

REVIEW OF: *Becoming Biosubjects: Bodies, Systems, Technologies.*

By Neil Gerlach, Sheryl N. Hamilton, Rebecca Sullivan, and Priscilla L. Walton.

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Co-authored by four versatile scholars, *Becoming Biosubjects: Bodies, Systems, Technologies* makes a delightfully fluid read, which is as gratifying as it is analytically demanding. While the four authors' affiliations are in different fields, i.e. sociology/anthropology (Gerlach), law/communication (Hamilton), communication/culture (Sullivan), literature (Walton), their respective competencies run through all six chapters of the book in a finely coordinated tandem. Unobvious, multi-layered dependencies are followed along with reinterpreted familiar ones. A well supported message is articulately transmitted: "biosubjectivity" is here to stay, with all its contradictions, challenges, and (arguably) promises, and humanity has choices to make. Generated at the polysemantic interface of the social, legal, political, technological, and... the vital, biosubjectivity in a sense holds the meaning of humanity's, and perhaps the planet's, present and future. The analysis expressly foregrounds the Canadian context, but also situates the processes under investigation internationally.

In reviewing key aspects of the book's discursive terrain this essay in addition opens up venues for its participatory reading. The analysis is theoretically contextualized within the McLuhan tradition and an analogy is projected between the challenges of biotechnology's ambivalent repercussions and the similarly consequential and controversial tangle of climate change issues.

The suitably coined neologism "biosubjects" comprises various categories, spanning the entire range of biomorphological complexity. There is the human subject, whether a DNA-tracked criminal or a provisionally DNA-trackable regular citizen, the (potential) mother/father, the surrogate mother, human hosts of pathogens. Further, there is the human embryo/fetus, in various media and modes of gestation. To these are added the genetically modified plant/animal life form, e.g. Monsanto's canola, Harvard's Oncomouse. The list continues with Chakrabarty's oil-eating bacterium, which first

breached the “life” patenting boundary in 1980. The pathogen brings up the line, whether it is carried by a human or animal host, e.g. SARS, smallpox, anthrax, avian flu, BSE viruses. Although the primary interest is in *biotechnological* subjects as juridical-civic-political actors, the literal term “biosubject” can extend to those that are not necessarily *biotechnological*, in the sense of genetically engineered, yet they are “objectified” as subjects in a Foucauldian sense. This serves the book well, given that the cases discussed may be ambiguous between natural and genetically engineered (SARS), sometimes the former and sometimes the latter (smallpox, anthrax), straightforwardly natural (women; embryos when traditionally conceived and gestated), or at least not genetically manipulated even if technologically assisted (“above-board” in vitro cases and abortion).

In all cases biotechnologies are analysed taking into account the complex epistemic/power dynamics at the intersection of the legislative and judicial systems, politics and government, and less robustly science itself. All along, the book discusses how the media, mostly the press, represent(s) and may variously tip the scales of the socio-political processes underway, by speech or silence. Thus in view of proposals by Marshall McLuhan, developed later by Eric McLuhan (McLuhan and McLuhan 2011), which descend from Aristotle’s four causes (material, efficient, final, formal), the book can be analyzed as a study of formal causality,¹ i.e. what would commonly be seen as the “(side) effects” of biotechnologies.

The authors note the instituting in the public sphere of a “biotechnological imaginary,” grafted on to a prior scientific imaginary of unquestioned faith in science. More recently the modernist Humboldtian faith has been interrogated by a Lyotardian postmodernist “reflexivity” about (techno)science’s and (techno)scientists’ authority and reliability, which is quite appropriate for the biotechnological context, where promising/risky possibilities can serve research, business or warfare, with weighty physical and symbolic implications for bodies, minds, and souls. The shifting imaginary goes hand in hand with a discourse in the public sphere and pop culture, qualified as “social science fiction.” This latter label invokes the tension between what is already actual, e.g. DNA identification, genetic engineering of plants, and what may come,

¹ “Cause” translates αἰτία, which does not commit to temporal sequencing. Quoting St. Thomas Aquinas after Eric McLuhan, formal cause “completes the intelligible expression of a thing’s quiddity [essence, lit. what-ness]” (E. McLuhan 2011 [2005], p. 105, gloss in square brackets added).

arguably, in the future, e.g. DNA cataloguing of each and every citizen, (routine) genetic engineering of humans. The boundary that separates the two in the public mind is analyzed as blurred and permeable, feeding unrealistic expectations of forensics (the “CSI effect,” chapter 2), or smoothing the path for human genetic engineering (chapter 3). This permeability corresponds with the “leakiness” of national borders in a post-9/11 world, threatened by biological warfare (chapter 5), whereby fluctuations of fiction and imaginary may balance out to invite a “biogovernmental surveillance” regime as a public insurance policy, domestically (pp. 60-61) but also globally (pp.169-172).

