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Tough, Tender, and Tenacious

THE EXECUTION OF AN ACTION BY NO MEANS PROVES THAT WE KNOW, EVEN SUPERFICIALLY, WHAT WE ARE DOING OR HOW WE ARE DOING IT. IF WE ATTEMPT TO CARRY OUT AN ACTION WITH AWARENESS-THAT IS, TO FOLLOW IT IN DETAIL-WE SOON DISCOVER THAT EVEN THE SIMPLEST AND MOST COMMON OF ACTIONS, SUCH AS GETTING UP FROM A CHAIR, IS A MYSTERY, AND THAT WE HAVE NO IDEA AT ALL HOW IT IS DONE.

-Moshe Feldenkrais

"FELDENKRAIS THERAPY? Hmm ... sounds interesting. What exactly is it?"

I was sitting in my office taking a history from Margaret Bemin, a high school language teacher who had suffered a stroke several years earlier. She had walked into the office supporting herself with a Canadian crutch held by her right arm. The left arm was flexed at the elbow and hung close by her side, the hand a tight fist. A metal brace supported her left ankle.

She explained to me that her working life had abruptly come to an end the day her left side stopped moving. She had been hospitalized, the usual tests had been done, and she had then gone to a rehabilitation hospital to work on regaining the use of her left side in hopes of learning to walk again. Her initial efforts at rehabilitation had been a partial success, insofar as she had discovered that life *is* possible in a wheelchair, especially when you have the kind of family encouragement and support she had; she had not, however, been able to return to her job teaching high school Spanish. And since teaching was the real love of her life, no rehab program could have been counted a success if it did not allow her to get back to a classroom blackboard.

Someone told her about a young man in Berkeley named David Bersin, that he did something called "Feldenkrais." She went to see him, and he began working on her in sessions doing slow, easy movements, guiding her body with his hands. Eventually her left side started to move again, she learned how to walk with a brace and a cane, and she got back to the black-board and back to her life.

"**You** should meet David," she said innocently.

I did go to meet David-I'm not certain precisely when I did, but it "(as over ten years ago. Calm, friendly, casual, and assured, David told me that Moshe Feldenkrais was an Israeli physicist interested in the mechanics and control of bodily movement. He had developed a series of "movement lessons" that seemed to change the fundamental organization and character of body movement. He had used these at first to help friends with aches and pains, a dance teacher solve problems with students, a child with cerebral palsy, an adult who had had a stroke.

"**How** is what you do different from physical therapy?" I asked David when I met him.

I wasn't tape-recording our conversation, but I recall his explanation very well. The gist was that Feldenkrais had discovered that certain movements, done gently and in particular sequences, would lead the person doing them to a heightened sense of what the body was doing, the mechanics of getting from one place to another. Eventually, with practice (by doing movement "lessons"), the person could learn to move more smoothly, efficiently, and, indeed, pleurably.

The underlying idea had occurred to Feldenkrais over a period of time just by observing people, watching them with a physicist's eye and thinking how difficult it would be to get a motorized vehicle to move as the human body does. The more he thought about walking, the more he marveled at the sophistication of the brain as a controller of movement. Somehow athletes could perform, dancers could dance fluently, sometimes magnificently, and the incomprehensibly complicated physics, biomechanics, and physiology of the body-the underlying ballet of bones and joints and muscles- would take care of itself completely outside of awareness, confidently, silently, and reliably orchestrated by the brain.

But Feldenkrais saw a paradox: most people *don't* move as dancers and athletes move. Most people slouch, tilt, shuffle, twist, stumble, and hobble along. Why should that be? Was there something wrong with their brains? After considering what dancers and musicians go through to improve control of their movements, he guessed that

people must either be ignorant of the possibilities or refuse to act on them. So they just heave themselves around, lurching from parking place to office to parking place, utterly oblivious to what they are doing, to their appearance, and even to the sensations that arise from bodily movement. He suspected that people just lose contact with their own bodies. If and when they do notice, it is because they are so stiff that they can't get out of bed or are in so much pain that they can barely get out of a chair. *Then* they start noticing.

