5. REFLECTIVE TECHNIQUE  
Electrical Wiring and Construction

For a very long time in the West, there has been a tendency among intellectual elites to distinguish between physical work and technical skill—labor, the mechanical arts, crafts and trades—and deliberative and philosophical activity, which emerges from leisure, or, at least, from a degree of distance from the world of work and commerce. This distinction is related to another: between pursuits that are ends in themselves and pursuits that are means to other ends, "pure" activity and knowledge versus the instrumental, applied, and practical, which possess less merit. These distinctions find early articulation in Classical Greece where they were part of a comprehensive philosophical system that celebrated the capacity of the human mind but that developed in a society reliant on slavery and servile labor. One consequence was that entire social and occupational groups were narrowly, and harshly, defined. In The Republic, Plato mocks the craftsman who would pursue philosophy, for his soul is "warped and maimed" by his work; such men are "incapable of culture." And Aristotle in Politics notes that "there is no element of virtue in any of the occupations in which the multitude of artisans and market-people and the wage-earning class take part." Because such occupations are "ignoble and inimical to goodness," Aristotle further proposes that their practitioners be denied citizenship. To be sure, the craftsmen—from cobbler to shipwright to potter—was essential to Greek civilization, and his skill was praised, but, wrote Plutarch, "It does not necessarily follow that if a work is delightful because of its gracefulness, the man who made it is worthy of our serious regard." Work of body and hand, then, has limiting, even harmful, consequences for civic status and engagement, for the ability to deliberate and interpret, for virtue.

I am reading again what the Greeks and others in the Classical tradition had to say about physical work as I visit these classrooms and job sites where young people are learning a trade. The distinctions between pure and applied, theoretical and practical are deeply familiar to me, resonant from undergraduate courses in philosophy and literature, from graduate study in education and psychology, and from years of professional life in a research university, where a range of institutional decisions and certifications—from course credit to disciplinary definition—are made on the pivot of the pure-applied differential. A lot of our schooling reinforces this way of thinking about human activity. Though there certainly are dissenting voices in Western intellectual history, from Saint Augustine to William Morris, it is striking how pervasive this perspective on human behavior is. It underlies many canonical treatises on art and on education. So when Felipe expresses pleasure over the utility of his cabinet, he would raise, for some, a set of judgments that lessens the merit of the object of his craft and the virtue of his activity.

Yet, when you get in close to that activity, watch it unfold over time and get a sense of the thought and motive that directs it, you gain continual evidence of many of the qualities that the classical philosophical distinctions tend to diminish. The work itself when seriously engaged—the traditions and values one acquires and the complex knowledge and skills developed—gives rise to a virtue of practice, an ethics and aesthetics, and a reflectiveness intermixed with technique. Furthermore, as we've been seeing, all this becomes part of the construction of one's sense of self.

There are many reasons why physical work is perceived as it is in our time, reasons stemming from our economic and social structure. But an element of our perception—particularly in some intellectual communities and institutions—is related to these long-
standing distinctions, absorbed into new historical contexts. I want to consider the way these distinctions restrict, even categorically rule out, the possibility of the full expression of mind for whole groups of people, contributing to a stereotypic opinion of blue-collar workers. To help us arrive at a more philosophically generous view of mind and work, let me bring together a series of further vignettes, some from settings we’ve visited—Jon Guthier's plumbers and Jerry Devries's woodshop—but most from other sites, particularly two involving electrical wiring and construction.

One early event that got me to thinking about these issues occurred at a Habitat for Humanity construction site. As we were traveling to the site, I listened to a boy named Skip hold forth. Teen-magazine good looks, cocky, a mouth full of trouble, he was needling another boy about his acne and declaring that he was going to take care of someone else “for talking some shit about me.” By the end of the ride, I found myself imagining the hell Skip creates for some of his teachers and surely for his vulnerable classmates. He was quickly becoming my least favorite kid.

Then we pulled into the job site. A cluster of house frames, stacks of lumber, young folks and old securing joists, nailing plywood to rafters, installing windows. The teacher, a skilled carpenter named Scott Butler, picked Skip and two other boys to spend the day with him and learn how to install windows. I went with them. And witnessed a remarkable transformation in Skip. almost from the moment he put on his tool belt.

