, but rather the functional kinds of an internal combustion engine, their various interpretations by different manufacturers, and their proclivities for failure. You also develop a library of sounds and smells and feels. For example, the backfire of a too-lean fuel mixture is subtly different from an ignition backfire. If the motorcycle is thirty years old, from an obscure maker that went out of business twenty years ago, its proclivities are known mostly through lore. It would probably be impossible to do such work in isolation, without access to a collective historical memory; you have to be embedded in a community of mechanic-antiquarians. These relationships are maintained by telephone, in a network of reciprocal favors that spans the country. My most reliable source, Fred Cousins in Chicago, has such an encyclopedic knowledge of obscure European motorcycles that all I can offer him in exchange is regular deliveries of obscure European beer.

There is always a risk of introducing new complications when working on decrepit machines (kind of like gerontology, I suppose), and this enters the diagnostic logic. Measured in likelihood of screwups, the cost is not identical for all avenues of inquiry when deciding which hypothesis to pursue—for example, when trying to figure out why a bike won't start. The fasteners holding the engine covers on 1970s-era Hondas are Phillips head, and they are *always* rounded out and corroded. Do you *really* want to check the condition of the starter clutch, if each of ten screws will need to be drilled out and extracted, risking damage to the engine case? Such impediments can cloud your thinking. Put more neutrally, the attractiveness of any hypothesis is determined in part by physical circumstances that have no logical connection to the diagnostic problem at hand, but a strong pragmatic bearing on it (kind of like origami). The factory service manuals tell you to be systematic in eliminating variables, but they never take into account the risks of working on old machines. So you have to develop your own decision tree for the particular circumstances. The problem is that at each node of this new tree, your own unquantifiable risk aversion introduces ambiguity. There comes a point where you have to step back and get a larger gestalt. Have a cigarette and walk around the lift. Any mechanic will tell you that it is invaluable to have other mechanics around to test your reasoning against, especially if they have a different intellectual disposition.

My shop mate in the early years, Thomas Van Auken, was also an accomplished visual artist (he is the illustrator of this book) and I was repeatedly struck by his ability to literally *see*

things that escaped me. I had the conceit of being an empiricist, but seeing things is not always a simple matter. Even on the relatively primitive vintage bikes that were our specialty, some diagnostic situations contain so many variables, and symptoms can be so under-determining of causes, that explicit analytical reasoning comes up short. What is required then is the kind of judgment that arises only from experience; hunches rather than rules. I quickly realized there was more thinking going on in the bike shop than in my previous job at the think tank.

Socially, being the proprietor of a bike shop in a small city gives me a feeling I never had before. I feel I have a place in society. Whereas "think tank" is an answer that, at best, buys you a few seconds when someone asks what you do and you try to figure out what it is that you in fact do, with "motorcycle mechanic" I get immediate recognition. I barter services with machinists and metal fabricators, which has a very different feel than transactions with money, and further increases my sense of belonging to a community. There are three restaurants in Richmond with cooks whose bikes I have restored, where unless I deceive myself I am treated as a sage benefactor. I feel pride before my wife when we go out to dinner and are given preferential treatment, or simply a hearty greeting. There are group rides, and there used to be bike night every Tuesday at a certain bar. Sometimes one or two people would be wearing my shop's T-shirt, which felt good.

Given the intrinsic richness of manual work—cognitively, socially, and in its broader psychic appeal—the question becomes why it has suffered such a devaluation as a component of education. The economic rationale so often offered, namely,

that manual work is somehow going to disappear, is questionable if not preposterous, so it is in the murky realm of culture that we must look to understand these things. Here a bit of history can help; a glance at the origins of shop class early in the twentieth century reveals cultural currents that continue to swirl around us.