Feldenkrais wondered if refinement in movement might be restored to the person who slows down to pay attention to the feel of the body-some- one who stops rushing, pulls over, and takes time to pay attention. He tried his idea out on some friends and quickly found that his own hands could assist another person's sensitivity to even the smallest movement. By guiding their movements, using the pressure of his hand itself to heighten sensitivity, he seemed able to get people to pay attention to their own movements.

What he was doing did not seem complicated. The goal of the guided movements was not to learn how to move, in the sense of learning to do a new dance step. The goal was not to stretch ligaments or muscles. It was not to increase strength. The goal, as he saw *it*, was to get the *messages moving* again and to encourage the brain to pay attention to them.

Feldenkrais eventually wrote a book called *Awareness Through Movement*. The title expresses his increasing conviction that the basis for disturbed or degraded bodily movement was, as he had originally supposed, inattention, ignorance, or laziness. But the book suggests that sometimes there was something *really wrong* with the person. He had *learned* to move abnormally. The cause might be obvious - a stroke, a head injury, or a pulled muscle - but more often there was a hidden reason whose discovery could come as a complete surprise. Sometimes (in fact quite often) it seemed that the body in its posture and movement had become a walking metaphor for a whole life out of balance, or for a life distorted by the need to mask or forget pain. Body language was not necessarily waving your at the grocer for selling you a bad cut of meat; body language could be the silent and disguised voice of a traumatized life.

The more time Feldenkrais spent with people, the more often he discovered that by initiating the correction of movement he could unlock memories of old, forgotten events and buried feelings; more often than not these memories turned out to be

disagreeable. Changing a posture or a movement in and of itself had an uncanny tendency to flush out stories of disappointment, of loss, or of some personal derailment. Working to improve the movement - without ever suggesting such a purpose - seemed to be all that was necessary to initiate unintended and nonverbal psychotherapy.

Feldenkrais had not originally planned to teach others to be movement trainers. Inevitably, though, people who watched him work, or who had achieved personal relief as a result of their experience with him, wanted to learn how to "do Feldenkrais" themselves. One of those people was a woman who, as a young child, had watched Feldenkrais giving his lessons to a small group of people in her own living room near Haifa, Israel. She didn't take the lessons herself then. It wasn't until she was a graduate student that she recalled having seen this man (whom she had in the meantime forgotten) some years before, doing his peculiar gymnastics with people in her parents' home.

As a teenager she had taken a few Feldenkrais lessons from her ballet teacher but remembered them later only as a pleasant add-on to the ballet lessons; her impression then was simply that the lessons seemed to make it much easier for her to dance. The full realization of who Feldenkrais was and what he was doing did not come until much later - quite suddenly, during her graduate training as a psychologist - when she heard about him and went to watch him give a lesson to a group of people in a hall in Tel Aviv. In one of those epiphanies one hears about - for her, a jolting surprise - she *unforgot* him, realized what he was doing, and decided that it was her job to become his student.

Anat Baniel is small, lithe, dark, and very attractive. You cannot be in the same room with her and be unaware of her presence. This would be true if she were hiding under a table with a blanket thrown over her, such is her native charisma. I would say she is catlike except that cats are blasé, aloof, habitually in repose. Anat is restless - either pouncing or ready to pounce. I have wondered if her demeanor now is as it has always been) or if she may have picked it up as a quirk of her association with Feldenkrais) the antimissile defense scientist. Anat is all energy - husbanded, poised, and targeted.

Before I met Anat I had already come to appreciate how potent an ally a Feldenkrais practitioner can be to a neurologist. After meeting David I found many opportunities to send him patients who had become stranded in the shambles of a

musculoskeletal disorder. Some had had strokes) some suffered from Parkinsonism) some had multiple sclerosis. Always, when walking was a problem) Feldenkrais lessons improved control, balance, and endurance.