His agitated arrogance and the nasty streak disappeared. Instead, Skip was focused on the work, thoughtful about it and considerate of those working with him—his language inflected now with "yes sir" and "excuse me." He attended to Mr. Butler as the teacher guided the young crew through a range of activities: from tricks for working in tight quarters, to modifying routines in order to solve emerging problems, to thinking about the consequences of a particular repair for subsequent construction. Skip's one moment of disgruntlement—an emotional peep when compared to the braying on the bus—came in response to a poorly cut window frame left by a previous crew. "Oh man," he said, shaking his head, "measuring is one of the first things we learn how to do."

Skip's transformation and the connection to craft he displays call to mind a passage in Pedal to the Metal, Lawrence Ouellet's sociological study of long-haul truck drivers. Himself a veteran trucker, Ouellet reflects on his and his buddies' high school disrespectful rebelliousness versus the ethic and "sense of honor" he encountered as he entered the truck-driver's community, the way the work of the road, while allowing a countercultural bearing, brought with it certain codes of conduct and standards of performance. To be sure, the codes of physical work can incorporate cultural biases about race and gender, and about poverty itself. And there can be a certain rigidity to some craft values, a one-right-way absolutism that can blend with social intolerance. We, of course, don't know how Skip will turn out. But, for now, getting the windows right makes its demands on his mind and manner. Something in the techniques he's learning and the traditions they embody, or the occasion to display competence, or the relation the work affords with Mr. Butler—who knows exactly what—creates for this boy at this juncture in his development the opportunity to act with deliberation and civility, experiment with alternative ways of being in the world.

* * *

I was writing this book during a time of anguished national conversation about young people—about their popular culture, their goals and values, and, with the shock of schoolyard murders, their
internal torments and disconnection from the social fabric. Against this backdrop, I was reading about virtue, right action, and finding illustration of it in unexpected places, unexpected given our intellectual traditions and common biases. Now, I certainly witnessed peer insult, distorted masculinity, virtual and real violence. We just got a dose of it all from Skip. But young people's lives have many dimensions to them, and, thus. I also witnessed behaviors that are dearly sought in our national assays of adolescent experience. It is as if our collective anxiety is leading us to look in the wrong places, to seek pathology, and, as a result, to miss whole categories of activities that are principled and contribute to the social good.

During my visits I heard continual expression of—and saw material evidence to support—a desire to do a job correctly, not to rush it, to make something work well. Take, as illustration, Nancy, who, with another student in her automotive technology class, is replacing the brake pads on her sister's car. She works through the class period and into lunch. As she is finishing up, tightening wheel nuts with a pneumatic wrench, she talks about the importance of good brakes, how she is "really picky about brakes," how they can make the crucial difference in protecting both life and property.

Or watch Peter repairing the sinks in a women's shelter. He works with Joe, a retired plumber volunteering his time. Peter works hard and fast, says he enjoys getting this experience with a seasoned plumber, and is curious about the function of things. He'll ask Joe to repeat a task or manipulate a device so he can see how something works. At this moment, they're replacing the faucets on a bathroom sink, and are about to fit the sink back into its cabinet. Peter takes a quick look at the drainpipe and p-trap, running his finger inside the trap. "Oh, look at this!" he says to Joe. The trap is corroded, and if you squat down, you can see the build-up of rust and debris. "We've gotta change this," he says, "we can't put it back together like this." The schedule for the day specifies faucets only, so Peter goes in search of his instructor, wanting to get approval for a new p-trap that he will then have to find in the crew's supplies. Peter's curiosity and his desire to do good work combine here toward action that both satisfies his sense of workmanship and yields benefit to others.

Nancy and Peter are meticulous about the work they do, aware of its consequences, exhibiting both pride in and commitment to doing a good job. There are social and ethical ramifications here. And as we've been seeing throughout this book, these craft values emerge from and contribute to a sense of who one is, principled action and identity intertwined, which, it seems to me, provides a good foundation for virtue. Consider Rudolfo and Charles.

