

Traversing the Territories: When Humanists Engage with Biotechnology and Technoscience

Review article by ALLISON MURI

University of Saskatchewan, Canada

Published in *New Media & Society*, October 2007; vol. 9, 5: pp. 871-879.
doi:10.1177/1461444807081232.

Eugene Thacker, *The Global Genome: Biotechnology, Politics and Culture*. Cambridge, MA: The MIT Press, 2005. xxiii _ 416pp. ISBN 0-262-20155-0, \$39. 95 (hbk); ISBN 0-262-70116-2, \$19. 95 (pbk)

Marquard Smith and Joanne Morra (eds), *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*. Cambridge, MA: The MIT Press, 2006. vii _ 297pp. ISBN 0-262-19530-5, \$34. 95 (hbk); ISBN 0-262-69361-5, \$18. 95 (pbk)

For the first time in human history, the body has become a medium that absorbs and interfaces with technologies at the microscopic and molecular levels. The authors of these biotechnologies, of individual and cultural potentials, are a select few trained in the quantitative languages of physics, chemistry, biology, genetics or engineering. How do the rest of us participate in what should be a healthy dialogue about our biocultural futures? Although more than a decade has passed since physicist Alan Sokal (1996a) published his hoax essay 'Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity' in *Social Text*, his exposure of the use of figurative speech in critical theory is still an important cautionary tale. However limited his appreciation for the intellectual experimentation of postmodern theory and the ambiguity of metaphor, the incident has served as a reminder that science and technology studies by those of us who make our living in the humanities and social sciences must skirt the boundaries of imposture. As Sokal put it, while 'humanist intellectuals' ignorance' about basic principles of physical science has remained basically unchanged since C. P. Snow's time, 'nowadays a significant

minority of humanist intellectuals feels entitled to pontificate on these subjects in spite of their ignorance (perhaps trusting that their readers will be equally ignorant)'. Consider, he wrote, the example of the 'fashionable' theorist Paul Virilio's words in *Rethinking Technologies* (1993):

it now seems appropriate to reconsider the notions of acceleration and deceleration (what physicists call positive and negative speeds). The reader who does not find this hilarious (as well as depressing) is invited to sit in on the first two weeks of Physics I. (quoted in 1996b: 346)

As a reader who finds this anecdote neither hilarious nor depressing, despite having sat through and even passing a first-year physics class, I take this critique as a reminder that the luxury of moralizing the sciences as professors of philosophy, literature, fine arts, cultural studies or critical theory, is that we can (indeed, in some venues are encouraged to) indulge in elaborate wordplay at the expense of literal accuracy. And sometimes that is damaging to our credibility. Sokal's indignant derision was, I think, well deserved in this case, but it was also packed with the stinginess of scientific authority that negates others' investments in the social, commercial and political realities manifested by a technoscientific culture. How do we engage in a productive dialogue?

The status of 'the human', of 'life itself', in the wake of recent developments in such fields as biomedical engineering, nanotechnology and information sciences, has increasingly preoccupied theorists in other fields. Our bodies are open to interventions at the molecular level wrought by equipment and processes that we rarely witness and even more rarely understand: we are compelled, even obligated, to engage in a dialogue about these inevitable penetrations and occupations of our social and economic structures, our day-to-day lives and ultimately our own tissues and cells by the implements of science and biotechnology. But how do we make sense of this foreign territory if we ourselves do not occupy the laboratories, if we do not understand how regulatory circuits and operon fusions function in prokaryotic

gene regulation, if we cannot appreciate how recursive estimation of the driving signal of surface EMG signal might make a better myoelectric arm (Sanger, 2006)? Two recent publications from MIT Press offer models of the tools that we might use to examine the technoscientific extensions of human embodiment. At one extreme, *The Global Genome: Biotechnology, Politics and Culture* by Eugene Thacker is a theoretical framework that is decidedly rhetorical, metaphoric and text-based; at the other, *The Prosthetic Impulse: From a Posthuman Present to a Biocultural Future*, a collection of 13 essays edited by Marquard Smith and Joanne Morra, is a set of approaches more experiential, material and body-based.

