

# Incomplete Science, The Body, and Indwelling Spirit

## By Martha Herbert

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Below and after the fact is another contribution to the Future Visions consultation.

Writing on "Incomplete Science: The Body and Indwelling Spirit," is Martha R Herbert, M.D., Ph.D., a pediatric neurologist at the Massachusetts General Hospital in Boston and at McLean Hospital in Belmont MA. Herbert specializes in patients with learning and developmental disorders. She is also Vice-Chair of the Board of Directors of the Council for Responsible Genetics. She received her medical degree from Columbia University College of Physicians and Surgeons, her pediatrics training at New York Hospital-Cornell University Medical Center, and her neurology training at the Massachusetts General Hospital, where she remains and is on the faculty of the Harvard Medical School. At MGH she pursues research on brain structure abnormalities in developmental disorders, particularly autism. She also works on health and ecological risks of genetically modified food, and on neurotoxins and brain development. She pursues an ongoing critique of genetic reductionism, and is working on elucidating parallels among alternatives to genetic reductionism at different biological levels, such as the ecological level (sustainable agriculture or regenerative ecology) and the level of the human body (biopsychosocial approach to neurobehavioral disorders, mind-body or somatically grounded approach to therapies). Prior to her medical training she obtained an interdisciplinary doctorate from the History of Consciousness program at UC Santa Cruz, studying evolution and development of learning processes in biology and culture.

Herbert contrasts two parallel projects in science (as well as in religion), what she calls a "control-oriented, disconnected" belief system versus a "stewardship-oriented, connected" belief system. She concludes this carefully argued essay calling for a spiritual and cultural framework that helps us live better, but with the ambivalence on never really having control. She challenges us to preserve and even regenerate our biological and cultural legacies as "bodies of knowledge that are subtle, complex, somatically and environmentally grounded". And she wants to hold science and technology to the same critical and moral standards. She writes:

"This cannot mean an abandonment of the cognitive advances we have made. In particular, scientific advance has allowed us unprecedented access to levels of material reality not immediately accessible to the human sensorium. Our newly gained access to mediated perception of levels from the subatomic to the galactic is a gift of great aesthetic merit."

I have several more such papers that I will post over the next few weeks. Of course, the entire collection is available online at <http://www.meta-lists.net/futurevisions>.

-- Billy Grassie

From: "Martha R. Herbert"

Subject: INCOMPLETE SCIENCE, THE BODY AND INDWELLING SPIRIT

Science can be considered as a particular extension of pervasive human activities of thinking and problem solving. Systematic and rigorous testing of observations, carried out by science, is not unique but simply in some respects more careful. But scientific knowledge is inherently incomplete. Rigor is not achieved equally for all components of a system. Components of a subsystem are characterized with the remainder staying in background. Characterizations of larger systems tend to be statistical rather than precise.

A careful scientist may make sweeping inferences and articulate hopes and desires inspired by scientific findings, but scientific claims themselves should be more strictly constrained by the limits of the evidence itself. The inferences scientists and other people make from science, however, are often confused with the science itself. These inferences reflect much more than the science or the material world studied. They reflect belief systems that are strongly culturally conditioned. These belief systems shape and are shaped by every aspect of experience of body, self, other human beings, and nature. These belief systems feed back upon the science and shape how science proceeds. They shape what questions are asked and what are not, what is noticed and what is not, what can be spoken and what cannot, what is thinkable and what is not.

In what follows I will schematize some opposing worldviews that can shape science, and sketch their divergent implications. The first worldview I will call a *control-oriented disconnected* belief system. The second I will call a *stewardship-oriented connected* belief system.

Underlying much of the scientific enterprise has been a set of beliefs: that we can control nature through science, that this is desirable and good, and that this control will end human suffering. This belief system also tends to include negative assumptions about nature. Nature is limited, dumb. Human engineering is superior to nature's. In order to progress it is necessary to transcend nature.