Rudolfo is sanding a bookcase, showing me a small flaw along the base. Under a strip of oak that both decorates and reinforces the base—in a place that no one will be able to see once the bookcase is upright—Rudolfo points to a tiny gap in the otherwise flawless seam where strip and base join together. The gap is between one-sixteenth and one thirty-second of an inch wide. Wood inevitably warps, and, as Rudolfo explains, he placed his finishing nails "too high on the strip," thus not correcting for a small irregularity in the oak. Next time, he notes, he'll place the nails lower, checking the seam more carefully. Now, though, he's going to fill the gap with putty and sand it. "No one can see it," he explains, "but I want it to be right."

Charles is volunteering at a Habitat for Humanity site and is assembling the frames for the walls of one of the bedrooms. These frames consist of two long, horizontal two-by-four boards with six shorter two-by-fours, called studs, nailed vertically in place.
sixteen inches apart. Charles begins by measuring and marking the sixteen-inch increments on the horizontal boards, and then lays out the vertical studs accordingly. He measures again. Then he begins nailing the studs in place, driving one nail, then another, stopping occasionally to check with his eye or a framing square the trueness of the frame. I ask Charles about this precision. He says that when the frame is finished, "I know it's going to be straight and well done." He pauses and adds: "That's the way I am." Charles's values motivate and guide his action: measuring twice, positioning his body, eyeballing the frame. The emerging frame, in turn, embodies those values, manifests them back to Charles, confirming his sense of himself.

* * *

"Hey, Justin, that's pretty!" Jim Padilla yells to the boy on the ladder, under the eaves, affixing the last fastening strap around a long stretch of electrical conduit. Mr. Padilla pulls two other boys over, pointing up. The sun is behind us, warm and bright on the stucco of the new house. "Look," Mr. Padilla says in his earnest, rolling voice, "you can barely see the conduit. Nice, huh? You always want to preserve the beauty of the home."

Jim Padilla, a stocky man with thick black hair and a full mustache, is the teacher of this crew of fledgling electricians, fifteen or so boys, high school juniors and seniors out of the classroom on their first job site, a modest tract house in need of outdoor lights and receptacles. Mr. Padilla moves on, his arms angling out from his chest as he walks, and stops at another ladder to talk to another boy fastening conduit under the eaves. "Hey, Mundo," he hollers up, "come down here a minute, por favor. I wanna show you something." Mundo makes his way down, rung after rung, setting foot alongside Mr. Padilla. The teacher points up to one of the straps on the underside of the roof. It is off-center. "Look, Mundo," says Mr. Padilla, "see, all the other straps are in the middle. That's good. Fix this one, OK? If the strap's in the middle it's stronger, and it looks better." Mundo nods and starts back up the ladder. Mr. Padilla places his hand on the boy's shoulder. He's not done yet. "We try hard not to show our straps, Mundo. We want to show as little evidence of the electrician's being here as possible."

The snug attachment of a conduit, the neat bend in it as it connects to a receptacle, the exact placement of a fastening strap where few will see—there is functional purpose to all this, but an aesthetic motive, too. ("What looks well works well," says one of the carpenters in Tracy Kidder's House.) To Jim Padilla's eye, such work is pleasant to behold, is "pretty," and he tries to train the eye of his students to see it as pretty, too. Being on a job site with Jim Padilla is like being in an artisan's studio, surrounded with evaluative craft-talk. Over time, the students acquire it, and the acquisition re-creates tradition in this time and place. A boy next to me stands back from his work, looks at it quietly, then turns to me and says, "That's nice, isn't it?" The look of the work becomes a mark of one's identity as an electrician. Showing a group of students the wiring in the electrical panel alongside the house, Mr. Padilla tells them: "Here's the thing, guys. Make it as neat as possible. Your signature is on this."

But it is an unusual signature, and an unusual aesthetic, given the aesthetic of display that so permeates both our popular and highbrow culture. Part of the appeal here is the care put into embedding one's work in the context of the house, out of view, even hidden. An experienced electrician I visited had removed a section of drywall and was commenting on a cluster of wires running along the frame. The braid was perfect, he said approvingly. That makes it easier, he explained, to single out a particular wire—the functional value—but also, it just looks good. The previous electri-
The Mind at Work by Mike Rose, Penguin Books 2005

cian's signature is woven into the braid, but anonymously so, and completely out of sight, seen, if at all, by another electrician, carpenter, or plumber over the life of the house.

