RE-EMBODYING TECHNOSCIENTIFIC FANTASIES

POSTHUMANISM, GENETICALLY MODIFIED FOODS, AND THE COLONIZATION OF LIFE

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> *If my nightmare is a culture inhabited by posthumans who regard their bodies as fashion accessories rather than the ground of being, my dream is a version of the posthuman that embraces the possibilities of information technologies without being seduced by fantasies of unlimited power and disembodied immortality, that recognizes and celebrates finitude as a condition of human being, and that understands human life as embedded in a material work of great complexity, on which we depend for our continued survival.*
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> —Katherine Hayles, *How We Became Posthuman*

THE NIGHTMARE

In July 1999 philosopher Peter Sloterdijk gave a lecture titled "Rules for the Human Zoo: An Answer to the Letter on Humanism" to a small group of scholars gathered to discuss "the exodus of being" in Elmau, Germany. In this talk he suggested that the advancement of humanist ideals lay in the hands of genetic engineers. As Andrew Piper reports in his *Lingua Franca* article on the controversy that emerged in the wake of that talk:

> [Sloterdijk] posed a blunt question: Was the age-old humanist ideal of educating human kind ever all that different from the more recent notion of genetically engineering or breeding humankind? (2000, 74)

Humanism, as it is understood by Sloterdijk, is informed by Enlightenment assumptions about "Man" as an autonomous and rational thinker, able to fashion or improve himself and society through education and self-reflection. Sloterdijk's talk reportedly emphasized the close relationship between humanist ideals and genetic engineering and argued:

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> the advance of reason is not an emancipation from the body but a certain way of conditioning the body. Seen in this light, humanist education and genetic engineering—the selection or creation of genes that will fashion people who are more healthy, more intelligent, more attractive, perhaps even more ethical—are closely related. (Piper 2000, 74)[1]

According to Sloterdijk, "Reading and selection [Lektionen und Selektionen] have more to do with each other than any cultural historian is willing or able to imagine" (Sloterdijk in Piper 2000, 74), and his talk went on to trace what he sees as the parallels between the practice of teaching reading in the classroom and genetic selection in the lab. In Sloterdijk's view, however, the power of education as a tool for human improvement has lost its effectiveness. With reference to violent events in the U.S. school system, such as the shootings at Columbine High School in Denver, Colorado, he argued that "[c]ivilization's potential for barbarism is growing; the everyday bestialization of man is on the increase" ("Anger," 2). He suggests that, with the tendency toward "barbarism" in the classroom on the rise, "traditional instruments of education have become thoroughly obsolete, rendering genetic engineering the only viable form the human progress can take today" (Piper 2000, 74). In a follow-up interview about the paper he gave at the Elmau conference, he stated: "One must finally accept that people are always 'made' in all cultures," and that "[t]his has happened until now only through the interaction of the rules of class, caste, marriage and upbringing ... in accordance with rules of selection and combination. In the meantime improvements in biotechnology have come into sight" ("Anger," 2). By September 1999, Sloterdijk's paper had caused a furor in the German public media: over a hundred articles were written about it, "frightening images of Aryan clones" were featured alongside discussions of the controversy, and *Der Spiegel* ran a cover story titled "GEN-Projekt Übermensch" (The superman gene project) (Piper 2000, 74). The manner in which Sloterdijk's comments splice together genetic engineering in the lab with the drive for "improvement" or "development" characteristic of humanist discourse has led the media to characterize his views as everything from reminiscent of Nazi eugenics ("Anger," 2)[2] to a kind of "post-human humanism" (Piper 2000, 77).

This essay seeks to unpack the significance of Sloterdijk's claim that genetic engineering is the logical extension of humanist philosophy

and its resonance with the rhetoric of improvement associated with the research and marketing of genetically engineered crops. In particular, I trace the similarities between Sloterdijk's view of genetic engineering as the "end" (Piper 2000, 75) of humanism and claims by biotech companies like Monsanto who use similar rhetorical strategies to legitimate their research and patenting of genetically modified life forms (hereafter GMOs, genetically modified organisms). Despite the rhetoric of hybridity and constructivism that characterizes these claims about the impact of these new technologies in society, their ownership, implementation, and regulation are haunted by an Enlightenment subject that presupposes knowledge as disembodied and humans as autonomous and unified agents, and ultimately reinscribes relations of power along colonial lines—something that Sloterdijk's views unwittingly disclose. I argue that both Sloterdijk and Monsanto's discourse shuttles between a perception of identity as always already hybrid, or a chimera of nature and culture, while at the same time claiming to improve and even perfect nature in the name of humanity—effectively co-opting posthuman discourse and containing its critique of their universalizing, disembodied views. I will draw on what I call more critical expressions of posthumanist theory, such as those articulated by Katherine Hayles and Donna Haraway, to foreground the relation between information and materiality that is obscured in conceptualization of genetically modified foods produced by agribusinesses like Monsanto. By briefly reviewing the stakes of high-tech genetic engineering, I suggest that a more radical notion of posthumanism can serve as a basis for critiquing what is essentially a disembodied colonial attitude toward the theory/practice of biotech research today.