Because of this experience, I had already come to accept the potential value of Feldenkrais training when I learned that Anat had recently moved to northern California from New York. Her advance billing was impressive - she was "something special." My first opportunity to see her work came at an informal workshop I had organized for the Health Program for Performing Artists at the University of California at San Francisco. The San Francisco Bay Area, as everyone knows) has become something of a cornucopia (or a street fair) of life- and body-changing philosophies and practices. It offers every imaginable variety of massage, breathing, and herbal therapies) acupuncture) hypnotherapy) mud baths and compost packs, and) of course, Feldenkrais lessons-these are the conservative choices on the list. Wanting to respond more effectively to the unusual needs of some of my musician patients) I decided to invite a mixed group of "alternative therapies" practitioners to meet with me and one of my patients. I would describe his problem, let him discuss it) and ask for their help. My challenge to them was to demonstrate) in an open session) how they would deal with the problem: If I were to refer my patient to you for help, how would you see it, and what would you do? The patient was a young guitar player plagued by wrist and arm pain who had agreed to a public discussion of his problem. It was an eye-opening event for all of us.

Of the many interesting exchanges that took place that afternoon, the one I recall most clearly was that between the guitarist and Anat. Unlike most of the others, when it was her turn she made no move to approach the chair where this young man was seated. She chatted with him about music, about playing the guitar, and asked him specifically how he had learned to play the instrument. She asked about other physical activities he had taken part in during high school, particularly around the time the guitar had, for all practical purposes, become his life. He laughed, saying that the happiest day in his four years of high school was when he learned that studying the guitar would fulfill his requirement for a physical education course. He hated "jocks" and couldn't believe his luck at being able to spend his gym time playing the music he wanted *to* play (rock, of course). Anat, although her turn had come near the end of our session, was the first therapist to ask him to play the guitar.

After watching him play for a few minutes, Anat became very serious, very quiet. Then she spoke:

Well, let me put it this way. The guitar means everything to him. He has spent all of these years since high school doing nothing but thinking about the guitar and loving it with his fingers. If you watch his hands, you will see a thirty-year-old man, very talented, very musical. However, as he has told us, the rest of the body is of no interest to him. And you can see that. If you look at him sit, if you watch him turn his head or shrug his shoulders, you will see an eight-year-old boy. And that's the problem. Those hands need the body and the experience of a thirty-year-old man to support them. If I were to work with him, I would try to get them back together. I think it would take a while, but it could be done.

And that was it. No one said anything. Her analysis registered with all of us as being transparently and distinctly correct.

Several years later I asked Anat to see an extremely difficult and, for me, upsetting case. A young woman training for a triathlon had suddenly been stricken with uncontrollable twisting and pulling movements of her neck. The condition, which is called torsion dystonia, can be, in its chronic form, one of the most devastating of all neurologic disorders. Young people in their prime have been for all practical purposes completely demolished by this nightmarish movement disorder. The head, pulled by powerful, writhing contractions of the neck and shoulder muscle, tilts severely backward and to the side, and may be pulled and twisted in slow rhythmic movements. Often, at the beginning, these movements can be suppressed or modified by tricks that the patient invents-holding the head back against a wall; resting the chin against the palm of the hand; touching a spot on the back of the head with one finger. But the situation always gets worse.

The prospects for improvement are now much better than they were when I first saw the young woman owing to the availability of Botulinum toxin, a drug that interferes with muscle contraction. It can be a truly miraculous treatment. However, this drug was not available for use in the United States when I first saw the young athlete. At that time, many people with dystonia were being advised to travel to Canada, where

the drug was available. She had decided not to go. With no real options, I asked Anat if she thought she might help. She said she would try.

To this day I cannot account for what happened. The young woman had already given up her job and was housebound and immobilized. But after her third Feldenkrais "lesson" (the first of which I personally videotaped) she went out dancing with her husband. Her friends and family were so shocked by the change that they wondered if she hadn't been faking the problem from the start. Unfortunately, after the treatments stopped, the movements returned very quickly. Anat and her associate, Mary Spire (another Feldenkrais therapist whom I knew and trusted) agreed to continue the lessons, about thirty in all, which spanned nearly a year. The last time I saw her in my office, after my year in Düsseldorf, there was no trace of the problem and she had been free of symptoms for more than two years. Curiously, she was not comfortable discussing her recovery with me, as though just thinking or talking about the dystonia might bring it back. It was as if her therapy had only subdued an extremely dangerous beast that was still inside her. She was "cured," but she did not want to tempt fate.

