

Ecofeminist Science and the Physiology of the Living Body

Part One

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Science, during the Twentieth Century, has been as destructive as it has been constructive. This is reflective of a lack of awareness scientists have had of their own bodies. An ecofeminist science sees the body's way of learning as a paradigm for all human living.

MODERN SCIENCE DEVOTES itself characteristically to manipulating and controlling the natural world. And it's no accident that it arose at the same time as women's subjugation strengthened and deepened.¹ Francis Bacon, an early ideologue of modern science, saw nature as a woman whom scientists forcibly penetrated to get her to reveal her secrets; and this kind of thinking coincided with an explosion of witch-hunting.² Thus both the feminist and ecological projects are forced to confront the nature of science and scientific inquiry ever more deeply as they face the profundity of their goals of cultural reevaluation and regeneration.³

In the modern epoch, we determine that knowledge is legitimate and scientific insofar as it approaches standards set by classical physics. We find a bias in favor of linear causation, hierarchical control, and mechanistic reductionism. The experience of the senses is regarded as an inexcusable contaminant destroying objectivity, and the passive voice dominates scientific discourse. "It was observed that" is all right; "I observed" is not. "Objectivity" thus splits knowledge apart from the one who knows. And the mind that knows is split off from the body that the mind is. Scientists themselves become stereotyped as an odd breed split off from "normal" human beings, while their science is held in awe or fear, and is rarely understood.

But is this the only road to rigorous and worthwhile knowledge? If we want to overcome the destructiveness and domination wrought by modern science, we need to reconsider how we

develop and evaluate knowledge. This project of regeneration is particularly central to ecofeminism, which insists on the essential integration of ecological and feminist concerns. How do we create a sympathetic, embodied, context-sensitive way of knowing? What would a systematic, learning-oriented, nondominating relationship with nature be like? How can we respect rather than exclude the rich webs of interrelationship in nature and in human caring communities? What does it mean for

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science to take account of the particular ecological, cultural, and economic contexts where we live? Are there gentler but still rigorous ways of gaining reflective, verifiable knowledge?

The Body

The body is a central figure in the domain we need to reevaluate. For the body is the material self of the knower who knows. If we really aim to develop context-sensitivity, we need to pay detailed attention to the body, as the context in which all human affairs occur—including science. What does it mean to be reflective about the body? How can we do science as reflective rather than naively embodied, gendered beings? How can we move beyond the mind-body split, to incorporate rather than oppose our bodily experience in our ways of knowing? And finally, what potentials might

be implicit in our embodied intelligence that we could cultivate more widely? How can attention to the body help people fulfill their capacity to engage in thoughtful, reflective, shared learning processes? That is, how can a fuller appreciation of our body-mind potentialities contribute to the democratization of science?

Among feminists and many others concerned with the social dimensions of bodily experience, the sexual and gendered aspects of bodily experience have received the bulk of attention, for reasons which seem obvious. When you say "body," people immediately think "sex," "desire," or "reproduction"; women think "menstruation" and "child-bearing." Then after sex there's medicine. "Body" might trigger "pain," "disease," and "death." For those of us who get into good moods on occasion, perhaps we might think "dancing" and "sports." In what follows I will have almost nothing specific to say about any of these things. I will largely talk about simple things—walking, standing, sitting, holding your head up above your torso with the least possible effort; that is, I will talk about body use. And I will consider the awareness or lack thereof with which we will use our bodies. On the one hand, this leads to judging the relation between what we know, or don't know, about how our bodies function; and on the other hand, judging how we are able to know, or how we are blocked from knowing, more generally.

Yet I hope it becomes apparent that many of the issues central to a feminist-critique arise even out of considering such an apparently simple, nonsexual

aspect of bodily experience. Even though we may not all agree about what patriarchy means, we probably concur that because we've all grown up under patriarchy, there is a patriarchal cast to our every unreflective

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perception or conception. Moreover, I might point out a parallel between the situation of women and the situation of bodies. As Hilary Rose has pointed out, in Marx's vision of a post-revolutionary society, "where we fish and hunt before dinner and make social criticism after the dinner," just who makes the dinner itself is totally taken for granted.⁴ Similarly, when we walk, talk, sing, dance, wash the dishes, have sex, suffer, and die—it's not just psychosocial beings, but our bodies who do all these things. So women and bodies have in common the fate of being taken for granted. We have been instruments, but not ends in ourselves, except in the most problematic sense.

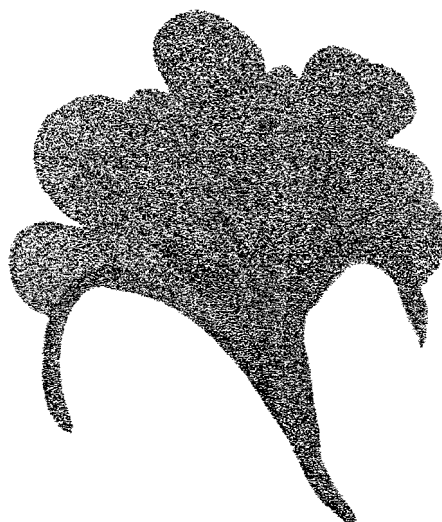
The move, then, of attending to what was previously merely used and taken for granted is in some fundamental way a feminist move. The attention we give to our bodies can be a feminist attention, even if what we are attending to is not specifically gender related. And surely in the case of bodies, gender cannot be far away. Moreover, considering body knowledge is essential for the project of ecofeminist regeneration, which demands that we engage the issues of how our bodies both make us part of nature and mediate our relationship to it.

The Body and Knowing

The body has two levels of significance in relation to knowing. On the one hand, it is that vehicle through which we experience and perceive everything; and on the other hand, the body itself can become an "object" of knowledge. In relation to knowing, then, we can thus ask two general questions: how does the body influence what and how we know? And how might knowledge about the body affect how we know through the body? To put this in other terms, how do

body learning processes affect learning more generally? What are some physical, personal, and cultural constraints on bodily experience? What does it mean to make the body—and not just any body, but one's own, living body—an object of knowledge? Thomas Hanna defines *somatics* as precisely this: "the field that sees bodily functions as simultaneously a third-person objective event and a first-person subjective event of awareness."⁵ What kind of experimental method does one use? How do one's observations get evaluated and shared? And, can body learning processes be used to overcome deficiencies and limitations in our ways of relating as learners to the world?

A number of bodily practices have been developed in the twentieth century that respond to these questions. I have chosen three to discuss—the



Alexander Technique, the Feldenkrais Method, and the hypnotherapy of Milton Erickson—because they are particularly well documented, and because their originators have been especially responsive to the scientific demand for rigor and verifiability. But the rigor they've maintained and the verifiability they possess have not prevented them from leaving Cartesian masculinized splitting of mind from body behind and working in terms of mind/body integration. Therefore, although the particular practices I'll discuss (though not all body practices) were developed by men, they move in directions that in many respects parallel the direction of feminist epistemology, at least in relation to many of the issues of context-sensitivity and embodiment sketched above. (And, given the nature of their

concerns, it is not surprising that a large number of practitioners of these techniques are women.) In my discussion, I will emphasize the consequences of the identity of the object of knowledge with the learning subject. And I will highlight some similarities between some of the states of body and mind involved, on the one hand, in this kind of exploration and, on the other hand, in scientific research.