If the virtualization of humans was noted already with the advent of electric technologies such as radio, telephone, TV (see Marshall McLuhan’s “disembodied,” “discarnate” or “angelized” man metaphors), and has been theorized extensively in the context of new media technologies (Katherine Hayles 1999, a.o.), the “contingency” of the body as problematized by Gerlach et al. gains strikingly wide-ranging and far-reaching structural-systemic distribution. Whether a child is separated from the mother’s body through in vitro gestation, artificial insemination, surrogate motherhood (chapter 3), or whether DNA surveillance, of varying range and kind, looms as a step toward a national “full genetic justice system” (chapter 2), or toward global security from bioterrorist acts on a par with costly natural pandemics (chapter 5), there are potentially serious implications for citizens’ integrity of the body, privacy, personhood, and the structure of family and society alike. The restored chance of having children, individual and public safety and a state fulfilling its responsibilities, as well as recognition of advances in technoscience are (on the surface) desirable technological effects. However, there is also the downside to take into account. The objectification of human subjects inexorably expands with the reduction of identity to DNA sequencing and convenient digitization; prenatal babies being productized, even (arguably potentially) genetically customized, wombs becoming available for rent, sperm and eggs for sale. Arguably consensual biogovernance may flip into a form of hegemony, enslaving the public’s agency.

With the case of Harvard’s Oncomouse patenting, chapter 4 introduces a discursive thread which steers away from the human biosubject. Mice are joined by lower life forms such as bacteria, in chapter 5 by viruses like SARS, smallpox, anthrax, and in the

concluding chapter 6 by Monsanto's Roundup Ready Canola (RRC). Being biological and (arguably) agentic, as well as genetically engineered and subject to surveillance, all of the above align with human biosubjects, giving witness to ways of biotechnological obliteration of distinctions between humans and nonhumans. Although Gerlach et al. emphasize the procedural side of patenting of life, they do not overlook the implications of the actual biological re-architecting in transgenic engineering, where genes travel within and even between species. Thus if higher/lower life form, human/nonhuman, natural/artificial dichotomies are being dissolved symbolically in the patenting contexts reviewed, the boundaries are being breached literally, to start with. This poses weighty legal, political, and certainly ontological questions. It results in silences of legislative bodies, impasse in politics, partial/contingent decisions of the courts, discrepant coverage in the media. Not surprisingly, cries of progress-murder from the biotechnology industry. Opening a rhetorical aside, could it be that biotechnological formal causality is merely extending available scientific knowledge, namely that at a sufficiently deep level everything in the "known" universe is structured identically? The visceral question then is, if consonant with versions of today's ecological view and its cross-cultural predecessors (Vandana Shiva 1984), the "crown of creation" has to give up exclusive/exclusionary status so that all that "is" gains status of value, who and what should, and could, decide about the inclusivity of such a level playing field?

The crucial distinction between ontological equity "value" and "price" receives a straightforward translation in Gerlach et al.'s excellent analysis of the issue of gene patenting-legitimation of ownership of life, not excluding human. The legal issue is understandably entangled in moral-political dilemmas. Is a whole mouse patentable if the gene implanted in the embryo out of which it grew is? Are, then, all the mice born subsequently that carry the same gene? If a lower life form like a bacterium can go under "invention" as "matter," can/should a higher life form follow? If a mouse can, can/should a human? Unlike the United States and Europe, where both Harvard's Oncomouse and the Oncogene were eventually ruled patentable, Canada appears to be a hold-out, with only the Federal Court of Appeal ruling yes on both counts in 2000 and the Supreme Court confirming in 2002 the 1995 decision of the commissioner for patents, who made a distinction to render the procedure of gene splicing patentable but not the mouse itself, let

alone its progeny. Just by extrapolating from the book's account of the Oncomouse case in chapter 4 one can well imagine the enormity of problems around human genetic patenting, and for starters engineering, which surged especially with the human GENOME project and the possibility of "discovering" and patenting human genes (for the metaphorical tip of the iceberg, see e.g. Karen Norrgard 2008, David Resnik and Daniel Vorhaus 2006).

On the subject of ownership (and designing!) of human tissues and humans, a novel and a movie about human cloning for organ donation are referenced as projecting the implications of biojuridical subjectivity "more effectively ... than any of the Canadian institutional authorities have done" (p. 132). I'd propose that pop culture text here fulfills the function of art as a McLuhanian "early warning system".² Further, if courts are left to fend for governance as a whole, in the absence of much needed updates in the law due to governments' evasive tactics, the "depoliticization" regarding biotechnologies diagnosed in the book may be the "politicization" of, i.e. giving the final say to, the merger of technoscience and entrepreneurship in the context of globalization. This would mean superseding the hitherto supreme authority of morality/legality as enforced by the nation-state. Over and above the issue of what powers hold sway, the question stands as to how to avoid committing humanity, and with it the planet, to aggravated social and environmental issues and probable destruction. Perhaps not unlike the predicament of global climate change, whose risky unleashing of planetary forces matches that of biological molecular forces, with commensurate magnitude of social-political repercussions facing less than adequate response.³