Negative assumptions about nature include negative assumptions about our own nature, both our psychological nature, and the nature of our bodies. "Human nature" is nasty, selfish, greedy and lustful. Natural impulses are anti-social, and civilization requires that they be reined in and controlled. The body is distasteful, a source of pain, appetite, sex, sickness, suffering and death. The body's pleasures are sinful and dangerous, and must be reined in and controlled; the body's pains should be fixed and escaped.

A schematic of a spiritual belief system consistent with this control-oriented approach to nature is of a remote deity, not rooted in body or place, with transcendence or escape as a spiritual goal, and with discipline of body and mind imposed by external authority

An opposing belief system holds that we can play a role of nurturance and stewardship toward nature, but that control is an impossible, misguided goal. The goal of minimizing (not eliminating) suffering is approached in these terms through a balanced integration of technical, cultural, economic, community and spiritual approaches.

From this point of view nature is fascinating in its intricacy, and complexity. Eager curiosity is balanced with humility about the limits of what we know compared to what exists and may yet surprise us. Nature is respectfully queried for lessons arising from the complexity of matter, of planetary structure, and of the long evolution of organisms and ecosystems. Characterizing how interventions will ramify throughout a system is an intrinsic part of scientific inquiry and technical planning.

Human beings are seen as having inherent drives toward love, cooperation, curiosity, creativity and conviviality. Rage, impatience, self-centeredness and greed are seen as borne of fear, isolation, danger, humiliation and deprivation whose opposites, love, genuine connection, safety, respect and heartfelt generosity, can in principle minimize these defensive reactions.

The human body and mind are understood to have great potential for physical, mental and spiritual development. Every individual has the intrinsic capacity to cultivate these potentials to the extent that effort is applied, with high refinement and subtlety rewarding sustained commitment. Curiosity about the body, how it moves, how it senses, how it feels in the many senses of that word, is encouraged and incorporated into cumulative cultural practices. Sexuality, one of the body's many capacities, is sacred but not taboo.

A schematic of a spiritual practice consistent with the stewardship approach would ground spiritual practice in human relationship, bodily experience and connectedness with nature and would create cooperative modes of interacting.

While these two opposing belief systems are ends of a spectrum, and while fascinating and even perverse combinations of elements of both perspectives can be found, the stark opposition of vantage points can help pose questions.

As an adherent, to the best of my capacity, of the second belief system, I ask of adherents of the first set of beliefs, why do you have such a fierce need for control? In real life attempts to engage this discussion I have encountered difficulties, as the question does not resonate with people who appear to be, to use current parlance, "control freaks." In my experience such people do not characterize themselves in this manner, no matter how strongly they may come across in this way to others. At best they might take the value of control for granted and wonder why there should be any question about it. An alternative seems inconceivable to them. I have thus been left with my own inferences about the answer to my question, which I will share.

I suspect that the need, indeed the drive, for control comes from deep-seated disconnectedness. From infancy connection to other human beings, to the body's own sensorium and movement and expressive repertoire, and to nature have been thwarted. Infants may not be touched, may spend long periods of time alone in a crib in a room by themselves. Toddlers and children may be seen and not heard, and treated as annoyances and as defective adults. Achievement may be a child's only route to recognition; open-ended wonderment may be disdained as unproductive and therefore threatening. Nature may be seen (if it is seen at all by city dwellers) as dirty or dangerous, as undifferentiated and uninteresting. Only technical experts may seem to know about nature, and the interesting parts of nature become not those that can be seen with the eyes, heard with the ears, and smelled and tasted and felt, but rather only those aspects that can be discerned with the assistance of complex technologies. There is often no tangible personal experience of body-based transformation of perception or emotion, and the body thus comes to be experienced as static, and even as remote. Only technical experts seem endowed with the power to change the body, and only from the outside; the body is submitted to these interventions as a passive disconnected object.