These body-oriented techniques over the years have attracted a great deal of interest from scientists and philosophers. John Dewey, for example, was a pupil of F.M. Alexander, one of the earlier pioneers in this area. Alexander inspired and transformed Dewey tremendously. Describing the Alexander technique as the "physiology of the living organism,"⁶ Dewey argued that this practice completed the thus far incomplete project of scientific discovery by finally incorporating the dimension of sensual learning.⁷

As might be anticipated, the conclusions of Mr. Alexander's experimental inquiries are in harmony with what physiologists know about the muscular and nervous structure. But they give a new significance to that knowledge; indeed they make evident what knowledge itself really is. The anatomist may "know" the exact function of each muscle, and conversely know what muscles come into play in the execution of any specific act. But if he is himself unable to coordinate all the muscular structures involved in, say, sitting down or in rising from a sitting position in a way which achieves the optimum and efficient performance of that act; if, in other words, he misuses himself in what he does, how can he be said to know in the full and vital sense of that word?⁸ (emphasis in original)

How do body learning processes affect learning more generally?

The self-control here referred to by Dewey is different from the externally imposed discipline that has been much more characteristic of physical training in the West. Western physical disciplines have tended to follow exter-

nally prescribed instructions and constraints, and minimal attention has been paid to the cultivation of inner sensitivity. On the other hand, Eastern physical disciplines, such as yoga and Tai Chi, are oriented primarily toward gaining access to the enormous potential for inner sensitivity and self-regulation that remains latent without serious cultivation.⁹ For this reason, it makes more sense here to describe the practices I will discuss not as disciplines, but as means of cultivation.

It is interesting that the practices I have chosen to discuss here began not as lofty attempts to cultivate latent human potential, but rather as rigorous self-monitoring aimed at compensating for or overcoming personally experienced physical handicap, as I will explain specifically below. Yet the horizons opened by this quality of attentiveness to one's own bodily experience soon surpassed the standards of "normalcy" considered sufficient by Western medicine. But then the notion of what is "normal" is derived externally, often statistically; and achieving it is usually the result of things done to rather than *by* a person.

Cultivation in the East was oriented to spiritual ends, using criteria from nonscientific symbol systems. The Western practices considered here, on the other hand, while sharing the orientation of inner cultivation, use vocabulary and ways of thinking rooted in science and scientific method. But the path the Western practices have chosen of inner cultivation have led them as well to cultivation of supranormal capabilities. The path of sensitivity and awareness seems to encourage the discovery of levels of subtlety and interest that are not accessible to those

The Alexander technique completed the project of scientific discovery by finally incorporating the dimension of sensual learning.

who simply blindly follow the dictates of external authority.

One of the differences between these body practices and many other forms of scientific activity is the degree of control imposed on the conditions under which observation takes place. The

predilection for controlled environments characteristic of nonnatural, history-oriented experimental science gives way to observation in conditions of ordinary life. In explaining what he

Guidance by inner awareness moves in a contrary direction to the goal of efficient control from above.

means by the "physiology of the living organism," Dewey says

[Alexander's] observations and experiments have to do with the actual functioning of the body, with the organism in operation, and in operation under the ordinary conditions of living—rising, sitting, walking, standing, using arms, hands, voice, tools, instruments of all kinds. The contrast between sustained and accurate observations of the living and the usual activities of man and those made upon dead things under unusual and artificial conditions marks the difference between true and pseudo-science.¹⁰

Dewey continues by remarking that our habit of associating science with the latter sort of thing makes it hard to appreciate the "genuinely scientific character" of the kind of work Alexander has done.

This project of carefully observing body use under ordinary circumstances, cultivating more richly subtle sensitivity and awareness, and cultivating an inner awareness that will come to replace external dicta as the criterion for appropriateness is congruent in a number of ways with the ecofeminist union of feminist reconstruction of science with the cultivation of sensitivity to ecological relationships. The location of its practice in the domain of ordinary daily activities escapes the problem of the nonreflective decontextualization that dominates contemporary mainstream science. The subtle sensitivity and awareness are indeed very much akin to the kind of sympathetic relationship to nature characteristic of some of the most gifted scientists, such as Barbara McClintock with her "feeling for the organism."¹¹ And the goal of guidance by inner

awareness moves in a contrary direction to the management-oriented goal of efficient control from above and without of ever more intimate details of people's lives.

What, then, do these practices involve? One of the key themes running through all of the techniques here discussed is the unity in practice of mind and body. Yet each technique approaches this unity in its own way. Let us start with Alexander, since he came first.

The Alexander Technique

An Australian actor, F.M. Alexander was born in 1869. He developed his technique first through several years of painstaking work on himself, after his voice failed him and he could no longer act. Fruitless medical consultations led him to take matters in his own hands. Having been advised to rest his voice for an extended period, he discovered that he could speak perfectly well in normal conversation; but as soon as he began to recite his voice be-

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gan to fail him. From this he concluded that there must be something he was *doing* that led his voice to fail. The questions then were: What was he doing, and what could he do about it?¹²

Alexander concluded that he, like most other modern people, suffered from *misuse* of his body. This raises a theoretical point. The range of posture and appropriate movement for him thus was defined not simply in cultural terms, but rather also in terms of considerations, such as biomechanics. This move, which many other body practices share, still leaves room for a *range* of appropriate movement styles and, therefore, for different cultural styles. It thus can open the way not to a reductionistic biological determinism, but to a rich discourse about the dialectical relationship between biology and culture. But anything more than passing reference to this prospect is beyond the scope of the current paper.

Alexander looked at another dimension of the origins of misuse that has been highlighted by the Reichian, Bioenergetic, and Gestalt therapy tradi-

tions.¹³ Habitual postures of misuse can come not only from emotional trauma, but also "from the way we use our bodies in recurrent work situations."¹⁴ This leads to a different orientation to intervention: Reichians and others in that tradition generally feel that a release of

Improved patterns of body use involve less physical strain.

the capacity for emotion and feeling is a prerequisite for improved body flexibility and adaptability. But starting from the complementary perspective that habitual postures are "a position from which certain actions and emotions can be possible,"¹⁵ Alexander and his students found that learning new patterns of movement opened up new horizons for the growth of personality. This could lead to more openness in other areas of life as well.

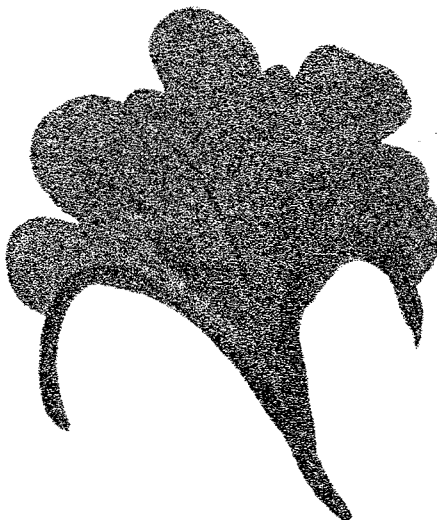
One reason that the new patterns of movement can create openness in other areas of one's life is simply that improved patterns of body use involve less physical strain. Whereas a posture or movement pattern poorly adapted to gravity forces the body to expend muscular effort (and thereby energy) in compensating for the extra stresses, more biomechanically correct body use frees the body from a lot of extra work and gives it a grace which it carries over into other affairs.

But if correct use is so much easier than incorrect use, why don't we do it spontaneously? Alexander thought that the problem lay in the unreliability of our sensory appreciation of our bodies. This was because the senses alone judge not by reason, but by habit—one feels that what is habitual is correct; and doing things differently feels wrong, even if it makes more sense. The problem for Alexander was how to substitute reason for habit. That he set up the problem in this way set him on a path that kept his work consistent with a scientific world view. His suspicion of immediate sense perception was quite consistent with modern science since Galileo.