As you read the following interview with Anat, it will help if you have a picture of her working. The room and the atmosphere are quiet; it is intimate. The "client" lies on a table or on a mat; Anat dresses simply, wearing a short-sleeved blouse, dark slacks, and sweat socks. She talks softly but moves quickly from one side of the table to the other. She touches, then reflects. She takes an ankle in her hand, lifts it, then slowly moves the whole leg until half of the body is stretched, the other half in a fetal position. She coaxes the trunk of the person over the side of the table, cradles the head, moves it in a gentle rocking motion, and sometimes offers reassuring words, as a mother might to soothe a child who needs to be held. She asks how something feels. She laughs.

Born near Haifa, Anat is the daughter of a research biochemist and inventor. Her mother is both a homemaker and an artist, and her older brother is a playwright and director, also living in Israel. Anat herself works and teaches comfortably in a realm that technologically advanced medicine tends to discount or to consider a historical curiosity. But Anat knows what she is doing, and there is no doubt Feldenkrais knew what *he* was doing when he decided to let Anat come for lessons. What I have seen Anat accomplish, and the method by which she obtains results, puts me in mind of the

obsolete meaning of the word "doctor," which comes from the Latin word *docere*, meaning "to teach."

When I was three we moved to Haifa, to the top of a mountain, and I became maybe the youngest hiker in the world on my own. I would leave home and just walk, and somehow my mother didn't seem to be concerned. Miraculously, I never got lost. When I was a little older, I used to hike from the top all the way down to the seashore and then back up.

I was a very poor student; I really didn't like school, it didn't feel right, the teacher didn't feel nice. I was also a daydreamer. I remember around the fourth grade my father was driving me somewhere in his car and he asked me, "Do you like to daydream?" And I said I did; I guess the teachers had talked to him. So he asked, "Do you like to daydream a *lot*?" I said, "Yes." And he said, "How much?" And I said, "All the time."

I had a very vivid inner life, extremely so. And I was lucky that my father didn't know what to do about it and so decided not to interfere. He didn't want to spoil it. Somebody told me that one of the best things that happened to me as a child was that I was left alone, because I turned out to be a pretty unregimented person. It was years before I realized that most women are raised to *feel* that they're not as smart, or they shouldn't *appear* as smart, or they should have different *kinds* of intelligence than men. I absolutely was not informed about that.

Feldenkrais himself always liked and had women friends who were either creative or very intelligent. Some were very well known artists in Israel. My father placed a very high value on education, and he said, "*You* must do what you love." When my brother decided to go into the theater and my mother worried about it, my father said, "If that's what he loves, that's what he should do. People should do what they love, because they have a lifetime to do it." Music and dance were my passions as a child, but when I went to high school I only wanted to be popular with the boys. I became the top student in my class, but my reason to do it had nothing to do with school - it was just a way to be popular with boys. My passions were music and dance, hiking, and my friends. Once, when my father went to Paris, he took us with him; that was where I saw Nureyev for the first time. It was a life-changing experience - he was so phenomenal that the audience wouldn't let him stop dancing. I don't think it was so much the height

he jumped or the acrobatics, it was something of the quality, it was a feeling, in how he moved. I don't know if anybody can talk about it directly, but the artistic quality, the passion, the man-I wouldn't have been able to say it in words at age eleven, but I was grabbed by it as soon as he walked on stage. We were all mesmerized like people in a church; it was like listening to Casals play the cello. This quality I also found in Feldenkrais.