If there is an aspect of Western intellectual history that diminishes the thought and virtue in physical work, there is, as well, a tendency to limit the meaning and occasion of aesthetic response. I am reminded of something one of Jerry Devries's students said in an English class. The teacher was introducing a list of vocabulary words, drawn from an essay they were reading. Aesthetic was one of them. After a few minutes of discussion, this boy, one of Jerry's more able students, raised his hand and respectfully suggested to his teacher that the word "doesn't have anything to do with us." His comment reveals the power of some traditional, and widespread, approaches to aesthetics, that it is a particular kind of response to "high art." Such definition is unfortunate here, for it compromises the student's understanding of his own activity.

Of course, there is a range of opinion in Western aesthetics about the nature and function of art, but what strikes me as I read in that literature is the immense intellectual effort put into differentiating that which is marked as art from other forms of human artifice. Tolstoy put it nicely: "[A] certain class of works which for some reason please a certain class of people is accepted as being art, and a definition of art is then devised to cover all these productions." And these definitions are often wrought comparatively: art is contrasted with other activity (for example, craft) and judged to be of a different, and superior, order. I am not suggesting that Felipe's cabinet or Justin's neat conduit is the cognitive or imaginative equivalent of The Starry Night or "Mood Indigo." What is worth considering, though, is the way the process of defining art tends to diminish other realms of artful behavior.

* * *

Marcus lays a small spirit level on the top of one of the receptacle boxes, examines it, then tightens the fasteners affixing conduit to receptacle. He takes three or four steps back, folds his arms, and looks at the assembly, a long look, quiet. He takes a pair of pliers out of his back pocket, walks forward, taps another receptacle box, lightly, then again. He moves back, takes the scene in, focused amid the chatter of other students working on other assemblies. He returns to the box, taps it once more, puts the level over it. Perfect. He recedes again, leans against an adjoining wall, reflective.

Marcus is completing a mock-up of an assembly of outdoor lights and receptacles, not unlike the configuration Jim Padilla's crew is working on, but a bit more complicated, for he is further along in development, taking courses in a trade-technical college program in electrical construction and maintenance. Marcus is in his mid-forties, and wants to become an electrician after having worked in the airline industry for a number of years. The mock-up before him is one of twenty-five such assignments he and his peers must complete this term; it has taken days to think through and build.

In his brief essay on painting, "Making Pictures," D. H. Lawrence writes of the experience of "disappear[ing] into that canvas." There are times in this electrician's workshop when you sense that kind of absorption. It's a relatively quiet place. The students talk some while they're working, check in on each other, consult, hang out—but not a lot. Concentration. You occasionally hear an exclamation of frustration, shit or goddamnit, but it tends to be linked to a blunder or mishap—a porcelain fixture that cracks with the final turn of a screw or a finger whacked or pinched—rather than to a circuit that didn't test out. You could describe the students as patient, but, though not inaccurate, patience doesn't quite capture the feel of the room; there's a sense of engagement, a sense that
these problems are worth solving. You give yourself over to the task; it takes what it takes. To pitch a fit at every failed test would be bad form.

What I am trying to describe here—this mode of engagement—is nicely rendered in studies of intelligence in other cultures, where "smart behavior" can include what Western psychologists would distinguish as qualities of emotion and personality. Among the Canadian Inuit, for example, competence at solving a puzzle, or fixing a snowmobile, or teaching a baby to walk is manifested through a blend of experience, skill, knowledge, and a calm perseverance. One's orientation to the task, one's way of being with it, is crucial. This ability is not considered to be innate; one learns it, is socialized into it.

I got to watch something akin to this process of socialization closer to home—with Jim Padilla and his students working under those eaves.