Nevertheless, Alexander was working with a living, sensate human body—indeed, his own, to start with—and not an inanimate projectile or a machine. An important aspect of a human body is that it does not come apart, and one

cannot effectively deal with it as separate units. One cannot "fix" the defective use in one part without dealing with the relationship of that part to the rest of the body. Alexander concluded that, due to the particular demands of upright posture, the relationship of the head, neck, and torso was of key importance for the best use of the whole body.¹⁶ Alexander termed this relationship the "Primary Control." The proper use of Primary Control facilitates the antigravity system, which consists of the muscles, connective tissues, and spine associated with upright posture. Poor positioning of head, neck, and torso forces other muscles to compensate for what the antigravity system is kept from doing by such poor use; and the other muscles do a poorer job with more effort, pain, and tension.

One of the main goals of the Alex-



ander Technique is to give the pupil the experience of an appropriate and balanced working of this Primary Control, so that she can experience the impact of this balanced Use on her quality of movement more generally. But how does a pupil gain such an experience if her sense perceptions provide faulty guidance and her habits lead her astray? The technique of attaining such improved use involves touching and verbal instruction from a teacher who herself has had long and intensive experience with this process of substituting reasonable for habitual modes of body use. The first thing the pupil needs to learn is to inhibit her immediate impulses to "help" the teacher do what she thinks the teacher wants. The reason for this is that we tend to confuse ends with means. Alexander

calls us "ends-gainers": we take the means for granted, and jump directly to the end we think we want. But our image of the end is sloppy and habitual; and we get all the way to the *end* without having a chance to reflect on the quality of the *means* we use to achieve it. Alexander described this process of inhibition as learning to "leave oneself alone."

Having learned to inhibit these immediate, habit-formed impulses, the pupil becomes ready to learn to use reason instead. For Alexander, this involved projecting an appropriate psychophysical pattern using verbal instructions. Initially, the appropriate response of the pupil to such instructions is simply to *think* them. Over time, one learns thereby to substitute mindful attention to the "means-whereby" for a nonthinking attempt to achieve one's end. And through this process, one starts to restore the reliability of one's sense perception. Reason, by inhibiting and directing our reflexes and choices of body use, can open up new kinds of body experience for us. And the sense of appropriate, efficient use—of ease and comfort—can become our new criteria, and can allow us to change.¹⁷

The role that reason plays in moving toward better body use leads to a second reason why this kind of work can lead to greater openness in domains beyond immediate body experience. For the use of reason in guiding one's observations of one's body movement—and one's interventions to change it—introduces the quality of *reflectiveness* into otherwise naive and unaware activities. The approach of learning to stop taking things for granted seems to extend beyond the domain where it was originally learned. This is one of the main common themes that emerges from a comparison of the techniques I

Alexander concluded that the relationship of head, neck, and torso was of key importance.

am discussing here. Alexander offers the horizon of a quality of grace coming to characterize our movement and our lives that we previously could not have conceived. And he considers this to have implications at the evolutionary scale. Through his work he intends to

promote "the great phase in Man's advancement in which he passes from subconscious to conscious control of his own mind and body."¹⁸

The Alexander Technique is thus a method of learning how to learn.

One starts to restore the reliability of one's sense perception.

We venture from the known to the unknown, using reason to guide us through the transitional period when the deviation from what we are used to considering "right" makes us feel disoriented.¹⁹ And this open mode of body experimentation can lead to a more open, experimental, learning-oriented approach to other areas of experience as well. This certainly seemed to be Dewey's experience.

[Dewey] found it much easier, after he had studied the Technique, to hold a philosophical position calmly once he had taken it or to change it if new evidence came up warranting a change. He contrasted his own attitude with the rigidity of other academic thinkers who adopt a position early in their career and then use their intellects to defend it indefinitely.²⁰

The Feldenkrais Method

The method developed by Moshe Feldenkrais departs from very similar assumptions, but they are articulated in different terms and experienced by different techniques. Feldenkrais was a Paris-trained physicist, born in Russia in 1904, who was also Europe's first black belt in judo. From 1929 through the 1940's, he published a series of books on judo, exploring the bodily mechanics and theory of judo combat.²¹ After a severe knee injury from playing soccer, for which surgery offered little prospect of help, he undertook an intense study of anatomy, physiology, psychology, and anthropology in a successful attempt to heal himself.²²

Feldenkrais became interested in the problem of human correction, and so the question became when and how to do this. Differing with the hypnotists of his time, Feldenkrais chose to work with people in the waking state, which he saw as made up of four components: sensation, feeling, thinking, and move-

ment. These components are in constant interaction and cannot be separated except conceptually. Since these components all influence each other, a change in one will change the others as well. Feldenkrais chose movement as the most efficacious point of intervention for a series of reasons:

1. *The nervous system is occupied mainly with movement.*
2. *It is easier to distinguish the quality of movement [than of anger, love, envy or even thought].*
3. *We have a richer experience of movement . . . than of feeling and thought.*
4. *The ability to move is important to self-value.*
5. *All muscular activity is movement.*
6. *Movements reflect the state of the nervous system.*
7. *Movement is the basis of awareness.*
8. *Breathing is movement.*
9. *[Movements are the] hinges of habit.²³*

Movement was key for Feldenkrais.

This last point gets to the heart of the matter. Because of his view of the organism as an integrated set of functions, Feldenkrais named his technique "Functional Integration." Since this technique required the presence of a trained practitioner and therefore was inherently in short supply, he later supplemented his teaching through touching with a set of exercises called "Awareness Through Movement." Movement was key for Feldenkrais because

A fundamental change in the motor basis within any single integration pattern will break up the cohesion of the whole and thereby leave thought and feeling without anchorage in the patterns of their established routines. In this condition it is much easier to effect changes in thinking and feeling, for the muscular part through which thinking and feeling reach our awareness has changed and no longer expresses the patterns previously familiar to us. Habit has lost its chief support, that of the muscles, and has become more amenable to change.²⁴

Being awake and being able to move, though, do not in themselves guarantee that a person will fulfill her potential for awareness and for richly differentiated development. Feldenkrais speaks of both of these as uniquely human capabilities. His notion of awareness is reminiscent of Alexander's goal of inhibiting impulsive end-gaining.

The possibility of a pause between the creation of the thought pattern for any particular action and the execution of that action is the physical basis for awareness. This pause makes it possible to examine what is happening within us at the moment when the intention to act is formed as well as when it is carried out. The possibility of delaying action—prolonging the period between the intention and its execution—enables man to learn to know himself. And there is much to know, for the systems that carry out our internal drives act automatically, as they do in the rest of the higher animals.²⁵

Once again we have the goal, here called awareness, of reflection on actions and processes that would otherwise be naively taken for granted.