Art, Crafts, and the Assembly Line

Early in the twentieth century, when Teddy Roosevelt preached the strenuous life and elites worried about their state of "overcivilized" spiritual decay, the project of getting back in touch with "real life" took various forms. One was romantic fantasy about the premodern craftsman. This was understandable given changes in the world of work at the turn of the century, a time when the bureaucratization of economic life was rapidly increasing the number of paper shufflers. As T. J. Jackson Lears explains in his history of the Progressive era, *No Place of Grace*, the tangible elements of craft were appealing as an antidote to vague feelings of unreality, diminished autonomy, and a fragmented sense of self that were especially acute among the professional classes.

The Arts and Crafts movement thus fit easily with the new therapeutic ethic of self-regeneration. Depleted from his workweek in the corporate world, the office worker repaired to his basement workshop to putter about and tinker, refreshing himself for the following week. As Lears writes, "toward the end of the nineteenth century, many beneficiaries of modern culture

began to feel they were its secret victims."[14] Various forms of antimodernism gained wide currency in the middle and upper classes, including the ethic of craftsmanship. Some Arts and Crafts enthusiasts conceived their task to be evangelizing good taste as embodied in the works of craft, as against machine-age vulgarity. Cultivating an appreciation for objets d'art was thus a form of protest against modernity, with a view to providing a livelihood to dissident craftsmen. But it dovetailed with, and gave a higher urgency to, the nascent culture of luxury consumption. As Lears tells the story, the great irony is that antimodernist sentiments of aesthetic revolt against the machine paved the way for certain unattractive features of late-modern culture: therapeutic self-absorption and the hankering after "authenticity," precisely those psychic hooks now relied upon by advertisers. Such spiritualized, symbolic modes of craft practice and craft consumption represented a kind of compensation for, and therefore an accommodation to, new modes of routinized, bureaucratic work.

But not everyone worked in an office. Indeed, there was class conflict brewing, with unassimilated immigrants accumulating in America's eastern cities and serious labor violence in Chicago and elsewhere. To the upper classes of those same cities, enamored of the craft ideal, the possibility presented itself that the laboring classes might remain satisfied with their material lot if they found joy in their labor. Shop class could serve to put the proper spin on manual work. Any work, it was posited, could be "artful" if done in the proper spirit. Somehow a movement that had started with reverence for the craftsman now offered an apologetic for factory work. As Lears writes,

"By shifting their attention from the conditions of labor to the laborer's frame of mind, craft ideologues could acclaim the value of any work, however monotonous."[15]

The Smith-Hughes Act of 1917 gave federal funding for manual training in two forms: as part of general education and as a separate vocational program. The invention of modern shop class thus serviced both cultural reflexes of the Arts and Crafts movement at once. The children of the managerial class could take shop as enrichment to the college-prep curriculum, making a bird feeder to hang outside Mom's kitchen window, while the children of laborers would be socialized into the work ethic appropriate to their station through what was now called "industrial arts" education. The need for such socialization was not simply a matter of assimilating immigrants from southern and eastern Europe who lacked a Protestant work ethic. It was recognized as a necessity for the broader working-class population, precisely because the institutions that had previously served this socializing function, apprenticeship and guild traditions, had been destroyed by new modes of labor. In his 1915 report to the United States Commission on Industrial Relations, Robert Hoxie worried thus:

> *It is evident . . . that the native efficiency of the working class must suffer from the neglect of apprenticeship, if no other means of industrial education is forthcoming. Scientific managers, themselves, have complained bitterly of the poor and lawless material from which they must recruit their workers, compared with the efficient and self-respecting craftsmen who applied for employment twenty years ago.*[16]

Needless to say, "scientific managers" were concerned more with the "efficient" part of this formula than with the "self-respecting" part, yet the two are not independent. The quandary was how to make workers efficient and attentive, when their actual labor had been degraded by automation. The motivation previously supplied by the intrinsic satisfactions of manual work was to be replaced with ideology; industrial arts education now concerned itself with moral formation. Lears writes that "American craft publicists, by treating craftsmanship . . . as an agent of socialization, abandoned [the] effort to revive pleasurable labor. Manual training meant specialized assembly line preparation for the lower classes and educational or recreational experiences for the bourgeoisie."[17]