Hector, in a quarter-twist of his torso, arms over his head, is trying to fasten a conduit strap into tight quarters. "Mr. Padilla," he moans, "the screw won't go in. Dang, I can't get leverage!" Jim Padilla rests his foot on the bottom rung of the ladder, one hand on the rail, watching Hector, offering suggestions calmly, methodically. "Try a smaller screwdriver, Hector." Then, "Turn the hammer sideways." Then, "No? Well, start the hole with a nail." Mr. Padilla intersperses these suggestions with homilies and exhortations: "Hector, there's more than one way to get milk from a cow, verdad?" And, "I'm not gonna let you give up." And, eventually, Hector does get the vexing strap affixed—starting the hole with a nail does the trick, once he holds the hammer sideways—and he comes down the ladder, seemingly pleased with himself.

Imagine a developmental history of such experiences, surrounded by a discourse of persistence. I'm struck by something as I go back through my notes. I find not a single instance where Jon Guthier, or Jerry Devries, or Jim Padilla is talking to his students, or to me, in a way that suggests that some kids have got it and some don't. There is no talk of innate talents or of deficits versus giftedness. They will note when a student is skillful, a good crafts-person, careful, promising. But these evaluations seem focused on what the youngsters accomplish, rather than on some pervasive quality of their cognitive and biomechanical endowment.

So here's Mr. Padilla with Hector, talking him through alternative solutions, encouraging persistence but with flexibility—that is, not a dogged grunting at the problem but an adaptive sequence of attempts. There's lots of ways to get milk from that cow, lots of variations, tricks of the trade. In fact, one could define tricks of the trade as embodiments of wiliness, ways that other workers have developed to overcome limits, tight spots, blunders. With such a delivered history of alternatives, and with it a frame of mind that encourages thinking alternatively, one, perhaps, has less need for a language of endowments and deficiencies.

Persistence, sticking with a problem and assuming there's a way to solve it, becomes a powerful motivator to continue, and a hedge against frustration—and against one's own sense of ineptitude. The young people working with Mr. Padilla get frustrated, to be sure, but their teacher guides them toward a different way of conceiving of the difficult moment. With the right frame of mind—and the right techniques—the problem just might be solvable, if you give it the time.

***

Marcus and his fellow students at the technical college talk a lot about time. They talk about the time it takes to do something right,
or about making an error because they were going too fast. You'll also see students redoing a task that was completed satisfactorily, but not up to their own standards ("I'll not settle for this," one says) and willingly giving up the time to do it again. Mastery is foregrounded: the clock recedes. Yet there is a clear tension between this task-oriented sense of time and the pressure of workplace production. (Some historians have noted similar tensions with the advent of industrialization.) These students have all held jobs; they're aware of the demands of the clock. They know they will have to become faster; as Marcus puts it, the job will be no place to train. So there is the hope that time given to mastery now will lead to surer, faster skills in the future. This is the economic context of their absorption. But it would be a mistake, I think, to attribute all motivation here to economic concerns and miss the other dimensions of their engagement.

I am intrigued by the feel and rhythm of this engagement, the oscillation between action and reflection that we saw with Marcus as he worked on the receptacle boxes. There's a reflective cast to the technical work these students do, a concentrated involvement, a disappearing into the task. "That's his world," the wife of an expert plumber tells me, "and he goes deep into it." That's what I sense here. A room, at times, lost in thought.

What, in this context, makes such engagement possible? What leads up to Marcus pondering his assembly? I spent several months observing him and his classmates, trying to catalog the different kinds of knowledge they acquire.

Marcus and his classmates learn a vocabulary and symbol system for electrical work. They read, interpret, and discuss electrical codes and perform a number of calculations related to them. They think and talk their way through multiple "scenarios"—various combinations of lights, appliances, switches, receptacles—using graphical displays developed from the electrical symbols. Several kinds of literacy and numeracy come into play: the mastery of new vocabulary and symbol systems; translating from one symbol system to another and using the symbols to solve problems with multiple variables; interpreting the codes and calculating from them. These codes, especially, raise an interesting set of social and educational issues. "You gotta be a lawyer" to read them, says Marcus. "The code is not written as an instructional manual," adds one of his classmates, "but is there to protect the industry, so that's tough, correlating the instructional aspect with the legal." As Marcus and company spend more time with experienced electricians, they'll further develop their knowledge of the code through talk and illustration, but now they work hard at deciphering it, learning to read the code for their own ends.