Feldenkrais also had an approach to development and learning. Whereas some human functions are learned early and are securely rooted, human beings engage in a uniquely large repertoire of functions that require apprenticeship. Furthermore, the challenges of developing an adequate adaptation to gravity in our unique bipedal posture take a long time to be met successfully—it takes several years for our bodies to be ready for upright posture. Because of the time and learning involved, there are plenty of opportunities for failed learning and incomplete apprenticeship. If neurosis can be defined as "a series of stereotyped reactions to problems that the person has

Maturity involves the capacity to make choices.

never solved in the past, and is still unable to solve in the present,"²⁶—i.e., failed learning—then human beings (certainly in modern developed societies at least, with their institutional

disruption of more organic cultural modes of learning)²⁷ are presented with an appalling range of opportunities for neurosis and immaturity. Maturity involves the capacity to make choices. For Feldenkrais, maturity "means that the individual has learned to bring to bear upon the present circumstance only those parts of previous experience that he consciously deems necessary. The immature person cannot stop himself from restoring the whole situation where only an element of it is associated with the present."²⁸

We might pause here to highlight a parallel between Feldenkrais' concept of maturity and the process of scientific analysis, with which one can move from an undifferentiated sense of the nature of a material system to a more differentiated and specified sense of order and of relations of cause and effect. From the vantage point of Feldenkrais' work as well as that of cognitive psychology, then, the operations performed by scientists are in their structure an extension of learning processes in which everyone engages during the course of their maturation.

Feldenkrais' intention is to transform and enrich our self-image.

In the acknowledgments to *Body and Mature Behavior*, Feldenkrais thanks J.D. Bernal and Solly Zuckerman, to whom he first presented the work as a lecture series. Bernal in particular is well-known as a central figure in the history of British Marxist science. Perhaps the company Feldenkrais kept has something to do with how he has an explicitly social explanation for our failure to fulfill more than a small fraction of our potential.²⁹ We are motivated to keep improving our functional capacities only until they function adequately to fulfill our immediate needs, he says. We learn to talk until we are understood. But few of us are motivated to polish our fluency and voice quality. Society, in fact, expects little more than minimum functioning in general for most people; and, I would add, it gives us precious little opportunity to exceed that. Nor do many of us get to learn how to judge our satisfaction by our own rather than external standards. However, the limitations we see in peo-

ple now are no reflection of our inherent limitations. Feldenkrais saw great potential for human fulfillment in the interaction of social transformation and self-education. His approach to the interaction of biology and society was a discourse of potentiality rather than determinism.³⁰

In spite of many similarities in spirit with Alexander's technique, Feldenkrais' method in practice is rather different. Feldenkrais doesn't rely on reason guided by verbal instructions as a means to gain new bodily experience. These new experiences are gained instead through the touch of a trained Feldenkrais practitioner or through following instructions in the Awareness Through Movement exercises. The intention in either case is not to try to achieve any "correct" posture or movement pattern, but to transform



and enrich our self-image; for our self-image, which in terms of our musculature resides in our motor cortex, is formed of—and limited by—our range of movement experiences. This self-image, then, is smaller than our potential capacity (because our actual range of movement is less than our potential range); but it can be expanded by gaining experience of new functions. And as the range of movements that one's body has experienced increases, so the mind, with this new and wider range of choice, can make its own judgments of what is appropriate on a broader basis. This broader basis comes about since a richer range of body movement experience leads to a more detailed, and hence more accurate, mapping of the body image on the motor cortex. The practice, then, involves helping the

pupil to experience such a broader range of movement possibilities. Often work will be done on only one side of the body, so that the mind (or, more accurately, body-mind) can make comparisons between the worked and unworked sides—a rich means to learning for the entire body.³¹

Alexander and Feldenkrais insisted that their work was education and not therapy.

Both Alexander and Feldenkrais insisted that their work was education and not therapy. The person being worked on was not a patient or even a client, but a pupil. And especially for Feldenkrais, the learning process was not serious and pedantic, but rather light, playful, and full of easygoing repetition, much like child's learning. Just as a child adds new options to its repertoire of knowledge and competence through play—and just as play is most successful in children who haven't yet been crippled by a critical, judging mind—the process of learning new movement options for adults works best when the new information is neither heavy nor overwhelming, but acquired as a by-product of interest and even enjoyment. ■

Part Two, the conclusion of Ecofeminist Science and the Physiology of the Living Body, will appear in the Spring/Summer, 1990, issue of Somatics.

NOTES

1. See, for example, Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution*; New York: Harper and Row, 1980.
2. *Ibid.*
3. Sandra Harding in *The Science in Feminism* (Ithaca: Cornell University Press, 1986) and Evelyn Fox Keller in *Reflections on Gender and Science* (New Haven, CT: Yale University Press, 1984) discuss the trajectory of feminist critiques of science. Among the ecological discussions are Morris Berman, *The Reenchantment of the World* (Ithaca: Cornell University Press, 1981) and Ynestra King, *Feminism and the Reenchantment of Nature* (Boston: Beacon Press, forthcoming).