The Global Genome is a book about ‘how, in biotechnology, ontological questions immediately fold onto questions that are social, economic and cultural’ (p. xi). DNA, for example, exists as a material, slimy goop extracted from organic material; as a computer file defining a sequence of nucleotides; and as a commercial, patentable entity. The relationships between these entities, Thacker argues, has to do with ‘how the concept of “life itself” is being fundamentally transformed in the era of biotechnology’ (p. xii). Thacker contemplates ontological questions concerning such enigmatic indeterminacies as ‘life itself’ (always enclosed in scare quotes), the supposedly Aristotelian ‘tension between “form” and “information”’ (p. 73) and a ‘refashioning of the species being’ (p. 47) through biomaterial labor – the ‘work’ or ‘core labor power’ done by non-conscious cells, enzymes and genes on behalf of the biotechnology industry (pp. 44–5). Aristotle, Michel Foucault and Karl Marx loom large in this text, emphasizing all too clearly one of the difficulties of applying the discourse of humanism to that of science. While new discoveries constitute authority in that culture of empiricism, observation and experiment, we tend to look to past authorities for our knowledge, no matter how anachronistic: ‘Aristotle’s distinction [in *On Generation and Corruption*] between coming-to-be and alteration leads us to ask if the same distinction holds for stem cells’, Thacker writes. ‘Are stem cells a form of *coming-to-be* or of *alteration* in

Aristotle's terms?' (p. 288). The more pressing question is why Aristotle even comes up in a serious discussion of 'the potentials that inhere in regenerative medicine' today (p. 279). Aristotle's philosophy is perhaps more familiar ground for those of us educated in a humanist tradition than the genome, but it offers little real illumination on the topic of how genetic research and medicine affects (and surely improves) individual lives today. Thacker's impressive work might be overly limited by too much attention to these old authorities as a means of commenting on current issues: the result is that occasionally both the theory and the presentday contexts are distorted by this application. Bartha Maria Knoppers politely complains in a review for the *Canadian Medical Association Journal* that a certain amount of the content is not contemporary (DNA Sciences and its Gene Trust had been abandoned by 2003; the Tonga Gene Bank Autogen never began) or is mistaken (Public Population Project in Genomics is an open-access resource for research tools and not a population database; additionally, 'these chapters are not wholly accurate in their understanding of population genomics and human diversity') (Knoppers, 355); Paul Rabinow (2005) points out in a review for the *Journal of the American Medical Association* that the Celera Genomics project as representative of what Thacker calls the 'more universal "human" genome projects' to sequence the human genome is not a 'universal signifier that will contain the average of all specificity' (Thacker, p. 136): rather, the sequence produced by Celera Genomics served as the basis for the largest singlenucleotide-polymorphism project to date . . . [and] the equally universal government sequencing project has transmuted into the HapMap project or the cancer genome project, whose aim is to document diversity and mutations'. (Rabinow, 2005: 2237) These points emphasize perhaps the greatest shortcoming of this book, which is to force the specificities of current biotechnology cultures within the confines of old theories designed for other contexts. Thacker's decision to attempt to position his critique of the biotechnology industry somewhere 'between' Michel Foucault's theory of biopolitics,

proposed in 1976 and Karl Marx's theory of species being, formulated in 1844 (pp. 21 and 36), is very problematic in this regard. They simply do not apply to cellular research and commerce except in the most general of ways.

Toward the conclusion of his book, Thacker ventures into the realm of pure postulation, with a discussion of developments in regenerative medicine currently at the hypothetical and experimental stages alongside deliberations on *X-Men* hybrids from popular science fiction and a new notion of labor power inspired by Marx's theories of industrial capitalism:

[I]n biotech there is no laboring body . . . that actually does the producing. Instead of a human worker, who views his or her labor power as property to sell, exchange and circulate, we now have a nonhuman biological network of cell lines, tissue cultures and genomic databases. (p. 300)

Problematically, Thacker's argument frequently rests upon such syllogisms as labor power produces commodities; cell, tissues and genes produce commodities; therefore cells, tissues and genes are equivalent to non-human labor power. The language of obfuscation here too often takes the place of meaningful commentary. Another example goes like this:

[I]n contemporary molecular genetics and biotechnology, biology is information and information is both immaterial and material. Furthermore, this biological information is understood to be operative only within a network . . . I can thus state . . . biological exchanges conceive of 'life itself' as informatic and in doing so *biological exchanges informationalize without dematerializing*'. (p. 11).

Is Thacker really saying simply that exchanging data about the living body does not mean that the living body ceases to be physically present? However, regardless of these objections, Thacker offers important and profound comments on the new intersections of biotechnology, politics and culture, and I am sure that this work will provide both a basis and inspiration for many more studies and critiques in the years to come.