The conceptual work they do, then, is of some substance—and it is purposeful, must move outside the classroom to be realized and tested in assembly. Marcus observes that the time in class "gives you what you need to analyze" the tasks in the shop. The symbolic graphics help him "think ahead" as he builds an assembly, and the challenge is to "apply the concepts" he is learning to "new situations, new assemblies." It is in application that Marcus's knowledge gains its power, and this effective use becomes a test of the depth of his understanding.

Watching Marcus, you see the various cognitive and behavioral means he and his classmates have acquired to work the interface between classroom learning and assembly. He pins the symbolic representation of the assignment on the board alongside his emerging assembly and consults it as he works; sometimes he redraws parts of it on separate paper, using the sequence of symbols to assist him in thinking through the steps of assembly. He stands back...
from the assembly and with his index finger traces one of the multiple circuits through the conduits and switches, isolating a variable with the aid of a gesture. He reports visualizing the assembly, or a part of it, and, in fact, explains the need to imagine the assemblies when in class, to convert the symbolic representations into material networks of conduits and receptacles. He can then "take that image in my head right back out to the shop."

What Marcus and company reveal—and this resonates with the kind of thing we saw with Jerry Devries's carpenters—is the use of multiple representations of concepts and procedures, and a shuttling back and forth among them. In other words, these new electricians are making thought physical and, equally, converting the physical into images and symbols that they can manipulate.

Such work encourages a cognitive suppleness and contributes to a problem-solving cast of mind—evident with Jon Guthier's novice plumbers, but here in a different domain, and further along in development. Watch, for example, as Marcus and the others troubleshoot some problems in assembly. As they shift back and forth from graphics to assemblies and manually trace circuits, they speculate as to the cause of the problem. If you ask them, they'll talk in an experimentalist vocabulary of theories and hypotheses, and the steps they need to take to "test my theory." They are trained to proceed systematically. As one said, "You make sure each thing is doing what it should be doing, so you check them one at a time." Given the number of variables—and the increase in them as the assignments proceed—this focused, isolating orientation is crucial. And it is not mindless procedure. You hear the students articulate causal links, logical connections, as they take you through the elements of an assembly, then flick a switch, saying "and, indeed, the connection is made." Or they note that "in light of the wires coming from the panel" one can expect a particular outcome.

This aspect of the work, at least for some, yields a motivating cognitive pleasure; the students describe it as a "brain teaser" or a "mechanical puzzle," expressing the intellectual kick found in the need to "problem-solve mechanically."

Finally, let me note again the role of workmanship and aesthetics, evident throughout as part of the developing electrician's knowledge base and value system. As mentioned earlier, there is often a relation between appearance and function: the graceful bend in a line of conduit looks good but also contributes to a secure assembly. It is not uncommon, though, that a student's efforts are more aesthetic than functional; something just doesn't look right to the disciplined eye. So one student trims off a fraction of the end of a conduit that will be hidden in a receptacle box, or another reconfigures a series of wires because, simply, "it was all fucking ugly." Your signature is in the braid of that wire.

These are some of the factors I can isolate that precede and inform Marcus standing before the assembly. He is eyeballing for symmetry, which has aesthetic and functional benefit. He is thinking about the circuitry, a final run-through. He feels a sense of accomplishment and a sense of things coming together, a sense of the whole. Marcus's experience, and the experiences of others like him, do not meet the Classical criteria for philosophical reflection or contemplation: that the object of contemplation is necessary and immutable, and that the contemplative act is purely intellectual, complete in itself, and free of personal gain. But isn't it worth pondering the degree to which such criteria limit the contemplative possibilities of human experience? To assume that contemplation cannot emerge from work of the hand, observes Christian philosopher Douglas Steere, is "to exclude all those . . . who are not favored by a large leisure." For that fact, the Classical definition also denies something we've witnessed: the interplay between action
and reflection. We learn powerful things about the world not only by reflecting on it but also by acting on it—and what we learn through action can well move us to the contemplative. Marcus's configuration of objects and the channeling of electrical power it yields is his creation, one involving basic physical forces as well as human drives and needs. It is worthy of a long look, leaning against the side wall.