I had met Moshe when I was very young. My father would bring researchers and once a week Moshe would come from Tel Aviv and give a lesson at our house, on the floor. I was three or four and I used to watch it. Much later, as a college student, I had been considering both dance and medicine; I tried to visualize myself in a hospital and was sure I couldn't function in that environment. At that point in my life I even didn't remember Feldenkrais or what I had learned of his work through my ballet teacher. It just wasn't in my consciousness. It was only after I began trying to find ways to use what I knew that I suddenly remembered Feldenkrais - my "lessons" as a child - and I went looking for him. I knew *nothing* about him. My father told me he was in Tel Aviv, and said, "Look in the phone book and call him up."

Anat calls her discovery of Feldenkrais "a guru story." She began attending his lessons, just as an observer. "He gave me my first lesson, and after that he couldn't peel me off. That was it. I never left."

It took me seven years before I could start explaining what was going on. But what I *said* was: "This man opened the closed box in my soul that I didn't know I had." That was my verbal translation of my experience. It was so delicate, it was so . . . *human!* It was true contact, a feeling of the other person, true communication in the person's reality. I knew that instantaneously; I didn't need more than one lesson to absolutely know that. I didn't know whether I could *learn* how to do it. I didn't know whether I could ever understand it. But I had no question about what he was doing.

I asked only one question in the first four years, near the beginning, and he didn't like it. So after that I just watched him work. I would come in and say, "Hello," then go sit in the back on a small stool-just disappear into the background. I never looked at a watch at a lesson, but when it came to the end, or almost the end, I would start crying.

You know, sometimes when you hear beautiful music, you cry. It happens to me. Every one of his lessons made me cry like that, but always at the moment of the end of the lesson. Without understanding *cognitively* what he was doing, I knew when the lesson got to its resolution point. And I spontaneously responded by crying.

I joked about this later: I was working as a civilian psychologist for the Israeli army while I was going to see Moshe work, and one week I couldn't come because of my work schedule. When I came the following week, he said, "Where were you?" I was shocked! At that time I wasn't even sure he even knew I was coming because we had no specific interaction - I would just say, "Good morning," and "Thank you, goodbye." I was like this orphan he let in and out. When I realized that he noticed that I hadn't come, I wondered why. I finally had the idea that when he looked at me and saw me cry, he realized it was the end of the lesson. Years later he said to me, "You were like a newborn child with no judgment and no idea. You just absorbed and absorbed. You learned from me like a newborn infant."

He was the one who started me with the children, without ever telling me or explaining that he was going to do it. He just said, "There is a child I don't have time to see, and I told them to see you." That's how it started. And so I said, "Okay, I'll go do it." I think working with children has given me this idea, which isn't often discussed in medicine: a lot of disease - medical disease and emotional "dis-ease"-is an outcome of a lack of full development. It's not something we can get to just by removing a psychological block. There actually are no blocks in that respect, but there is the block caused by lack of learning and development. In that sense, healing is a process of continuing development and learning. It's not a single, miraculous event that people imagine, a catharsis or something like that. So when I look at people with problems, more and more I ask: "What have they not learned? *What in their development have they missed?*"

Of course there are problems due to traumatic events in childhood, or disease-you name it. Feldenkrais said that ideal development would happen if the child was not opposed by a force too big for its strength. When you say to a small child, "Don't touch

that, its dangerous," you create such a forceful inhibition that you actually distort the child's movement, and growth, in a certain way.

Feldenkrais taught us to look for what isn't there. Why doesn't movement happen the way that it should, given gravity, given the structure of the body, given the brain? For all of us there is a sort of sphere, or range, of movement that should be possible. Some people get only five or ten percent of that sphere, and you have to ask, "What explains the difference between those who get very little and those who get a lot?" Feldenkrais said that the difference is that in the process of development, the body encountered forces that were disproportionate to what the nervous system could absorb without becoming overinhibited - or overly excited, which is a manifestation of the same thing.

It is important to understand that the major effect of trauma doesn't come from the trauma itself, especially in early childhood. The trauma per se, if the system kept moving, growing, responding evenly in all directions, would just be another thing that happened and eventually become nothing. But it was just a brief event, so why does it take away so much? The answer is that *violence* distorts functioning in some way, I guess in the brain, and spontaneous growth and learning in a certain direction may just stop.