Of the Smith-Hughes Act's two rationales for shop class, vocational and general ed, only the latter emphasized the learning of aesthetic, mathematical, and physical principles through the manipulation of material things. It is not surprising, then, that the act came four years after Henry Ford's innovation of the assembly line. The nascent two-track educational scheme mirrored the assembly line's severing of the cognitive aspects of manual work from its physical execution. Such a partition of thinking from doing has bequeathed us the dichotomy of white collar versus blue collar, corresponding to mental versus manual.

These seem to be the categories that inform the educational landscape even now, and this entails two big errors. First, it assumes that all blue-collar work is as mindless as assembly line work, and second, that white-collar work is still recognizably mental in character. Yet there is evidence to suggest that the new

frontier of capitalism lies in doing to office work what was previously done to factory work: draining it of its cognitive elements. Paradoxically, educators who would steer students toward cognitively rich work might do this best by rehabilitating the manual trades, based on a firmer grasp of what such work is really like.

This would take courage. Any high school principal who doesn't claim as his goal "one hundred percent college attendance" is likely to be accused of harboring "low expectations" and run out of town by indignant parents. This indignation is hard to stand against, since it carries all the moral weight of egalitarianism. Yet it is also snobbish, since it evidently regards the trades as something "low." The best sort of democratic education is neither snobbish nor egalitarian. Rather, it accords a place of honor in our common life to whatever is best. At this weird moment of growing passivity and dependence, let us publicly recognize a yeoman aristocracy: those who gain real knowledge of real things, the sort we all depend on every day.

But is it feasible to make a decent living in the trades? Or are we headed for a "postindustrial" society in which there will be little need for the work of the hand? Are we perhaps already there? What are the economics of "the knowledge economy"? My purpose in this book is to elaborate the potential for human flourishing in the manual trades—their rich cognitive challenges and psychic nourishment—rather than stake out policy positions or make factual claims about the economy. But it may be well to consider some economic views that can nourish our

skepticism about the postindustrial vision, and open the way for our larger inquiry.

The Future of Work: Back to the Past?

Writing in *Foreign Affairs*, the Princeton economist Alan Blinder considers the question of job security and falling wages for U.S. workers in light of global competition:

> *Many people blithely assume that the critical labor-market distinction is, and will remain, between highly educated (or highly skilled) people and less-educated (or less-skilled) people—doctors versus call-center operators, for example. The supposed remedy for the rich countries, accordingly, is more education and a general "upskilling" of the work force. But this view may be mistaken. . . . The critical divide in the future may instead be between those types of work that are easily deliverable through a wire (or via wireless connections) with little or no diminution in quality and those that are not. And this unconventional divide does not correspond well to traditional distinctions between jobs that require high levels of education and jobs that do not.*[18]

Blinder suggests the crucial distinction in the labor market will be between what he calls "personal services" and "impersonal services." The former either require face-to-face contact or are inherently tied to a specific site. Physicians who treat patients don't need to worry that their jobs will be sent offshore,

but radiologists who examine images have already seen this happen, just as accountants and computer programmers have. He goes on to point out that "you can't hammer a nail over the Internet."

Blinder's analysis suggests a future of rising wages for construction, for maintenance and repair work on physical plants, and for maintenance and repair of durable machines (such as cars) that aren't so cheap that they become disposable at the first sign of trouble, as for example a toaster oven is. In a follow-up piece in the *Washington Post*, he writes that "millions of white-collar workers who thought their jobs were immune to foreign competition suddenly find that the game has changed—and not to their liking."[19]

He finds 30 million to 40 million U.S. jobs to be potentially offshorable, ranging from "scientists, mathematicians and editors on the high end" to "telephone operators, clerks and typists on the low end." Blinder predicts a massive economic disruption that is only just beginning, affecting people who went to college and assumed their education prepared them for high-paying careers with lots of opportunity. Now their bosses are looking to India, or the Philippines, and finding well-qualified people who speak good English and will work for a fraction of what Americans have been earning. Architects face this threat, but builders don't.