4. Hilary Rose, "Hand, Brain, and Heart: A Feminist Epistemology for the Natural Sciences." In *Signs: Journal of Women in Culture and Society*, Vol. 9, No. 1, pp. 73-90. Reprinted in Sandra Harding and Jean F. O'Barr, eds., *Sex and Scientific Inquiry*, Chicago: University of Chicago Press, 1987.
5. This definition is in Thomas Hanna's preface to Yochanan Rywerant, *The Feldenkrais Method: Teaching by Handling* (New York: Harper and Row, 1983), p. xi. Hanna has written a number of books on the body, and publishes *Somatics* (available from 1516 Grant Avenue Suite 220, Novato, CA 94945). A related project is the Study Project in Phenomenology of the Body (information and their newsletter are available from Elizabeth Behnke, Coordinator, P.O. Box 0-2, Felton, CA 95018 USA). Morris Berman's *Coming to Our Senses: Body and Spirit in the Hidden History of the West* (New York: Simon and Schuster, 1989) is also relevant.
6. I have chosen to modify Dewey's phrase, talking about "physiology of the living body," to emphasize the dimension of this domain that is closer to lived experience.
7. Dewey, John. "Introduction" to F.M. Alexander, *The Constructive Conscious Control of the Individual*, (Centerline Press, 1985; originally published by E.P. Dutton in 1923), p. xxix.
8. Dewey, John. "Introduction" to F.M. Alexander, *The Use of the Self* (Centerline Press, 1984; originally published by E.P. Dutton in 1932), p. xv.
9. Yuasa, Yasuo. *The Body: Toward an Eastern Mind-Body Theory*. Edited by Thomas P. Kasulis; translated by Nagatomo Shigenori and Thomas P. Kasulis. Albany: State University of New York Press, 1987. Peter Freund, in *The Civilized Body* (Philadelphia: Temple University Press, 1982) makes a useful related distinction between self-regulation and heteroregulation; this distinction can help to set cultivation apart from Foucault's notion of discipline, but it doesn't necessarily imply the dimension of cultivation of latent potential.
10. Dewey, introduction to *The Use of the Self*, op. cit., pp. xiv-xv.
11. See Evelyn Fox Keller, *A Feeling for the Organism*, New York: W.H. Freeman, 1983, for a biography of McClintock.
12. Alexander, *The Use of the Self*, op. cit., Chapter one: "Evolution of a Technique."
13. Reich has been slurred as if he were a naive biological determinist. But one cannot read Reich carefully and still maintain this position. John Duggan has prepared a paper showing the persistence of a social consciousness in Reich's work all the way through until the late works.) Yet a purely social constructionist position is so popular today that there are doubtless people who, merely noticing that I discuss the biological body, will need no further excuse to slur these ideas in the same way. I only ask them to pause to consider whether perhaps a biology that claims to explain everything deterministically—which my use of biology doesn't do—might not itself be bad biology. Let us instead develop a more critical biology and consider the dialectical relationship between biology and culture—where they are *mutually* determining. This would be even more interesting and respectful of diversity than a pure social constructionist approach. (I develop this further in a manuscript entitled "The 'Social Construction of the Body' is a Copout.")
14. W. Barlow, cited in Michael Gelb, *Body Learning: An Introduction to the Alexander Technique*, New York: Henry Holt and Co., 1981, p. 32. This formulation will probably appeal to historical materialist readers. It also brings in mind the work in pre-World War II Germany of Rudolf Laban (the originator of the Laban system of movement notation), who helped workers choreograph dance based on the movement patterns they used at work.
15. *Ibid.*, p. 32.
16. Other body practitioners don't all agree; some say the pelvis is key, for example.
17. Whereas Alexander's own language is somewhat archaic and long-winded, Gelb's exposition of his method is quite clear. A further strength of Gelb's book is the use he makes in his exposition of a variety of physiological studies of the efficacy of the Alexander method.
18. F.M. Alexander, *Man's Supreme Inheritance*, New York: Dutton, 1910.
19. Gelb, op. cit. This is probably the central theme of this book.
20. Jones, *Body Awareness in Action: A Study of the Alexander Technique*, cited in Gelb, p. 33. Alexander had many eminent people among his pupils, including not only Dewey, but Aldous Huxley and George Bernard Shaw. He also received the support of the Nobel prize winning neurophysiologist Charles Sherrington and the anthropologist Raymond Dart. Nikolaas Tinbergen devoted a major part of his 1973 Nobel Prize acceptance speech to the Alexander Technique; the speech appears in *Science*, Vol. 185, No. 4145, 1974. Gelb's book includes a good bibliography of works by, about, and relevant to Alexander.
21. For a brief biographical sketch, see Thomas Hanna, *Explorers of Humankind*, New York: Harper and Row, 1979, pp. 16-19.
22. *Ibid.*
23. Moshe Feldenkrais, *Awareness Through Movement*, New York: Harper and Row, 1972, pp. 33-39.
24. *Ibid.*, p. 39.
25. *Ibid.*, pp. 45-46.
26. Moshe Feldenkrais, *Body and Mature Behavior: A Study of Anxiety, Sex, Gravitation and Learning*, New York: International Universities Press, 1949, p. 154. This is the first, and most technical, book Feldenkrais wrote on his method. Later books are not so full of detail about musculoskeletal areas and neurophysiology, but their basic argument is the same.
27. Recent work in body history, particularly "A Repertory of Body History" by Barbara Duden (an annotated bibliography compiled in collaboration with Ivan Illich, and published in *Fragments for a History of the Human Body*, Part Three, New York: Urzone, 1989 (MIT Press)), attempts to sketch how body percepts have changed over history and how an enormous range of body percepts are destroyed by the process of homogenization accompanying economic development.
28. Feldenkrais, *Body and Mature Behavior*, p. 154.
29. Feldenkrais, *Awareness Through Movement*.
30. Stephen Jay Gould, in "Biological Potentiality vs. Biological Determinism" (*Ever Since Darwin*, New York: Norton, 1977, p. 251-259) compares the sociobiological use of biology, which tries to show all the things which *aren't* possible due to genetic limitations and thereby plays into a social order which wants to keep people in their places, with a use of biology to suggest human potentialities that haven't yet found a social order in which they can be freely fulfilled. Unfortunately, Gould and others have been so occupied with maintaining a strong opposition to the frequently recurring claims of biological determinists that they haven't developed the notion of the biological potentiality of human beings to any great extent. The works of people such as I am discussing here could be useful to such an effort.
31. A work by one of Feldenkrais' students explaining the model utilizing a cybernetic model and a great deal of practical examples and case studies is *The Feldenkrais Method: Teaching by Handling*, by Yochanan Rywerant, op. cit.

Ecofeminist Science and the Physiology of the Living Body

Part Two

Martha R. Herbert, Ph.D.

Science, during the Twentieth Century, has been as destructive as it has been constructive. This is reflective of a lack of awareness scientists have had of their own bodies. An ecofeminist science sees the body's way of learning as a paradigm for all human living.

The Hypnotherapy of Milton Erickson

The enormous learning potential contained in relearning the unself-conscious absorption of childhood is also important for the last practitioner I will discuss here. Milton Erickson, a psychiatrist and one of the founders of family systems therapy,³² was one of the world's foremost clinical hypnotists and perhaps the major innovator in this field in the 20th century. Born in 1901 into a large and outgoing family of Scandinavian descent, he grew up on a Wisconsin farm, a background he used abundantly in his later work (as he used most of his experience). In his late teens he developed polio, which crippled every voluntary muscle in his body except those around his eyeballs. His family would leave him sitting in a rocking chair with a hole in it for toilet functions, while they did their business. So for quite a long time he had absolutely nothing to do except watch the goings-on around him. Erickson accomplished two major learnings during this period. One of them was that, partly with the help of some reading he had done before his illness, he became an extraordinarily acute observer of nonverbal communication and of discrepancies between the meaning of people's words and their body language. This acuteness was

to prove critical in his later work as a hypnotist.

The other learning, more centrally relevant here, had to do with learning itself. As time passed, one of the ways he would occupy himself was to review in rich detail old memories of things he used to do. One day as he was engaged in one of these reveries, he noticed that his rocking chair was rocking ever so slightly. There was no way it could have rocked for any reason but something he had done. This was Erickson's

Erickson's realization that thoughts about movement could create actual slight movements of the muscles.

first realization that *thoughts about movement* would create actual slight movements of the muscles involved in the imagined movement. (We have already touched on the relationship Feldenkrais and Alexander both utilize between imagined and actual action; in recent years, many an Olympic athlete has rehearsed his or her act in trance with detailed imagery.)

The birth of a sister around this time allowed Erickson to observe an infant learning to crawl, stand, and walk. Combining learning from his sister

with learning that thinking could facilitate movement, he taught himself to walk again. Of course, there was a decisive difference between his relearning to walk and the first learning of his sister, for he was proceeding as an adult, with an adult's mind which could participate *reflectively* and *awarely* with its developed intellect. Whereas the process of learning to walk the first time is buried in the recesses of childhood amnesia, Erickson as an adult could retain his memories of how he relived this primordial learning process. Since the only way he could make this process work was through painstaking attention to minute and sensual detail, he developed a strong sense of the foundational character of early learning experiences and of the importance of learning processes in psychological growth,³³ and he generalized from this experience in his work as a hypnotherapist. Many people stay stuck in ruts because they can't figure out how to make a workable, step-by-step process out of the road to greater flexibility, but Erickson would get inside the details of therapeutic learning processes that most people slide over and take for granted. (Unlike Feldenkrais and Alexander, as a psychiatrist he did think in terms of therapy, even with his strong emphasis on learning.)

Erickson didn't approach learning in a primarily instrumental, analytical fashion. He conceived of our minds as having a conscious and an unconscious part; he believed that whereas one's conscious mind ordinarily ran the show, it was the unconscious mind that contained truly vast wellsprings of

Erickson did think in terms of therapy, even with his strong emphasis on learning.

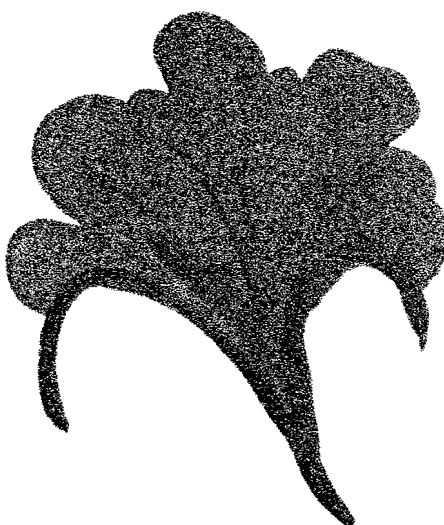
resourcefulness. Memories of the full range of our experience are contained in our unconscious; whereas the conscious mind, left to itself, tended to be too judgmental, narrow, linear, and attached to habit. The goal of his hypnotherapeutic work was, through trance, to get the conscious mind out of the way so that the unconscious mind could reorganize its resources into a more constructive and appropriate framework for the challenges being faced.

