AFTERWORD
A Tale of Two Barns

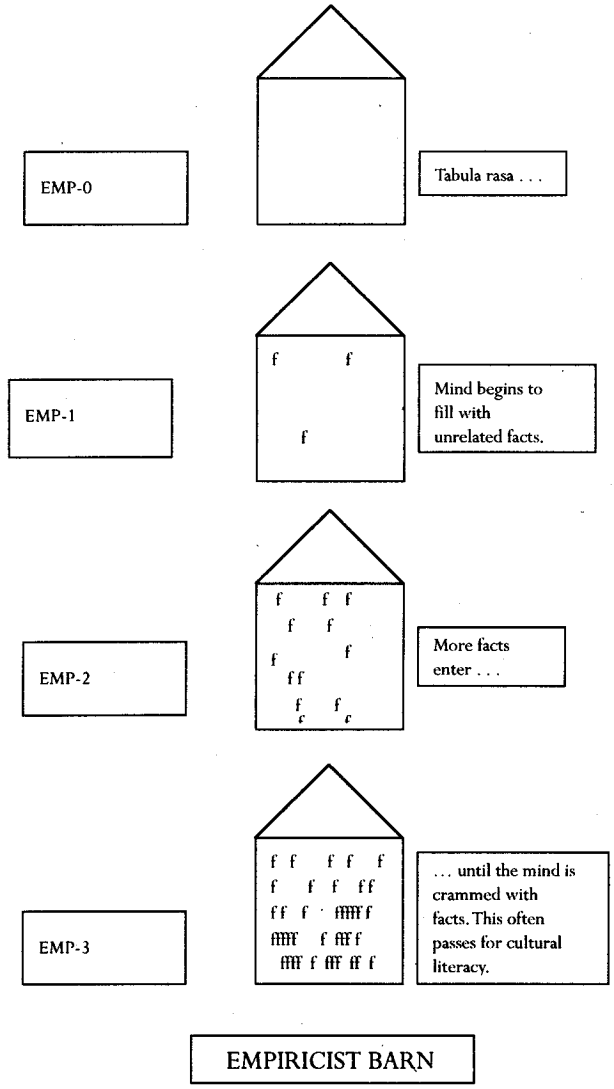
In *The Disciplined Mind* I've argued that individuals must construct their disciplinary understanding in the face of habits of thought that make those disciplines difficult to master. Despite our wishes, there is not a smooth path from natural, spontaneous ways of learning to the structured ways of thinking at a premium in the several disciplines. Indeed, the reverse is closer to the truth. Whether we are dealing with "misconceptions" in the sciences, or with "scripts" in history or economics, or with "tastes" in the arts, we must actually *undo* some of the most natural ways of learning if we are ultimately to become disciplined thinkers.

This pill proves difficult to swallow. And that is why, throughout the world of education, there remains a great divide. Individuals intimitately familiar with the literature of cognitive science and psychology appreciate that new ways of thinking must painstakingly be *constructed* against the odds; nearly everyone else fails to recognize this truth. The non-cognitively informed either assume that youngsters are born being able to think in a disciplined manner; or that they will gradually learn to do so simply by acquiring information and being encouraged to use it well.

When *The Disciplined Mind* appeared in the spring of 1999, I was not fully cognizant of the resistance to "constructivist" ideas. To be sure, I knew that my ideas were in tension with those of E. D. Hirsch, a leading educator who has created a curriculum based on "core knowledge." A series of print and radio debates with Professor Hirsch, centered around the argument of *The Disciplined Mind,* has confirmed that we are indeed far apart. What I had not sufficiently realized was

that Hirsch's view in fact represents the conventional widsom: the "natural view" of how learning in general, and disciplinary mastery in particular, actually work.

To help convey the difference in these perspectives, I have devised a comparison which I'll term here "A Tale of Two Barns." Most observers readily embrace the notion that infants are born with a mental space—