In contrast, *The Prosthetic Impulse* proposes to engage directly with the question of how to negotiate the 'metaphorical opportunism' that biotechnology inspires. Without

dismissing the metaphorical potential of theoretical flights of fancy, editors Marquard Smith and Joanne Morra attempt to ‘reassert the phenomenological, material and embodied nature of “the prosthetic impulse” ’ (p. 3). Taking Baudrillard’s paranoia concerning ‘the end of the body’ in *The Transparency of Evil* as an illustrative example, the editors explain their methodology as an examination of both the metaphoric and the material possibilities of biotechnological prosthetics:

The overexcited fear that is induced by such a theorization of encounters with cybernetic prostheses, by the indulgent and dystopian panic of contagion and by the rhetoric of high postmodernism, is a position from which the authors in this volume take a step back. They are not concerned with such fatality, such inevitable futurity. We have learned that the body, its histories and its mutability have not become fixed by technology. (p. 6)

The introductory sentence of the first essay in this collection, Vivian Sobchack’s ‘Let me begin with the fact that I have a prosthetic leg’ (p. 17), stresses the significance of a theoretical approach from the perspective of experience and embodiment: the unit of body and technology comprises an ‘intrasubjective entity’ (as Lisa Cartwright and Brian Goldfarb describe it), which a more abstract and generalized use of metaphor cannot adequately examine. As Sobchack reminds us,

the theoretical use of the prosthetic metaphor tends to transfer *agency* . . . from human actors to human artefacts . . . [which] indicates a certain technofetishism on the part of the theorist – however closeted and often antithetical to the overt critique of certain aspects of technoculture which the metaphor was mobilized. (p. 23)

Sobchack argues that the discourse of scholars ‘who describe the prosthetic *objectively* as an absolutely different species from the body’ is exclusionary and at odds with that of scholars ‘who describe their prosthetic *subjectively* as of the same species as the body that has incorporated and therefore included it’ (p. 26). Similarly, ‘[r]ather than asking where power is held between the dyad of user and technology (or among the triad of user, technology and technician)’, Cartwright and Goldfarb suggest investigating the multiple and dispersed functions of power and ‘its effects in producing new forms of subjectivity’. In order to do

this, they suggest, 'we need to understand the prosthesis as neither an iconic and substitutive object nor a supplemental and facilitative object'. Some technologies, such as neural prostheses, 'suggest a different configuration of agency in the act of control in which the device is not a medium but materially reconfigures the intersubjective unit body and technology as an intrasubjective entity'. They conclude: 'Agency is radically and synesthetically distributed and interconstitutive within the unitary body' (p. 138).

Cartwright describes her experience of undergoing spinal neurosurgery and experiencing the same numbness and muscle twitches which before had signalled nerve death. Her medical team, she explains, suggested that they could be understood only as 'ambiguous signifiers', which could mean either regeneration or degeneration of the nerves:

Living in this terrain of semiotic ambiguity – where life, death and health hinge on differences in signification, we hesitate to dismiss texts that consider prosthesis and the nervous system as tropes. Rather, we suspect that we will be drawn to investigate more deeply the semiotic meanings that are concretely incorporated into bodies with each new trauma, loss and schema. (p. 149)

Others in the collection manage to bridge the gaps effectively between embodiment, science and figurative play: for example, in 'The Bug's Body: A Disappearing Act', Gary Genosko's exposition on the 'plague of disposable prostheses' (p. 107) represented by the military 'cybug' as metaphor and as mimetic prosthetic is an illuminating take on simulated intelligence and mass disposability. In 'Disability, Masculinity and the Prosthetics of War, 1945 to 2005', David Serlin lucidly articulates the power and privileges accorded to able-bodied American masculinity in his process of unravelling 'the multiple implications of veteran amputees performing in Carmen Miranda drag for recuperating soldiers at U. S. military hospitals in the nationalistic culture of the 1940s' (p. 155). These are just some examples of the many fine essays in this collection. Regrettably, there is not the space here to address each of them, but what they accomplish as a whole is to demonstrate how scholars in the humanities and social sciences contribute best to a discourse of biotechnology. They

understand language, image, metaphors and tropes. They understand and explain history. They understand and ask us to reconsider present-day power structures and cultural assumptions. The value of this collection of essays is that in drawing on metaphor and theory, the authors tend toward understanding language, text and theory as artefacts rather than as prescriptions for understanding what a technologised humanity means.