Erickson thought of trance as a natural state, entered by all of us many times during the day when we drift off or space out. These "times out," which tend to recur in a regular rhythm of about ninety minutes, seem to give us frequent chances to use our unconscious mind to integrate our experience and regroup. Trance involves a focusing of attention, though one's absorption can be external as well as internal. The techniques Erickson employed as a hypnotherapist were intended to amplify and deepen our natural tendency to, and need for, such altered states of consciousness. The altered sense of time (indeed, sometimes timelessness), the imagistic thinking, the both-and logic, the receptivity to metaphoric communication—these characteristics of the trance state are systematically used in the Ericksonian approach.³⁴

Since people often don't talk at all while they are in trance, Erickson kept some track of what is happening to the subject through monitoring "minimal cues"—those bare beginnings of movements, gestures, and facial expressions, as well as changes in breathing, skin tone, and other physiological indicators.³⁵ His extended period for observing people's facial and body language during his long bout with polio surely

contributed to his skill in this regard. Since the motor cortex is dampened in hypnotic trance, a movement that seems small compared to normal waking movements can actually indicate quite intense mental activity.

Erickson's use of these minimal cues is relevant to differences between body-oriented practices and hypnotherapy. Feldenkrais, oriented toward body movement, was critical of hypnotists such as Coué who thought that merely by giving suggestions to the unconscious in trance or even sleep one could rectify long-standing psychological problems. He maintained that without transforming deeply ingrained body habits, the psychological problems would return. (This was also his criticism of psychoanalysis; he maintained that successful cures effected



through psychological intervention were inevitably accompanied or preceded by changes in body and facial muscle movement patterns.) It may well be that Feldenkrais' criticism doesn't apply to Ericksonian-style hypnotherapy, which involves such a careful observation of, and responsiveness to, bodily cues. For the body is indeed involved. (In fact, Erickson and Feldenkrais became friends toward the end of their lives and felt a deep kinship between their approaches.) Indeed, this attentive monitoring has led some to describe Ericksonian hypnotherapy not merely as nontraditional and non-authoritarian, but as a utilization and cooperation approach. Erickson believed strongly that any changes a person might undergo could not be imposed from without, but had to

come from a person's own inner resources, which could be better accessed in trance. "Minimal cues" were one means for a hypnotherapist to stay responsive to the changing needs of a hypnotherapeutic subject.

Erickson did a great deal of hypnotic work on psychophysiological and psychosomatic phenomena, thus concerning himself with a different range of problems than did Alexander and Feldenkrais.³⁶ More recent work by his students, drawing on the expanding body of research in psychoneuroimmunology and behavioral medicine, formulates the trance-related mind-body relationship in terms of the concepts of state-dependent learning and information transduction.³⁷ A catchy example of state-dependent learning is a study of medical students who were taught new information while drunk and subsequently remembered that information much better drunk than sober. State-dependent memory, learning, and behavior (a more complete name for the phenomena) have to do with how stress-related hormones and other bodily states affect the strength of the memory trace. Subsequently, the whole memory and behavior complex can be triggered by a new stimulus similar to any aspect of the sensory-information complex associated with the memory. Hypnosis can be used to disentangle this mass (or mess) of associations and give the person more choice of responses. Just as Feldenkrais described maturity in terms of the freedom to choose which parts of past experiences one wants to use in new situations, through hypnosis one can come to use the experience as a resource, rather than be thrown by

Erickson thought of trance as a natural state.

triggers of stressful memories into a regressive "automatic" repetition compulsion.³⁸

Information transduction is a term that describes the concern of psychoneuroimmunology research. How do psycho-social experiences, whether stressful or pleasurable, get transduced into organismic and cellular changes? The mechanisms of the pathways from neocortex through the

limbic-hypothalamic axis to the bodily and then the cellular levels are being actively investigated,³⁹ and this very investigation, with the interaction of multiple levels of integration that it involves, challenges at least to some extent the molecular reductionism that tends to dominate contemporary biomedical research. With an information

Erickson believed strongly that any changes had to come from a person's own inner resources.

transduction model, causation by no means has to go from the bottom up.

In his own way Erickson, particularly like the body-oriented Feldenkrais, wanted to help his patients have more options. He saw pathology as correctable by resumption of interrupted learning processes. One of the ways he helped people gain new options and resume learning processes was through the use of metaphor.⁴⁰ Erickson was very skilled at telling stories which were isomorphic to the problems his patients presented but which contained indications of other ways of framing and handling the problems. In the case of psychosomatic and physiological problems, the metaphors were often isomorphic to the physical problems themselves. The isomorphisms and suggestions in his metaphors were often obscure to the conscious mind, but Erickson pitched them at the unconscious mind on the grounds that new and generative behaviors, images, and dreams are generated from the unconscious and not from the conscious. Erickson also spoke to the little child in each of his patients who still loves to get absorbed in a good story. This was one of the

Erickson saw pathology as correctable by resumption of interrupted learning processes.

particular ways that he utilized the reverie state associated with trance.

Erickson did most of his work before there was much information about the mechanisms of these interactions. Yet, there was abundant phenomenological evidence that verbal suggestions and

metaphors indeed had physiological impact. Pain control and other physical problems have been resolved through hypnosis, even though the mechanism of the resolution (or even of the problem) is not understood. Erickson had more than ample opportunity to practice his pain-control skills on himself. He was one of the rare people who was stricken with polio a second time, in his fifties. From that point on he had constantly to deal with his own physical pain. Pain tends to present itself as an overwhelmingly intense and unpleasant experience, hardly inviting careful exploratory attention. Unfortunately, the urgent desire to escape the pain can serve to magnify it by focusing attention on it even more. One of the techniques Erickson used for pain control was dissociation. Another was to use one's curiosity about the pain to break it down from one overwhelming and undifferentiated experience to a complex set of interesting and varied phenomena going on in one's body. This, in turn, can lead to the subsequent ability that can be cultivated to vary some components of the pain, thereby gaining an increasing degree of control over the experience. This absorbed interest in one's physical sensations isn't so much kinesthetic, since it doesn't necessarily involve physical movement. But the inner knowledge gained from such absorption is reminiscent of John Dewey's remarks above about the difference between academic knowledge of anatomy and knowledge in use, which is more grounded and thorough. Erickson's own experience with the possibilities of highly differentiated inner awareness was the foundation for his ability to help other people develop in a similar manner.