The MIT economist Frank Levy makes a complementary argument. He puts the issue not in terms of whether a service can be *delivered* electronically or not, but rather whether the service is itself rules-based or not. Until recently, he writes, you could make a decent living doing a job that required you to carefully

follow instructions, such as preparing tax returns. But such work is subject to attack on two fronts—some of it goes to offshore accountants and some of it is done by tax preparation software, such as TurboTax. The result is downward pressure on wages for jobs based on rules.

These economic developments command our attention. The intrusion of computers, and distant foreigners whose work is conceived in a computer-like, rule-bound way, into what was previously the domain of professionals may be alarming, but it also compels us to consider afresh the *human* dimension of work. In what circumstances does the human element remain indispensable, and why? Levy gestures toward an answer when he writes that "viewed from this rules-based perspective, creativity [sic] is knowing what to do when the rules run out or there are no rules in the first place. It is what a good auto mechanic does after his computerized test equipment says the car's transmission is fine but the transmission continues to shift at the wrong engine speed."[20]

When this happens, the mechanic is thrown back on himself and must make sense of the situation. Often this sense making entails not so much problem solving as problem *finding*. When you do the math problems at the back of a chapter in an algebra textbook, you are problem solving. If the chapter is entitled "Systems of two equations with two unknowns," you know exactly which methods to use. In such a constrained situation, the pertinent context in which to view the problem has already been determined, so there is no effort of interpretation required. But in the real world, problems don't present themselves in this predigested way; usually there is too much infor-

mation, and it is difficult to know what is pertinent and what isn't. Knowing what *kind* of problem you have on hand means knowing what features of the situation can be ignored. Even the boundaries of what counts as "the situation" can be ambiguous; making discriminations of pertinence cannot be achieved by the application of rules, and requires the kind of judgment that comes with experience. The value and job security of the mechanic lie in the fact that he has this firsthand, personal knowledge.

Every trade is different. Each offers its own intrinsic satisfactions, characteristic frustrations, and cognitive challenges; sometimes these challenges are rich enough to be totally absorbing. To understand why the kind of thinking that goes on in the trades isn't more broadly appreciated, let us inquire once more in a historical mode, the better to understand our current situation.

2

The Separation of Thinking from Doing

The dichotomy of mental versus manual didn't arise spontaneously. Rather, the twentieth century saw concerted *efforts* to separate thinking from doing. Those efforts achieved a good deal of success in ordering our economic life, and it is this success that perhaps explains the plausibility the distinction now enjoys. Yet to call this "success" is deeply perverse, for wherever the separation of thinking from doing has been achieved, it has been responsible for the degradation of work. If we can understand the process by which so many jobs get fragmented, we will be better able to recognize those areas of work that have resisted the process, and identify jobs in which the human capacities may be more fully engaged.

In the 1950s, sociologists started pointing out a basic resemblance between Soviet and Western societies: in both there seemed to be an increasing number of jobs that were radically simplified. Both societies were industrial, and had in common a growing separation of planning from execution. This was sometimes attributed to automation, but more penetrating ob-

servers noted that it proceeded from the imperatives of rational administration—a sort of social technology, rooted in the division of labor. The "machine" in question was the social body, made up of increasingly standardized parts. In the Soviet bloc, this machine was subject to central control by the state; in the West, by corporations.

In 1974, Harry Braverman published his masterpiece of economic reflection, *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century.* Braverman was an avowed Marxist. With the cold war now safely decided, we may consider anew, without a sense of mortal political threat, the Marxian account of alienated labor. As Braverman acknowledged, this critique applied to the Soviet Union no less than to capitalist societies. He gives a richly descriptive account of the degradation of many different kinds of work. In doing so, he offers nothing less than an explanation of why we are getting more stupid with every passing year—which is to say, the degradation of work is ultimately a cognitive matter, rooted in the separation of thinking from doing.

