

and adjustments are made. I'm struck by the thinking-in-motion that some work requires, by all the mental activity that can be involved in simply getting from one place to another: the waitress rushing back through her station to the kitchen or the foreman walking the line.

The use of tools requires the studied refinement of stance, grip, balance, and fine-motor skills. But manipulating tools is intimately tied to knowledge of what a particular instrument can do in a particular situation and do better than other similar tools. A worker must also know the characteristics of the material one is engaging—how it reacts to various cutting or compressing devices, to degrees of heat, or to lines of force. Some of these things demand judgment, the weighing of options, the consideration of multiple variables, and, occasionally, the creative use of a tool in an unexpected way.

In manipulating material, the worker becomes attuned to aspects of the environment, a training or disciplining of perception that both enhances knowledge and informs perception. Carpenters have an eye for length, line, and angle; mechanics troubleshoot by listening; hair stylists are attuned to shape, texture, and motion. Sensory data merge with concept, as when an auto mechanic relies on sound, vibration, and even smell to understand what cannot be observed.

Planning and problem solving have been studied since the earliest days of modern cognitive psychology and are considered core elements in Western definitions of intelligence. To work is to solve problems. The big difference between the psychologist's laboratory and the workplace is that in the former the problems are isolated and in the latter they are embedded in the real-time flow of work with all its messiness and social complexity.

Much of physical work is social and interactive. Movers determining how to get an electric range down a flight of stairs require coordination, negotiation, planning, and the establishing of incremental goals. Words, gestures, and sometimes a quick pencil sketch are involved, if only to get the rhythm right. How important it is, then, to consider the social and communicative dimension of physical work, for it provides the medium for so much of work's intelligence.

Given the ridicule heaped on blue-collar speech, it might seem odd to value its cognitive content. Yet, the flow of talk at work provides the channel for organizing and distributing tasks, for troubleshooting and problem solving, for learning new information and revising old. A significant amount of teaching, often informal and indirect, takes place at work. Joe Meraglio saw that much of his job as a supervisor involved instruction. In some service occupations, language and communication are central: observing and interpreting behavior and expression, inferring mood and motive, taking on the perspective of others, responding appropriately to social cues, and knowing when you're understood. A good hair stylist, for instance, has the ability to convert vague requests (*I want something light and summery*) into an appropriate cut through questions, pictures, and hand gestures.

Verbal and mathematical skills drive measures of intelligence in the Western Hemisphere, and many of the kinds of work I studied are thought to require relatively little proficiency in either. Compared to certain kinds of white-collar occupations, that's true. But written symbols flow through physical work.

Numbers are rife in most workplaces: on tools and gauges, as measurements, as indicators of pressure or concentration or temperature, as guides to sequence, on ingredient labels, on lists and spreadsheets, as markers of quantity and price. Certain jobs require workers to make, check, and verify calculations, and to collect and interpret data. Basic math can be involved, and some workers develop a good sense of numbers and patterns. Consider, as well, what might be called material mathematics: mathematical functions embodied in materials and actions, as when a carpenter builds a cabinet or a flight of stairs. A simple mathematical act can extend quickly beyond itself. Measuring, for example, can involve more than recording the dimensions of an object. As I watched a cabinetmaker measure a long strip of wood, he read a number off the tape out loud, looked back over his shoulder