Body-Mind and the Practice of Science

The capacity for profoundly absorbed attention and the skill of transforming an undifferentiated experience into a carefully differentiated and observed set of variables are both involved not only in hypnosis but also in the process of scientific investigation. There are many stories of trancelike states providing the occasion for breakthroughs in scientific insight. Even some of the more esoteric phenomena of altered states of consciousness have been

described by scientists. Evelyn Fox Keller's biography of Barbara McClintock is full of stories of McClintock's use of altered states of consciousness. She told of many occasions when she would go into a trancelike state for perhaps half an hour and then come out with a new insight, hypothesis, or solution to a previously confusing problem. And in the course of working on a difficult corn genetics research project, she increasingly would have the sensation she described as getting down into the cell among the chromosomes and seeing them large all around her, while totally losing track of her normal, human-scale self.⁴¹ Keller even briefly mentions that McClintock herself became explicitly interested in Tibetan practices of mind-body regulation, such as body-heat regulation practices.⁴² There are stories about many other scientists as well. Einstein thought in images; and Kekulé's reverie that led him to figure out the ring structure of benzene is famous as well. Reverie plays an important role psychologically and in creativity.⁴³

One of the techniques Erickson used for pain control was dissociation.

A theme that I emphasized in the work of Alexander and Feldenkrais was the development of reflectiveness and awareness at a conscious level. Erickson, on the other hand, was concerned to facilitate the resourcefulness of the unconscious and wanted to get the conscious mind out of the way. On the surface, these two approaches would seem to be in contradiction, yet this is at least in part a matter of terminology rather than of substance. Erickson's "conscious mind" is more akin to the habit patterns that both Alexander and Feldenkrais worked to overcome, and all three wanted to liberate deeper sources of wisdom and appropriateness from habitual restraints.

Conclusion

What are we to make of this, theoretically and practically? Psychodynamic explorations are useful in suggesting why some people tend more than others to preserve a capacity for creative reverie and why different cog-

nitive styles tend to be gender-associated. And cultural critique can explain how an instrumentally oriented society like ours discourages free-floating, ostensibly "unproductive" reverie—or body sensitivity, but critique alone does not help people to better use their potential for creativity. Erickson's approach to hypnotherapy and to the

Erickson's approach to hypnotherapy bypasses the fixation on pathology that cripples too much of psychological theory.

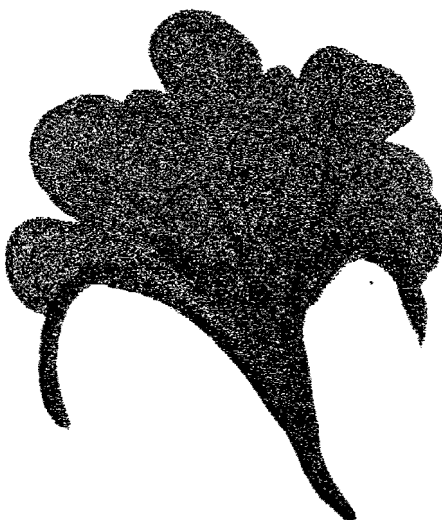
unconscious utterly bypasses the fixation on pathology that cripples too much of psychological theory and practice and causes practitioners to patronize and label rather than help.⁴⁴ Moreover, trance is useful not merely as psychotherapy but also for facilitating generative creativity.

Both hypnotic phenomena and the body-learning phenomena described above that come about through the Alexander Technique and Feldenkrais' Functional Integration involve developing a more highly sensitive and differentiated awareness of previously naive and unreflective experience. And what are these, if not some of the most prized capacities of human beings in general brought to more specific levels of sophistication in the sciences? Alexander, Feldenkrais, and Erickson all developed not merely modes of body learning, but even more, modes of using body and mind-body cultivation for *learning how to learn*. The emancipation of people's capacity to learn is surely one of the primary goals of any genuinely emancipatory program.

Yet although the originators of these practices at times alluded to the social implications of their work, this was not their primary goal. On the other hand, neither is it appropriate to use the stated political viewpoints of scientific researchers (or artists, for that matter) as a central criterion for evaluating their work. Moreover, explicit advocates of human emancipation have not been that strong in offering practices to back up their claim that the personal is political. How, then, do we integrate body practices, emancipation, and the reconstruction of science?

First, I want to argue that body and other cultivation practices should be an important part of emancipatory social practice. If we are trying to bring about a deep transformation in the way human societies work, we need to examine carefully how growing up in a troubled culture has imprinted itself deeply on every aspect of our beings. But this examination will never go deep enough if it is only conducted intellectually. This discussion of body learning practices should suggest that the process of what Marx called "educating the educator" needs to take place in our bodies as well as in our minds.

This is particularly important for feminism. At the level of critique, somatics is a necessary addition to a psychodynamic approach in the discourse on feminist epistemology.⁴⁵ The



work of Alexander and Feldenkrais presented here has illustrated the importance of sensory-motor activity in relation to knowing, and Erickson's mind-body work suggests practical approaches for accessing the generativity of the unconscious mind. These practices can help point the way not only to a stronger material basis for epistemological critique but also to the regenerative practices to which such critique should lead.

Second, I'd like to move from discussing emancipatory practice to emancipatory scientific practice. This means asking what we mean by "science." What kind of reconstruction of science is suggested by body-cultivation practices? For one thing, my sketch above of some such approaches should at least suggest grounds for considering

these modes of body cultivation and study to be in some sense scientific in themselves. They do not violate the basic criteria that science be reflective and verifiable, although they do challenge the domination of mainstream science by a Cartesian masculinization⁴⁶ that adds surplus determinations to the criteria for legitimacy.

In addition, these body practices can help develop an integrative alternative to scientific reductionism. To be sensitive to one's body while one's body-mind is being sensitive to the world is already a multileveled, context-sensitive approach to experience. This very approach shifts attention away from the reductionist search for the boss of the hierarchy of control (as where genes control everything) and toward an interactional sensibility and openness to complexity. These latter sensibilities are more compatible with feminist, ecological, and dialectical approaches to science.

More particularly, a somatic orientation can be a crucial tool in the development of a post-Cartesian biology. Henry Ey said, "The reintroduction of the subject into physiology and biology is the chief concern of modern thought";⁴⁷ a somatic approach to the physiology of the living organism can help give more substance to this concern. Furthermore, the fact that somatics involves the physiology of the *living* organism is crucial here. No "subject" remains if one works in a lab studying the physiology of organisms which are ground up and centrifuged or studying physical processes as reflexes while ignoring the role of higher levels of organization (like awareness) in modulating organismic processes.

Body practices should be an important part of emancipatory social practice.

Over time, a more conscious relationship of body practices and somatic education to scientific research, as well as to ecofeminist reconstructive practice, might well feed back into the body practices themselves. Also, since the practices discussed here were generated by men, it will be interesting to compare these approaches to those of women, and particularly feminist and

ecofeminist women, as such work becomes more richly documented.

The final point in conclusion raises the larger issue of who gets to be a scientist. If the capacities developed by body cultivation and altered states of consciousness are similar to capacities used in doing science, then what is special about the capacity to do science? Indeed, Feldenkrais and Alexander have both insisted that there are no ungifted people and that people who seem gifted excel more in their quality of use and their focus (and I would add, their social privilege) than in any inherent capacity. It would seem that giving people the opportunity to

A somatic orientation can be a crucial tool in the development of a post-Cartesian biology.

develop their own capacities for self-regulation, combined with appropriate intellectual stimulation and challenge, can lead in any reasonably intact person to the kind of skilled reflectiveness that is of the essence of science. Ernest Mandel once addressed this problem:

In fact, nothing now stands in the way of progressively transforming all people into scientists and scholars, that is, of that progressive dissolution of productive work into scientific work that Marx foresees . . . , provided that human society so reorganizes itself that every child is surrounded with the same infinite care and attention that are today devoted to preparing nuclear submarines or interplanetary rockets.⁴⁶

I would add that such infinite care and attention should be of another, more playful and open kind than some yuppies now lavish on their three-year-olds to ensure their future admission to Harvard. Certainly such caring labor could not be of the subaltern, taken-for-granted kind that now oppresses women.⁴⁷ The growing feminist discussion of the labor of caring might be enriched by considering the kinds of caring involved in the body and body-mind practices I have discussed.