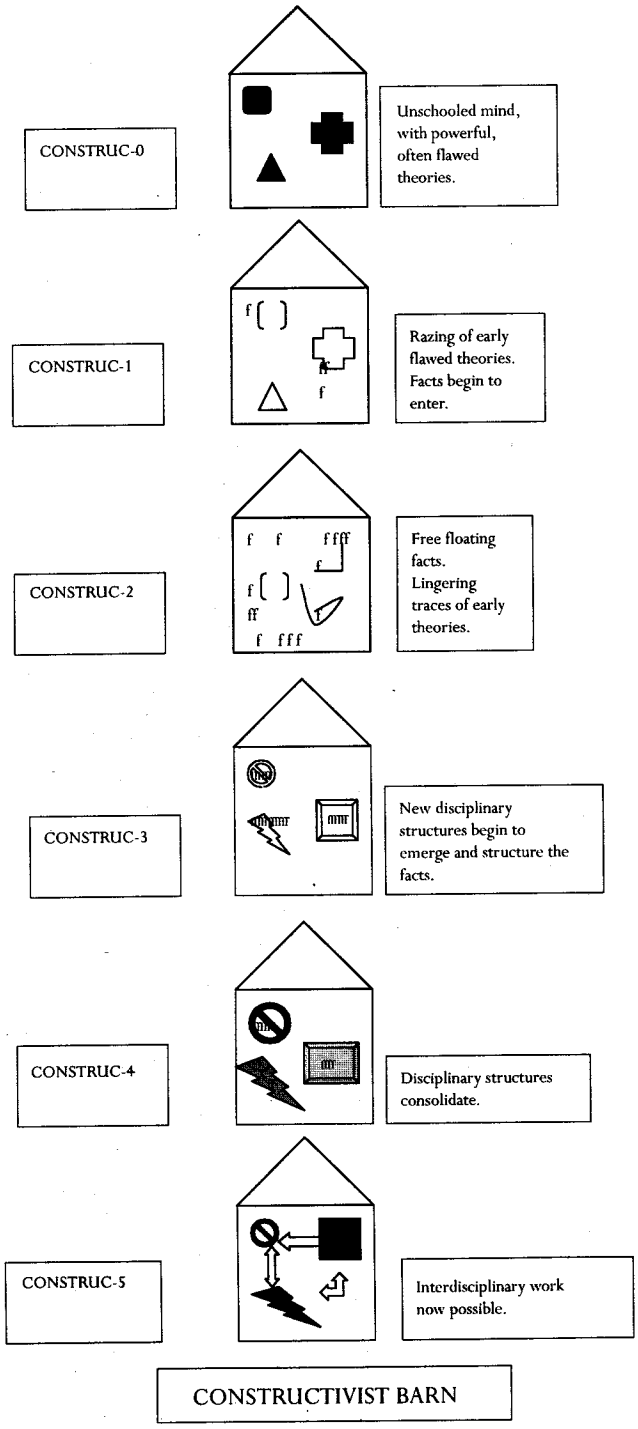
a mind-brain, a *tabula rasa*, that resembles an empty barn. According to this EMPiricist view, there is little if any furniture in that barn initially (EMP-0). The barn gradually accumulates information, chiefly in terms of facts, definitions, and certain procedures. These bits of information are not coded in any particular way and are, so to speak, interchangeable with one another. Over the course of years (EMP1–3), the barn gradually gets filled with a plethora of facts and figures until it is quite well stocked—in Hirsch's phrase, it now harbors "cultural literacy."

In this "Fill the Barn" approach to learning, the issue of disciplinary thinking is never really confronted. Either the disciplines have been there from the first (a nativist view); or they gradually emerge over time; or at certain point, some kind of a miracle occurs and the disciplines suddely erupt, like well-crafted furniture.

Evidently, my own view is quite different and a good deal more complex. According to this CONSTRUCTivist view, our mind-brains are not blank slates in the beginning; rather they are already stocked with some information (e.g., arrays that resemble a human face are important) and some ways of knowing (e.g., pay attention to areas of contrast)—see CONSTRUC-0. Some of these innate ways of knowing prove serviceable throughout life; but others (for example, be wary of individuals who look different from you; if you can't identify a cause, invoke a mystical one) are frank impediments to disciplinary learning.

Thus, the first task for the future disciplinary learner is to "raze" a good part of the barn. In Figures CONSTRUC-1 and -2, we see this process of razing at work. For simplicity sake, I have ignored those ways of learning that should be preserved and focused on the importance of razing those misconceptions and scripts that stand in the way of acquiring the major disciplines. As in the case of the empty barn, facts and definitions are being acquired and, in the absence of disciplinary furniture, they simply float about, unconnected to any meaningful structure.

In place of the razed furniture, children must, with the help of good teaching, gradually construct new furniture—furniture that embodies each of the major disciplinary ways of thinking (CONSTRUC 3–5). As noted, this work is demanding but it is also rewarding. For as the new furniture, the emerging structures of the disciplines, gradually come into being, formerly isolated bits of information find their rightful home—scientific facts aggregating in the dwelling of science, historical findings in the dwelling of history, and so on.