The Degradation of Blue-Collar Work

The central culprit in Braverman's account is "scientific management," which "enters the workplace not as the representative of science, but as the representative of management masquerading in the trappings of science."[1] The tenets of scientific management were given their first and frankest articulation by Frederick Winslow Taylor, whose *Principles of Scientific*

Management was hugely influential in the early decades of the twentieth century. Stalin was a big fan, as were the founders of the first MBA program, at Harvard, where Taylor was invited to lecture annually. Taylor writes, "The managers assume . . . the burden of gathering together all of the traditional knowledge which in the past has been possessed by the workmen and then of classifying, tabulating, and reducing this knowledge to rules, laws, and formulae."[2] Scattered craft knowledge is concentrated in the hands of the employer, then doled out again to workers in the form of minute instructions needed to perform some *part* of what is now a work *process.* This process replaces what was previously an integral activity, rooted in craft tradition and experience, animated by the worker's own mental image of, and intention toward, the finished product. Thus, according to Taylor, "All possible brain work should be removed from the shop and centered in the planning or laying-out department. . . ."[3] It is a mistake to suppose that the primary purpose of this partition is to render the work process more efficient. It may or may not result in extracting more value from a given unit of labor *time.* The concern is rather with labor *cost.* Once the cognitive aspects of the job are located in a separate management class, or better yet in a process that, once designed, requires no ongoing judgment or deliberation, skilled workers can be replaced with unskilled workers at a lower rate of pay. Taylor writes that the "full possibilities" of his system "will not have been realized until almost all of the machines in the shop are run by men who are of smaller caliber and attainments, and who are therefore cheaper than those required under the old system."[4]

What becomes of the skilled workers? The naïve view is that "they go elsewhere." But the competitive labor-cost advantage now held by the more modern firm, which has aggressively separated planning from execution, compels the whole industry to follow the same route, and entire skilled trades disappear. Thus craft knowledge dies out, or rather gets instantiated in a different form, as process engineering knowledge. The conception of the work is remote from the worker who does it.

Scientific management introduced the use of "time and motion analysis" to describe the physiological capabilities of the human body in machine terms. As Braverman writes, "the more labor is governed by classified motions which extend across the boundaries of trades and occupations, the more it dissolves its concrete forms into the general types of work motions. This mechanical exercise of human faculties according to motion types which are studied independently of the particular kind of work being done, brings to life the Marxist conception of 'abstract labor.'"[5] The clearest example of abstract labor is thus the assembly line. The *activity* of self-directed labor, conducted by the worker, is dissolved or abstracted into parts and then reconstituted as a *process* controlled by management—a labor sausage.

At the turn of the last century, the manufacture of automobiles was done by craftsmen recruited from bicycle and carriage shops: all-around mechanics who knew what they were doing. In *The Wheelwright's Shop*, George Sturt relates his experience in taking over his family business of making wheels for carriages, in 1884, shortly before the advent of the automobile. He had been a schoolteacher with literary ambitions, but now finds himself almost overwhelmed by the cognitive demands of his new

trade. In Sturt's shop, working exclusively with hand tools, the skills required to build a wheel regress all the way to the selection of trees to fell for timber, the proper time for felling them, how to season them, and so forth. To select but one minor task out of the countless he describes, here is Sturt's account of fabricating a section of the wheel's rim, called a "felloe":

> *Yet it is in vain to go into details at this point; for when the simple apparatus had all been gotten together for one simple-looking process, a never-ending series of variations was introduced by the material. What though two felloes might seem much alike when finished? It was the wheelwright himself who had to make them so. He it was who hewed out that resemblance from quite dissimilar blocks, for no two felloe-blocks were ever alike. Knots here, shakes there, rind-galls, waney edges (edges with more or less bark in them), thicknesses, thinnesses, were for ever affording new chances or forbidding previous solutions, whereby a fresh problem confronted the workman's ingenuity every few minutes. He had no band-saw (as now [1923]) to drive, with ruthless unintelligence, through every resistance. The timber was far from being prey, a helpless victim, to a machine. Rather it would lend its own special virtues to the man who knew how to humour it.*[6]