For people who grew up like this, power and potency are achieved through devices, and escape from the boring, aggravating immanence of the body. Powers beyond the body are cultivated but powers within the body are not. If athletics becomes a preoccupation, achievement of quantifiable milestones is sought, how many miles run, how fast, how many peaks climbed, how many weights lifted, but not quality of experience of the activity, not the movement of the limbs and torso while running and the many possible orientations of the pelvis and hips, not the view from the trails one races to complete, not the subtle and varied potentialities of human biomechanics while weight-training. Endorphins released by effort are noted and sought as a drug but not wondered at, explored. The body becomes another productive mechanism.

The inherent capability of the human body/mind/spirit for more integrated meaningful experience may on occasion break through this driven mindset. People however may not be prepared to enlarge upon these epiphanies, because every aspect of their life and belief systems may co-conspire against such spiritual opening; they thus easily revert back to a more defended existence.

Disconnectedness enables domination. It enables one to dominate, and it sets one up to be dominated. Disconnected from feeling and from compassion, one dominates others. Disconnected from one's power to imagine alternatives, to reject humiliation, and to resist, one submits to domination.

Disconnection also enables domination of nature. The drive to subjugate nature seems basic and urgent. Anyone or anything that slows this drive, even asks it to pause and reflect, is experienced as a threat. The struggle to defeat that threat may parade as the pinnacle of rationality against primitive nature, of science against emotion. But the underlying emotional force behind the urgent and intolerant tone of this struggle is a primordial preverbal inchoate fear.

Insofar as science and technology are driven by this disconnectedness, they are likely to ride roughshod over human, cultural, ecological and spiritual considerations. And we indeed have unprecedented power to override all of these concerns. Nuclear and chemical technologies, biotechnology and nanotechnology all have sweeping global ramifications. The power that now exists to manipulate the smallest genetic, molecular and atomic levels of living and inanimate matter is not something that adherents of the second "connected, stewardship" belief system feel comfortable leaving in the hands of the first "disconnected, control-oriented" belief system.

Advocates of germline engineering for the sake of "human improvement," notably extremists like the Extropy Society, are a frightening example of disconnected control oriented people who think they can do better than "Mother Nature" and do not appreciate their deep ignorance of the potentialities of the bodies we have, the breathtaking limitations of our current and foreseeable knowledge of genetics, or the magnitude of their intolerance and hubris. These people confuse constraint with deficiency. They do not comprehend that instead of escaping the "limits" of our body and the "limits" of nature, we need to reinhabit our bodies and our earth, and fall in love with the constrained but still infinite potentialities of both. Constraint is the basis of art. You do not criticize a violin because it is not a piano. Instead you admire the artful elicitation of the full potentialities of the instrument you have.

There are restricted settings where sheer technological "control" is appropriate. A pilot should be able to control an airplane to within tolerances allowing survival. A comatose patient or a patient in surgery can have physiological parameters closely regulated from the outside. Yet even within the bounds of these situations control is not complete. Control becomes altogether inappropriate when thinking of raising a child, encouraging artistic creativity or regenerating an ecosystem.

I think that the fundamental millennial task is to regenerate connectedness and to reorient every aspect of human enterprise from being driven by fear to being guided by love. This regeneration will require spiritual, cultural and somatic work as well as technical expertise. Indeed, technology needs to be reevaluated from spiritual, cultural, somatic and ecological perspectives.

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More judgement and forbearance is required when the question arises of transforming science into technology. This transformation needs to be done with more restraint, and from a connected rather than a disconnected ground. How do we use our technical power elegantly and appropriately, rather than on trivial impulse and for greed and profit?

We need to learn how to have meaningful interaction among sciences dealing with multiple levels and scales of the material world. Learning some of the mechanisms of operation of smaller units of matter, like genes or molecules, has become an end in itself, as if it could replace rather than augment other kinds of knowledge. It has been confused with gaining knowledge that is more fundamental. This is a deep mistake. Let me explain through examples.

A person who has a spiritual epiphany has been touched in some profound way. If we had instruments sensitive enough, we could detect accompanying alterations in neural circuitry, neurotransmitter concentrations, and gene expression, as well as in other larger levels such as breathing, heart rate and skin conductance. Mind affects matter. Yet even if we could thoroughly characterize a spiritual experience at these levels, we would not then recommend that we engineer spiritual experiences. We witness the hazards of decontextualized, engineered psychological/spiritual questing in the drug crisis. The best way to achieve a spiritual transformation is through spiritual discipline and lived experience, and will probably remain so into eternity.