At the same time, the actual strategies and moves associated with each discipline are coalescing. There are rules of evidence, interpretation, and expression associated with each discipline; and yet, each of these has its characteristic accent. There is one form of explanation in science where experiments can be repeated exactly, or with deliberate, quantifiable variation. Historical explanation has a different coloration: events occur only once, and one must take into account the intentions of the actors and the biases of the primary and secondary source materials.

Finally, the barn is reasonably well reconstructed—ideally by the end of secondary school (CONSTRUC-4). At this point in education, the child is able to think reasonably well in a number of disciplines—my own choices would be mathematics, science, history, and at least one art form. However, as has often been noted, much of the most important work nowadays occurs across the disciplines or at disciplinary interstices. It is crucial that the boundaries of disciplines not be so rigidly constructed that the disciplines cannot interact with one another. Happily, unlike furniture, disciplinary structures can have semipermeable boundaries. And so, in cases of good education, it becomes possible for individuals to combine their disciplinary ways of thinking and, perhaps, aid in the construction of new disciplinary or interdisciplinary ways of thinking (see CONSTRUC-5).

Admittedly, in the age of the sound bite explanation, the constructivist account does not lend itself to catch-phrases as well as the "fill the barn" approach. I take sustenance from Einstein's quip: "A scientific explanation should be as simple as possible—but no simpler."

In my exchanges with Hirsch he has suggested that the difference between our approaches is *empirical*—he has many schools based on core knowledge that "work," while I cannot boast of a similar number of schools based on my ideas about disciplinary understanding or multiple intelligences. Hirsch is correct that he has inspired many schools, and I am willing to accept his testimony that a good number of them succeed according to his lights. It's important to point out, however, that success on one or another kind of standardized test is not the only litmus test for a successful school. Indeed, as argued in *The Disciplined Mind*, measures of disciplinary understanding are generally quite different from short-answer machine scored tests. A good test of disciplinary understanding requires students to explain an unfamiliar specimen by invoking appropriate disciplinary frameworks—a far cry from "fill-in-the-bubble" instruments. For my part, I have desisted from sponsoring schools or programs in my name, though there are encouraging signs that "Multiple Intelligence Schools" launched by others are educationally effective (Gardner, 1999; Kornhaber, 2000).

But my response to Hirsch and others sympathetic to the "fill-the-barn" stance takes another form. I believe that our differences are not primarily empirical; they are *epistemological*. That is, we have quite different views of what learning and knowledge should be about. To draw on the above analysis, Hirsch believes that education is basically about acquiring information and a certain degree of shared cultural knowledge; and the way to do this is to add information each year. I believe that the purpose of education is to master the fundamental ways of knowing; those forms of knowledge must be constructed (they won't arise on their own); and we must first raze large parts of the mental barn and then construct new "cognitive furniture" that reflects the contours of each discipline.

Others bent on ecumenicism have suggested a rapprochement between Professor Hirsch and me. On their account, a Hirsch curriculum—featuring basic literacies and cultural literacy—should dominate the first years of school; thereafter, a curriculum focused on understanding in the disciplines should gradually be introduced.

I fully endorse the idea that a large part of early school should entail the acquisition of the three Rs; and I don't know responsible educators who advocate anything different. However, as should be apparent, I cannot simply cede the early years of schooling to the Hirsch vision. That perspective does not take seriously the need to challenge misconceptions and stereotypes; it does not begin to lay the groundwork for more sophisticated ways of thinking; and it places too much emphasis on each child's committing to memory a large amount of factual knowledge.

Indeed, in addition to our epistemological differences, we seem to have quite different views of motivation. I see motivation as arising intrinsically from a love of topics and questions; the motivated learner is the one who continues to seek knowledge and expertise even in the absence of outside pressures and rewards. As I read him, Hirsch be-

lieves that motivation arises from a sense of shared knowledge with others in a community—as well as a healthy dosage of testing, with its concomitant pains and reinforcements.

Of course, cultural literacy is a desirable commodity. But I see no need for this literacy to be acquired by drill techniques. The best way to accumulate a lot of information is to learn to read and to love to read; to become curious about the world, to ask questions, and to experiment in an effort to find the answers; that is, to become a constructivist at an early age. And for those who insist that all know the same body of knowledge, I have a simple technological solution: the Millenium Palm Pilot which instantly supplies all factual information, from Napoleon's dates and identity to the atomic weights and propensities of the elements in the periodic table.