Given their likely acquaintance with such a cognitively rich world of work, it is hardly surprising that when Henry Ford introduced the assembly line in 1913, workers simply walked out. One of Ford's biographers wrote, "So great was labor's dis-

taste for the new machine system that toward the close of 1913 every time the company wanted to add 100 men to its factory personnel, it was necessary to hire 963."[7]

This would seem to be a crucial moment in the history of political economy. Evidently, the new system provoked natural revulsion. Yet, at some point, workers became habituated to it. How did this happen? One might be tempted to inquire in a typological mode: What sort of men were these first, the 100 out of 963 who stuck it out on the new assembly line? Perhaps it was the men who felt less revulsion because they had less pride in their own powers, and were therefore more tractable. Less republican, we might say. But if there was initially such a self-selection process, it quickly gave way to something more systemic.

In a temporary suspension of the Taylorist logic, Ford was forced to double the daily wage of his workers to keep the line staffed. As Braverman writes, this "opened up new possibilities for the intensification of labor within the plants, where workers were now anxious to keep their jobs."[8] These anxious workers were more productive. Indeed, Ford himself later recognized his wage increase as "one of the finest cost-cutting moves we ever made," as he was able to double, and then triple, the rate at which cars were assembled by simply speeding up the conveyors. By doing so he destroyed his competitors, and thereby destroyed the possibility of an alternative way of working. (This also removed the wage pressure that comes from the existence of more enjoyable jobs.) In 1900 there were 7,632 wagon and carriage manufacturers in the United States.[9] Adopting Ford's methods, the industry would soon be reduced to the Big Three. So workers eventually became habituated to the abstraction of

the assembly line. Evidently, it inspires revulsion only if one is acquainted with more satisfying modes of work.

Here the concept of wages as *compensation* achieves its fullest meaning, and its central place in modern economy. Changing attitudes toward consumption seemed to play a role. A man whose needs are limited will find the least noxious livelihood and work in a subsistence mode, and indeed the experience of early (eighteenth-century) capitalism, when many producers worked at home on a piece-rate basis, was that only so much labor could be extracted from them. Contradicting the assumptions of "rational behavior," it was found that when employers would increase the piece rate in order to boost production, it actually had the opposite effect: workers would produce less, as now they could meet their fixed needs with less work. Eventually it was learned that the only way to get them to work harder was to play upon the imagination, stimulating new needs and wants. Consumption, no less than production, needed to be brought under scientific management—the management of desire. Thus, there came to be marketers who called themselves "consumption engineers" in the early decades of the twentieth century. They were armed with the latest findings of experimental psychology.[10]

The habituation of workers to the assembly line was thus perhaps made easier by another innovation of the early twentieth century: consumer debt. As Jackson Lears has argued, through the installment plan previously unthinkable acquisitions became thinkable, and more than thinkable: it became normal to carry debt.[11] The display of a new car bought on installment became a sign that one was trustworthy. In a whole-

sale transformation of the old Puritan moralism, expressed by Benjamin Franklin (admittedly no Puritan) with the motto "Be frugal and free," the early twentieth century saw the moral legitimation of spending. One symptom Lears points to is a 1907 book with the immodest title *The New Basis of Civilization*, by Simon Nelson Patten, in which the moral valence of debt and spending is reversed, and the multiplication of wants becomes not a sign of dangerous corruption but part of the civilizing process. That is, part of the disciplinary process. As Lears writes, "Indebtedness could discipline workers, keeping them at routinized jobs in factories and offices, graying but in harness, meeting payments regularly."