But the further we get from the subjective experience of the physical body or the analysis of witnessed texts and objects, toward the abstractions of alphanumeric representation of the body as DNA, the more we need – particularly for those of us who are not fluent in the language of science – the inexactitude of metaphor and analogy. The problem is compounded by the acceptance of old metaphors that were developed to explain a complex system for which many had, and continue to have, no language: the ‘alphabet’ or ‘code’ of DNA and RNA (the nucleotides represented as A, C, G and T), with their ‘words’ (codons) resulting in a ‘blueprint’ or ‘recipe’ and its subsequent ‘expression’ presents a temptation to conflate the scientific ideas with the everyday understanding for the terms. For example, in ‘Stumped by Genes: *Lingua Gataca*, DNA and Prosthesis’, Lennard J. Davis writes of how:

the genetic is seen as fixed and written, like a written language. The opposition between spoken and written language plays out in the modern conception of genetics that contains both the vocalized natural (and thus subject to change and self-making) and the fixed, inscribed, written-in-stone sense of the genetic fate or destiny. (p. 94)

In fact, the genome is not seen as fixed or written in stone at all, but rather as a biochemical structure subject to such variations as mutations, variable expressivity, environmentally responsive gene expression and so on. To conflate the metaphor of our fixed material texts, the media of literature, with the contemporary understanding of a gene as a material structure with properties specific to the dynamic chemical reactions of its constituents, is problematic at best. We might be more wary of play with the metaphors that geneticists have adopted, as

in the case of DNA as written script or code, alphabets and sentences, to explain the complexities of their subjects with a language more accessible than verbiage such as ‘Intron excision proceeds in two successive transesterification reactions whereby the upstream exon is cleaved from the intron and ligated to the downstream exon’ (Lopez, 1998: 284). Here is an example where the metaphor should be treated as the artifact of a specific historical moment and cultural divide where a group can communicate ideas only through the broadest allegorical gestures, rather than as the hegemonic attempt to define ‘the default gene for humans’ (p. 97) as Davis suggests here.

However, the metaphoric possibilities would seem irresistible. Davis argues that there really is no gene as a locatable place or item and science tends to use the term as a kind of prosthesis to mark the place where the location of the gene should be if there were a gene. The gene, like the prosthetic leg, marks the place of an absence and acts as a physical memorial to something lost. (p. 95) While in classical genetics the gene was indeed an abstract concept, a ‘unit of inheritance’ with no definable physical basis, it is today defined by the Sequence Ontology Consortium as ‘A locatable region of genomic sequence, corresponding to a unit of inheritance, which is associated with regulatory regions, transcribed regions and/or other functional sequence regions’ (see <http://www.sequenceontology.org/miSO/>). Davis further argues that ‘complex human processes cannot be contained in a gene’ since ‘a gene is not an actual place or thing’. Furthermore,

according to the central dogma of genetics, as postulated by Watson and Crick, one gene makes one protein. Complex human processes like intelligence can never be the result of the production or lack of production of a single protein. We can say that the idea of the gene for a complex trait is a prosthetic that posits the trait as an addition to being human. (p. 96)

However, the ‘one gene makes one protein’ tenet is outdated. The discovery of alternative splicing, discovered in viruses in 1977, has challenged that particular belief: alternative splicing means that potentially, one gene can generate thousands of distinct proteins (for a

plain language description of alternative splicing, see Michalowski, 2005; Pearson, 2006). Dietmar Schmucker et al. (2000), for example, have suggested recently that ‘alternative splicing can potentially generate more than 38,000 Dscam isoforms’, a molecular diversity that ‘may contribute to the specificity of neuronal connectivity’ (2000: 671). Davis’ suggestion here, then, that this ‘dogma of genetics’ can be countered by a biocultural approach providing ‘illuminations and insights that are not always available to a scientific one’ (p. 96), would seem to undermine demonstrably any plausible claim to humanist authority in the realm of scientific research agendas.

These comments are not to undermine Davis’s important observations on the risks of prosthetics at the genetic level as the ‘innermost notation of defect’ written in the *lingua gataca* readable only by experts with expensive machines at their disposal – and I am certainly no geneticist myself – but simply to point out that as professors of English, communications, philosophy, art and art history, we are not altogether well equipped to dismiss the actual science that we critique, especially if we focus too readily on old texts and old authorities as some sort of ‘set-in-stone’ articulation of scientific canon. Davis’s critique, like Thacker’s, seems to suffer from the limitations of simply being a literary scholar writing for a humanist, social scientist or cultural studies audience rather than, say, a geneticist writing from the vantage of the up-to-date professional experience and knowledge of that field. It is perhaps a predictable conclusion to return to Sokal’s insistence on strict definitions for speed here, but the work of being taken seriously by serious scientists is still nascent: of the tools at our disposal as outsiders, perhaps the experiential, material and observational impulses can temper the metaphorical–theoretical inclinations of our professions. Consider the reflections by David Wills on human experience in a world where technology implies reduced labor and increased speed, but has also motivated and configured ‘every antitechnological nostalgia . . . every Promethean melancholy’ (p. 238) over the resulting

distanciation, alienation and displacement. In Wills' 'Technology or the Discourse of Speed', the idea of the prosthesis inspires consideration of 'the technology of language', especially as it relates to the question of speed:

Prosthesis suggests that speed is less a matter of acceleration than one of transformation. Speed is a differential process, an articulation of time and space. Speed reinforces the effect of a displacement in space that takes place in time: the faster it occurs, the shorter the time and the greater the displacement. Speed, therefore, threatens a rapid displacement into otherness, a *fast-becoming foreign*. Just such a transmutation haunts the texts of Paul Virilio and makes his work less an analysis of speed, less the dromology that it purports to be than a simple eschatology (p. 245).

What it is that these writers offer is the evocative questioning of human destiny. There is a value in Virilio's inexactitude, however exasperating his lament might be to those who do not share it. To return to Sokal, then, what is the basic definition of speed in freshman physics?

Q: On his last business trip, Bob traveled a total distance of 325 km to get to his destination. The trip took 3 hours. What was his average speed?

A: average velocity = displacement/time

$v = d/t$ 320 km/3 hr = 106.67 km/hr

Here is a truth. In contrast, Wills' assessment of the works of Paul Virilio and Bernard Stiegler shows speed as a more equivocal – but no less 'true' concept. Sokal is right: we should attend more carefully to our own ignorance of scientific language and practice, but we recognize too the power in the languages of humanism. No calculation can communicate the rich and full implications of the speed at which our world and our lives are being transformed. But history, literature and art can. Subjective narratives of embodied experiences can. Metaphors can.

These two books raise the old issues of the 'two cultures' and how they might communicate; moreover, how do we find means to validate both sides in so doing? How do outsiders approach biotechnology without seeming hopelessly naïve or simply inadequate to

the task of presenting a valid critique? The inexactness of metaphor, the recognition of culture, society, the awareness of history and the variability of ‘truths’ and subjective experience, the recognition of other forms of power remind us that the indeterminacy of language and meaning is also a form of truth in itself. Both of these books ask questions that will contribute to the discourse between our two cultures, but the answers they provide are various and contradictory. And perhaps that is as it should be.

References

- Baudrillard, J. (1993) ‘The Transparency of Evil’, trans. James Benedict, p. 119. London, Verso.
- Knoppers, B.M. (2006) ‘The Globalized Gene’, *CMAJ*, 174(3): 355–6.
- Lopez, A.J. (1998) ‘Alternative Splicing of Pre-mRNA: Developmental Consequences and Mechanisms of Regulation’, *Annual Review of Genetics* 32(1): 279–305.
- Michalowski, J. (2005) ‘Alternative Splicing’, *HHMI Bulletin* 18(2): 23–7.
- Pearson, H. (2006) ‘Genetics:What Is a Gene?’ *Nature* 441: 398–401.
- Rabinow, P. (2005) ‘The Global Genome: Biotechnology, Politics and Culture’, *Journal of the American Medical Association* 294(17): 2237.
- Sanger, T.D. (2006) ‘Bayesian Filtering of Myoelectric Signals’, *Journal of Neurophysiology* 97(2): 1839–45.
- Schmucker, D., J.C. Clemens, H. Shu, C.A. Worby, J. Xiao, M. Muda, J.E. Dixon and S.L. Zipursky (2000) ‘*Drosophila* Dscam is an Axon Guidance Receptor Exhibiting Extraordinary Molecular Diversity’, *Cell* 101(6): 671–84.
- Sokal, Alan (1996a) ‘Transgressing the Boundaries:Towards a Transformative Hermeneutics of Quantum Gravity’, *Social Text* 46–47: 217–52.
- Sokal, A.D. (1996b) ‘Transgressing the Boundaries: an Afterword’, *Philosophy and Literature* 20(2): 338–46.
- Virilio, P. (1993) ‘Questioning Technologies.The Third Interval: a Critical Transition’, in V.A. Conley (ed.) *Rethinking Technologies*, Minneapolis, MN: University of Minnesota Press.