But it's not a block in the sense of an obstruction; you can't just remove it and expect everything to be normal after that. The person will need to go through a process of apprenticeship, of learning *how to be otherwise*, by developing a repertoire. I think the failure to understand this idea explains one of the potential weaknesses of verbal therapy, because you can become aware of what happened to you and why you are the way you are and so on, and gain a certain amount of freedom from it and more options, and relief from anxiety and guilt and so on. *However*; you still need to learn to do what you never learned.

Child abuse is an example; I think it always affects the breathing patterns. I work with somebody who was abused. I start communicating through touch, gently. I

explore, I try to get them to feel in their body and their breathing that there is an alternative to their way of breathing. The moment the breathing starts to change, there is a very strong tendency for the memory to come to the foreground. Very often people remember the event associated with the pattern before it was changed. Moshe used to say that if the lesson is done well, and the movements done gradually, a bad memory is not experienced as a terribly traumatic thing. Sexual abuse is so violent that the memory always brings a certain amount of anxiety to the surface, yes, but somehow the nervous system seems to be able to take it.

I think what Moshe gave us was the way to access what's in the person, not only in terms of their potential ability but also their inclination and need to learn to do it. We *need* to grow, we *need* to develop; the psychologists say we need to grow, and they're actually right. People need to continue growing. However, growth is a very concrete event. It's a very *physical* event, even if it comes through talking. Talking is very physical. Emotions are very physical. Thoughts are very physical.

And the hands, the beauty of the hands, is that they speak a universal primary language. It is the language of newborns. That's the language before words. Everybody had that language or we wouldn't be alive. People who do the research say that touching premature babies fifteen minutes a day increases their growth rate by forty-five percent. I don't remember the exact figure, but it's something pretty stunning.

When I was still working in New York, I saw a child from Ann Arbor diagnosed with cerebral palsy. When he finally started going to school, he had a hard time with arithmetic. The child brought me his homework. I looked at his paper and I asked him, "How much is two plus two?" And he said, "Five." And I said, "Right! And how much is six plus one?" And he said, "Let's see ... nine." I said, "That's right, and how much is ...?" And the mother, who came all the way from Ann Arbor, was about to *faint*. I said "right" even though he was making mistakes!

Of *course* he's going to make mistakes. That's why they've come! He obviously doesn't know how to do it, But I was looking to see what he *does*; I was looking to see

what his nervous system is doing with these questions, How else can I find out what he needs? And I found out, by using his mistakes to guide my questions. I think it took about ten minutes. The more I said, "Right," and "Go on," and "That's fine," the more he was ready to give me information, to *answer*:

So I found out what the problem was, He had *no idea* what numbers mean. He had no feeling or understanding of what counting is. He had just tried to memorize the right answers. I spent the rest of that time and the following time with him, actually giving him the feeling of numbers, which means *distinct* events or *things*. And where's the easiest place to find that out? It's your own body. As soon as we did it with movements, he understood it. We did it up to a hundred. That was all it took; he had it after that.

I asked Anat to comment about the learning that goes on formally in schools. What can *possibly* be done in schools to give children a better chance to learn?

That's a big one - actually it's vital. It's not by chance that there's so much breakdown. The question is, where to start? There's a lot of talk about class size; no matter how young or old the children are, some of them need personal attention, but class size isn't the only problem.

Without going into contents or subject, I think a big problem is when the teaching is done independent of the child's subjective reality. Somebody walks into the room to teach something without taking into account in a real way the students who are there. For me, it's a little bit like what's wrong with classical physical therapy. I want this child to crawl, so I'm going to put him through these exercises, *one-two-three, one-two-three*. Well it's a great idea, but *one-two-three* not only doesn't get every child to crawl, but very often it induces a traumatic state, with dissociation, more self-hatred. Since it doesn't bring into account and connect with where the child really is and how he or she is actually operating at the time. The child needs more than *one-two-three*, sometimes many other things, in order to be able to crawl.