Though well aware that I live in an "argument culture," I do not particularly enjoy pitting my views against that of another scholar. In a number of ways, I admire what Hirsch has tried to do, and in no way do I consider him to be villainous. Yet, since Fate seems to have cast us in adversarial roles in the current educational climate, I feel it is important to set forth my own view of the differences between us on the epistemological, motivational, and programmatic levels.

This afterword to the Penguin edition of *The Disciplined Mind* prompts me to offer two additional guideposts to readers:

1. I knew that in choosing three examples—evolution, the Holocaust, the music of Mozart—I was risking the wrath of individuals who did not like those examples. I stressed that these were only examples, and that others could equally well be used, but came to see that any trio would be problematic. Indeed, I could sympathize in this respect with E. D. Hirsch; whenever he cites essential names, dates, and concepts, individuals find fault with the ones that he omitted.

That said, I feel that my initial choices have been reinforced by the events of the past year. Darwinian evolution continues to be in the news every week. The state of Kansas State Board of Education rules that it is now optional to teach evolution and uproars issue forth from all over the country. Powerful new CD-ROMs use evolutionary principles to create arresting graphical and musical works of art. And DNA studies confirm Darwin's original speculations that the fourteen varieties of finches on the Galapagos Islands do indeed emanate from a single ancestral species.

Nor is it only the scientific choices that remain timely. Various European countries continue to debate their role in the Holocaust and, in various ways, seek to make amends for their malfeasance. Many cities plan museums or monuments based on the Holocaust and these sometimes elicit controversy. The existence of neo-Nazi Web sites stimulate discussion of the limits, if any, of First Amendment protection in this country, particularly when such sites are banned in Germany. And, alas, mass slayings in Kosovo and in Rwanda remind us that the prospect of genocide remains a motivator in some settings.

Not surprisingly, there is less regular visiting of issues having to do with Mozart and *The Marriage of Figaro*. Works of art are highly individual and the skills learned with reference to the analysis of one must be reconfigured if they are to prove useful in other contexts. For this reason I was intrigued to read an account of the most highly acclaimed American opera of 1999, John Harbison's *The Great Gatsby*. *New York Times* critic Anthony Tommasini declared:

> Mr. Harbison is dismayed, he said, when he encounters young composers whose concert works bear no stylistic connection to the music they listen to for fun or the music they loved growing up. The great opera composers had no such disjunction. Mozart loved to dance, loved dance music of all kinds, and loved a snappy alehouse tune. All of those loves come through in his operas, no matter how sophisticated the score. He enjoyed a good show and was never happier than when working in the opera house. He and John Harbison would have a lot to talk about.

2. A number of readers and reviewers, while expressing admiration for my educational vision, have questioned whether it is possible to achieve that vision. Some say that it requires teachers who have deep understandings and enduring commitments to working with students. Others say that my vision clashes directly with the current focus in the United States (and other countries) on accountability, defined narrowly as success on short-answer tests much more aligned with a Hirsch-style "fill the barn" educational approach.

I acknowledge merit in both of these reservations. I am asking a lot of teachers; it is not reasonable to expect that aspiring profession to rise immediately and sucessfully to new challenges. Considerable sup-

port and patience are needed, as well as conditions that will attract and retain talented young individuals to the profession. Alas, the current "signals" from educational policymakers are likely to have the opposite effect—to discourage the "best and the brightest" (however defined) from the teaching profession.

But I do not merely ask a lot of teachers. I ask a lot of all involved in the educational enterprise: our leaders, our parents, and our students themselves. No country achieves longterm success in education unless it catalyzes a synergistic commitment on the part of all partners. The United States cannot expect to be an exception to that principle.

Which brings me to a final point. I believe that many of our current testing policies, no matter how well intentioned, are fundamentally misguided. We are moving toward implementing an education that, at best, is suited to an earlier era, where the amassing of mountains of information was seen as the mark of an educated person. What is required of human beings for tomorrow, and what we now know about the minds, brains, and cultures of students and teachers, calls for a fundamentally different kind of education. Such future-accented education requires not only a mastery of the most important disciplinary forms but the capacity to use these flexibly to solve new problems and to create new lines of thought. Education will never be completely a science, but it borders on malpractice to design education that is backward-looking and that ignores what we now understand about how the mind constructs and reconstructs knowledge. It was to address the needs and opportunities of tomorrow that I developed the vision set forth in these pages.

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