A good deal of the feminist debate about science has remained within

the bounds of mainstream, officially legitimate science. If one focuses only on that kind of science, trying to change it faces one with huge sociological problems: how do you transform an essentially conservative socialization apparatus with strong insular tendencies? But this approach isolates science even from the social forces so many of us have been arguing indeed affect it. Moreover, it perpetuates a narrow view of the role of scientific activity in a broader picture of human affairs.

If instead we expand our focus to include all of the problems around the world that need a reflective, experimental, collective learning approach, then things look different. Finding ways to cultivate the full-bodied intelligence of everyone becomes much more important. And the sociology of the inner workings of more sophisticated, specialized science can be placed, as a political move, in a dialectical relationship with broader social problems. This is already going on much more clearly in some third world contexts, where problems of science and philosophy in relation to development have often gone to the streets.⁵⁰ In the first world, we already have growing pockets of alternative health, energy, and ecology projects. As the ecological, health care, and institutional crises worsen and the problem of generating a viable way of life becomes more immediate, science may take more to the streets at home as well.

Science education, even among alternative-minded folk, is still too often carried out in the dry and forbidding pedagogy of Cartesian science. The reflective body and mind-body learn-

The fact that somatics involves the physiology of the living organism is crucial here.

ing practices I have discussed here should suggest that there are specific ways for developing a more embodied and sensuous—and thereby more fully materialist—science pedagogy; and furthermore, such an approach could help make scientific capabilities more accessible to a larger portion of people.

Alexander, Feldenkrais, and Erickson have given abundant grounds, both theoretical and practical, for a rich

human potential for grace, balance, intelligence, and generative creativity. It is comforting and encouraging to

Finding ways to cultivate the full-bodied intelligence of everyone becomes important.

find yet more support for looking forward to the democratization of skill as well as power. This is particularly important to the ecofeminist project, which is devoted to maintaining and regenerating diversity, both of human personality and of natural organisms and environments. Ecofeminists do not look kindly on a vision of a top-down reorganization of society, for this can never honor diversity and individuation (which is quite different from individualism). The democratizability of skill supports the notion that a bottom-up reorganization is practical and not crazy. That we all embody potential capacities far beyond what we now develop is only further support for this prospect. ♪

This is the second part of a two-part article.

NOTES

32. An accessible and entertaining introduction to Erickson's work is in Jay Haley's *Uncommon Therapy: The Psychiatric Techniques of Milton H. Erickson, M.D.* (New York: W. W. Norton, 1973). Haley and others were involved in the collaboration with Erickson that also included Gregory Bateson, in the early years of the family systems approach. There is currently a not-so-small industry of psychotherapists putting out volumes on Erickson's approach. In the last period of his life, a growing number of people tried to systematize and render more teachable Erickson's approach. A short book which summarizes a lot of these attempts is *Taproots: Underlying Principles of Milton Erickson's Therapy and Hypnosis* by William Hudson O'Hanlon (New York: W. W. Norton, 1987).
33. Some of this biographical material may be found in E. Rossl, M. Ryan and F. Sharp, eds., *Healing in Hypnosis: The Seminars, Lectures and Workshops of Milton H. Erickson*, Vol. I. New York: Irvington, 1983.
34. An excellent and systematic exposition of the Ericksonian approach for practi-

tioners is Stephen Gilligan's *Therapeutic Trances: The Cooperation Principle in Ericksonian Hypnotherapy*, New York: Brunner/Mazel, 1987. Another useful book is Stephen Lankton and Carol Lankton, *The Answer Within: A Clinical Framework of Ericksonian Hypnotherapy*, New York: Bruner/Mazel, 1983.

35. (*Body and Mature Behavior*, introduction and throughout.) Erickson's use of "minimal cues" might indicate a common ground, since such subtle movements would seem to indicate the involvement of the motor cortex in trance processing.
36. Ernest Rossi, ed., *The Collected Papers of Milton H. Erickson on Hypnosis, Volume II: Hypnotic Alteration of Sensory, Perceptual and Psychophysiological Processes*, New York: Irvington, 1980; Ernest Rossi and Margaret Ryan, eds., *Mind-Body Communication in Hypnosis*, New York: Irvington, 1986.
37. Ernest L. Rossi, *The Psychobiology of Mind-Body Healing: New Concepts of Therapeutic Hypnosis*. New York: W. W. Norton, 1986. And Ernest L. Rossi and David B. Cheek, *Mind-Body Therapy: Methods of Ideodynamic Healing in Hypnosis*, New York: W. W. Norton, 1988.
38. *Ibid.*
39. Rossi's *The Psychobiology of Mind-Body Healing* is well documented. An early researcher in this area was Hans Selye, an endocrinologist who developed the concept of "stress" which he explains clearly in *The Stress of Life*, Revised edition, New York: McGraw Hill, 1976.

An important anthology was R. Ader, ed., *Psychoneuroimmunology*, New York: Academic Press, 1981. The Institute for the Advancement of Health publishes the journal *Advances* which includes abstracts of new work in this area that they periodically compile into annotated bibliographies.

40. Many of the above references have good discussions of the use of metaphor. More books are appearing constantly.
41. Evelyn Fox Keller, *A Feeling for the Organism*, *op. cit.*
42. *Ibid.*, pp. 202-3.
43. Alan F. Leveton, "Between: A Study Showing the Relationships Between Erickson, Winnicott, and Bachelard," in Jeffrey Zeig, *Ericksonian Psychotherapy, Vol. II: Clinical Applications*, New York: Brunner/Mazel, 1985, pp. 515-531.
44. At Erickson's funeral one person said "Erickson took on the psychiatric establishment single-handedly, and he beat them. They don't know it yet . . ." (in Sidney Rosen, ed. *My Voice Will Go With You: The Teaching Tales of Milton H. Erickson*, New York: W. W. Norton, 1982, p. 18).
45. The Freudian tradition is radically different from the more learning-oriented approaches of the people I have discussed. Perhaps in some future paper I will engage in a more detailed comparison between the approaches of Freudian-influenced projects, such as that of Reich and the object-relations theorists, with the learning-oriented

somatic approach I have been developing here.

46. For more on Cartesian masculinization, see Susan Bordo, *The Flight to Objectivity: Essays on Cartesianism and Culture*, Albany: State University of New York Press, 1987.
47. Ey is cited by F.J.J. Buyendijk in his book *Prolegomena to an Anthropological Physiology*, Pittsburgh: Duquesne University Press, 1974, p. 23.
48. Ernest Mandel, *The Formation of the Economic Thought of Karl Marx*, trans. Brian Pearce (orig. 1967). New York: Monthly Review Press, 1971, p. 115.
49. See, for example, Hilary Rose, "Hand, Brain and Heart," *op. cit.*; and Joan C. Tronto, "Beyond Gender Difference to a Theory of Care," in *Signs: Journal of Women in Culture and Society*, Vol. 12, No. 4, 1987, pp. 644-663.
50. Richard Levins, "Applied Biology in the Third World," in Richard Levins and Richard Lewontin, *The Dialectical Biologist*, Cambridge, MA: Harvard University Press, 1985. Also, Richard Levins, "A Science of Our Own: Marxism and Nature," in *Monthly Review* special issue "Science Technology and Capitalism," July-August 1986, pp. 3-12.



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