Let's take teenagers, later--teenagers, whose hormones are running mad in their bodies, boys and girls checking one another out and maybe yesterday they had a party and God knows what happened there and you're sitting there and guiding them through history or mathematics or German. *You're not connecting with anything that matters to them.* Our understanding is that in this way we connect to their brain.

In that sense there needs to be a revolution in comprehending what works in learning. Feldenkrais used to say over and over again, and initially I didn't understand what he meant-he said: "Teaching and learning are two independent processes, and usually they do not correlate."

Take, for example, teaching a child to read or write. There is a way to work with a non-reading child so that by the time they finally do it, it can be almost a nonevent. It happens very quickly. Or you can teach it and teach it and teach it and it's hard for them and hard for them and hard for them. And what do they learn? They learn that it's hard. You know, we learn *everything*, we don't just learn what we're supposed to learn, or what the teacher believes is being taught. So I learn that I feel horrible, I learn I don't know how to do it, I learn it's difficult, I learn my mother gets angry-you understand? I learn *everything*.

Another thing goes hand in hand with this. Both independent of whatever you teach them and in terms of the specific content of the teaching, it is vitally important for people to continue to develop their feeling world-their kinesthetic and perceptual world. It's very unfortunate when a child is put in the classroom and made to look outside of himself to learn the things "out there" and as a result needs to dissociate from himself to do it.

It is very beneficial when the focus is on the children. You can do arithmetic around the parts of the body, you can relate almost every subject through the self, you can make learning very egocentric in that sense, but you will create *much* less egocentric people in the long run, people who can really function far better. In order to do that, it is necessary to *detect* learning when it is happening; learning is usually well

under way long before the outcome you're after is there. I often work with children in my practice, who have severe motor problems, and I have to get them started with whatever it is they need to learn, and I have to know that what I am doing is working even though what I'm after might be two years away. I don't ever *talk* about walking or reading or writing before the child is actually ready to do it.

With Anat, it seems to me, we see again (as we saw with Reed Hearon) how the hands can bring an individual not only into a distinctive kind of work but into transforming relationships with people and ideas. As in many such cases, the hand as an instrument of action and contact may become, or seem to be, merely incidental to a more complex process or activity. But even when the hand eventually yields the stage to other skills (more true of Reed than of Anat) , its historic role in the acquisition of knowledge and skill during the apprenticeship remains in the foundations, continuing to feed the dynamic processes of the imagination. In a recent report on computers in education published in the *Atlantic Monthly*, Todd Oppenheimer offers his own version of this point:

Kris Meisling, a senior geographical-research designer for Mobil Oil ... still works regularly with a pencil and paper-tools that, ironically, he considers more interactive than the computer, because they force him to think implications through.

A spokeswoman for Hewlett-Packard, the giant California computer-products company, told me the company rarely hires people who are predominantly computer experts, favoring instead those who have a talent for teamwork and are flexible and innovative. Hewlett-Packard is such a believer in hands-on experience that since 1992 it has spent \$2.6 million helping forty-five school districts build math and science skills the old fashioned way - using real materials, such as dirt, seeds, water, glass vials, and magnets. Much the same perspective came from several recruiters in film and computer-game animation. In work by artists who have spent a lot of time on computers, "you'll see a stiffness or a flatness, a lack of richness and depth," Karen Chelini, the director of human resources for Lucas Arts Entertainment told me. "With traditional art training, you train the eye to pay attention to body movement. You learn

attitude, feeling, expression. The ones who are good are those who as kids couldn't be without their sketchbook."

Anat's experience raises a number of additional issues about human learning, to at least two of which we shall return in chapter 15: how experience *with the body*, as Vygotsky and others have argued, establishes (or, contrarily, can distort, or even block) meaning or intellectual understanding; and why learning is impeded in the absence of personal interest. Anat also raised the subject of a mentor's power to catalyze the integration of skill and intention into the creation of original and completely personalized work; this issue, which *must* be of paramount interest to teachers, is inextricably bound up with the other two.