A highly pertinent question, as an extension of the book's message, is the educative role of science itself. Scientists such as molecular biologist Margaret Mellon and plant

² McLuhan compares the ability of artists to sense potential dangers to human society to the Distance Early Warning (DEW) Line running across the Canadian Arctic, Alaska, Iceland. During the Cold War it was set up by the United States and Canada for radar protection from military threat. Note that although he is mostly known for treating *artists* as visionaries and DEW Liners (M. McLuhan 1965b), in McLuhan and McLuhan (op.cit.) he includes scientists on a par (M. McLuhan 2011 [1965a], p.15). One would imagine that the title could apply for positive/desirable and negative/undesirable "forecasts" in either group of actors. That is, as long as they present an alternative (an "anti-environment") to the pre-existing environment, calling for an upgrade or correction, as the case may be.

³ Molecular-level bioengineering has geo-engineering as its planetary-level counterpart. See Hansen (2009), Schneider (2009) for an assessment of the latter's equally controversial nature, including when considered or already used as a mitigation technique for climate change effects.

pathologist Jane Rissler, director and deputy director, respectively, of the Food and Environment Program at the Union of Concerned Scientists, have stepped into the public discourse with a series of books since the 1990s. This is similar to prominent climate scientists James Hansen, Stephen Schneider, Andrew Weaver publishing books for a general audience. Beyond that, one would expect that epistemic responsibility is best shouldered by both the public as well as governance, since (in a democratic system) voters have to meet politicians halfway to tip the scales toward policy making and action.

On the side of science, whatever dangerous biotechnological effects there may be (cf. mutations), it isn't clear how, and if, they could be "outsourced" from human agency and/or reduced to analogs of How much warmer? and How long before X? This prevents the formulation of relatively operationalizable, even if highly contingent, research questions that an intergovernmental panel like the one on climate change can work on, however imperfectly. As the book amply illustrates, the major barrier to top-level biogovernance is that any decisions concerning normativity are steeped in historically-economically motivated tensions, as in the case of climate change, only additionally aggravated by the singularly robust morality-ethics factor. A further complication is that legislation and jurisdiction, while considering regulations, would want to avoid tying the hands of scientists with stringent restrictions, as Gerlach et al. record, e.g. regarding alternative fertility strategies in chapter 3, patenting in chapter 4. On an altogether different scale, there are cases where the problem may not even be in the realm (proper) of public jurisprudence and jurisdiction. Other types of agency aside, the authors point out that the activities of rogue scientists and near-amateurs may well be under the radar, whether because they are recruited to serve special interests or have no strings attached, yet having, for example, the capacity to engineer a pandemic virus, even without any substantial investment in equipment and materials or sophisticated skills (chapter 5). Apart from tactical challenges, a highly pertinent concern regarding strategy for both climate change and bioengineering effects is that attention tends to snap to and is hard to pry away from immediate losses/gains, to the (wholesale) neglect of far-reaching, potentially irreversible consequences that in principle are clearly worth addressing, equally expediently.

To conclude, I second Jennifer Daryl Slack's evaluation that *Becoming Biosubjects* is an important book (back cover), and recommend it as thought provoking scholarship, worthy of the attention of both academic readers and the wider audience. The strength of this book is as much in the detailed and finely tuned account of a lot, if not all that is involved, as in abstaining from hasty judgements or serving on a platter a neatly sliced-up Gordian knot. It thus offers the benefit of drawing in the reader to partake of, or at least better appreciate, the responsibility of making a choice which, pared down to the basics, hangs in the balance between technoscience's agency and (non)human agents' ontology.

On a participatory reading of the book this essay has brought up the possibility of exploring biosubjectivity through a McLuhanian analytic lens, and of viewing the formal causality of biotechnologies in parallel with issues around climate change. The two problems interface in many respects, being similarly scaled politically, socioeconomically and, to start with, technoscientifically. Humanity is learning that progress has been compounding interest just as it has been providing value. Flipping and re-contextualizing Margaret Atwood's loaded quote featured in a chapter motto, the question is ours to tackle, in all of its dimensions: *Should hope play out as humanity's doom?*

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Systems. Technologies. Toronto: University of Toronto Press, 2011. 224 pp. *Becoming Biosubjects* is an informative and thought-provoking book on the infiltration of biotechnology into modern Canadian society and the legal system. The authors investigate the social, legal, and cultural mechanisms that govern biotechnologies. Using a Foucauldian conceptualization of governance, they examine how biotechnologies "intervene on living matter at the molecular level" (p. 5). Throughout the book, Neil Gerlach and his co-authors argue that the governance of biotechnologies is changing our understanding of Systems. Technologies by Neil Gerlach et al. (review) | *Becoming Biosubjects* is an informative and thought-provoking book on the infiltration of biotechnology into modern Canadian society and the legal system. The authors investigate the social, legal, and cultural mechanisms that govern biotechnologies. Using a Foucauldian...
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