Intervention at multiple levels can change a system's functioning. Elegance in technology should not be equated with intervention at the tiniest molecular or genetic level. It may be that the system has the capacity to transform itself more elegantly than we ever might with our genetic meddling if we only aimed to find another level at which to tweak it. The role of molecular and genetic inquiry in this kind of elegant technology model would be to learn more about the system's physiology and regulatory mechanisms, so that more complex pathways would be better understood, and points where regulation could be modulated might be found. Monitoring molecular, genetic and other technology-mediated markers might help fine-tune such modulatory interventions, but might not be the routes of intervention themselves.

The drive to control the tiniest parts of nature seems most parsimoniously comprehensible not in terms of scientific progress but rather in terms of economic pressure. Such tiny components of nature can be patented and privatized. Regulatory system-based interventions, on the other hand, are less easily turned into commodities for market. This suggests a rather profound contradiction or incompatibility between market forces and the integrity of complex biological systems. I pose this as a conundrum to ponder.

Regulatory system-based elegant interventions have more in common than do molecular and genetic engineering with practices encompassed in indigenous knowledge systems. For instance, traditional agricultural practices tend to involve not monoculture but multi-cropping, and integration of cultural and symbolic with agricultural considerations. Integrity of family and community as well as soil and agroecology are maintained in an integrated fashion. A large-scale study in China reported recently in the journal

NATURE found that by planting two rice varieties together instead of just one, the devastating "blast" fungus was reduced not only in the fields themselves by 94% but also strikingly in the entire region. This is a relatively simple application of a much more complex repertoire of traditional agricultural techniques, yet even this pared down intervention had dramatic effects. Traditional rice farmers in Asia report that it is the hybrid and not the traditional rice varieties that are subject to fungus, and they see the imposition of hybrid and now genetically engineered rice (imposition of these innovations always being accompanied by heavy-handed economic pressure) as devastating bioecocultural integrity and diversity.

Indigenous knowledge systems develop over long periods of time by thoughtful participant-observers who take account of phenomena in context. This is a different variant of human problem solving capabilities than the \_scientific or experimental method,\_ but the knowledge it yields has some distinct advantages. Chinese acupuncture is another indigenous knowledge system that was generated by cumulative complex observation of self as well as other, internal monitoring as well as external manipulation. Its system of meridians and points can now be detected with modern electrical equipment. Yet it is doubtful that these meridians and points would have been discovered de novo by scientists who work with instrumentation but without the guidance of their own cultivated somatic sensibilities. Certain classes of somatic and psychological knowledge, at least, require the inclusion of careful, skilled self-observation. And validation of these knowledge systems with modern instruments does not replicate the more comprehensive framework in which the knowledge was traditionally embodied. Electronic instruments cannot train the fingers to be sensitive to acupuncture points, nor do they cultivate the complex system of practices incorporated in Chinese medicine, such as Chi Kung and T'ai Chi, which have cultural meaning as well as health benefits. Who is to say whether acupuncture uprooted from its full context is more purified and true, rather than more weakened and lost?

Spiritual, moral and cultural frameworks can help us to live together in peace and goodwill within a world we will never fully know or control, however much we may learn. If we are to survive, we need to let go of the drive for control and private gain, and regenerate sustainable and meaningful ways of life. We have already lost ever so much of the biological and cultural richness that could help us achieve this. Our millennial challenge is to preserve and regenerate human capabilities and bodies of knowledge that are subtle, complex, somatically and environmentally grounded, and culturally and spiritually meaningful. And our millennial challenge is also to reevaluate science and technology, transforming them as necessary (possibly in major ways), so that they help regenerate rather than destroy cultural and biological diversity and biogeochemical integrity. Sensitive thoughtful grounding in our own bodily being is an important foundation for these regenerative efforts.

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