At first glance, Sloterdijk's and Monsanto's embrace of genetic engineering could be interpreted as a kind of posthumanism. As Katherine Hayles puts it in her book *How We Became Posthuman* (1999), a "common theme" of the posthuman is "the union of the human with the intelligent machine" (2). The union of man and machine and its more general expression, the merging of nature and culture, is central to Sloterdijk's rhetoric. In a paper delivered at Harvard in June 2000 titled "The Operable Man: On the Ethical State of Gene Technology," Sloterdijk claims that, given the "spectacular encroachment of the mechanical into the subjective," it is possible to imagine a "future

in which whole 'humans' can be 'made'" (3). Referring to and elaborating on Heidegger's metaphor of "the clearing" as the originary moment of human evolution, Sloterdijk comments:

> As we know, however, the clearing cannot be thought of without its technological origin. Man does not stand in the clearing with his hands empty, not as an alert shepherd without means near the herd, as Heidegger's pastoral metaphors suggest. He holds stones and the successors of stones in his hands. The more powerful he becomes, the sooner he drops the tools that have handles to replace them with tools that have keys. In the age of the second machines, "acting" withdraws and is replaced by operations of the fingertips. (4–5)

In his relationship with stones, tool handles, and keyboards, Sloterdijk's "Man" is imagined as a certain kind of cyborg in "his" originary state. The emphasis Sloterdijk places on the link between humans and technology and the intersection of nature and culture in the construction of identity in living organisms is echoed in the discourse of genetic engineers when queried about how foods, genetically modified in the lab, differ from those found in nature. For example, in a lengthy article of the April 10 issue of the *New Yorker* (Specter 2000) on the motives behind Monsanto's ever-widening interest in the research and marketing of genetically modified crops, Cornell rice research specialist Susan McCouch states: "If you look even briefly at the history of plant breeding, then you know that every crop we eat today is genetically modified. Every one. Human begins have imposed selection on them all. So don't ask me what is natural and what is not. Because I have no idea" (69). It is clear that both Sloterdijk and geneticists share a perception of human/plant identity as essentially hybrid, the result of a dialogue between nature and culture.

The form of this cyborg "nature" and hybrid identity and the power relations that impinge on its construction and interpretation are where genetic engineers and Sloterdijk part company with critical posthuman thinkers and begin to show their more humanist stripes. While Sloterdijk and Monsanto imagine genetic engineering as humanity's way of perfecting nature and thus undermining the originary and hierarchical divide between nature and culture, Man and machine, critical posthumanism questions the view that there

was ever an originary divide between these things in the first place. As Donna Haraway comments in her meditation on the historical attitudes toward genetically modified and transgenetic organisms, "The distinction between nature and culture has been a sacred one [in Western culture]; it lies at the heart of the great narratives of salvation history and their genetic transmutation into sagas of secular progress" (217). Not only are Sloterdijk's and Monsanto's views on genetic engineering implicated in this "saga of secular progress," they are key to agribusinesses' claims of ownership over the genetically modified organisms they produce. For example, the distinction and hierarchy between nature and culture is foundational to patent laws in North America and Europe. Clear distinctions were established between new varieties of plants "produced" rather than just "discovered" by botanists. In 1889, for instance, the "US Commissioner of Patents upheld an examiner's rejection of an application for a patent to cover a fiber identified in the needles of a pine tree" on the grounds that it was a "product of nature" (Bugos and Kelves, 79). As pressure increased to give private plant breeders greater financial incentive to pursue research in plant breeding, the House Committee on Patents passed a bill allowing for the patenting of new varieties of plants produced through human cultivation: "[A] new variety arriving from cultivation was such a discovery—and its cultivator a discoverer—since it was created by human agency" (82). As Bugos and Kelves report in their overview of the history of patenting plants in North America and Europe, the House Committee's report on the Bill

> saw no difference between "the part played by the plant originator in the development of new plants and the part played by the chemist in the development of the compositions of new matter." Both took the materials of nature, exploited its laws and applying a variety of techniques devised a new and useful product. (1992, 82–83)

Here, the determination of what is patentable relies on a clear distinction between nature and culture where the "inventor" is seen as acting in a deliberate and fully conscious way on a natural world that is imagined as passive and untouched by human history. Thus, while an exchange is taking place, it is one-sided in terms of where

agency is attributed. In terms of Sloterdijk's view of "Man," "he" is always in control of technology and determining its impact on nature and himself. What is interesting to note, however, is that the authorship or inventor status of the human agent inscribed by patent law is questioned by the history of plant breeding. Species of "invented" and "found" plants were notoriously difficult to distinguish from each other, claims of "improving" the strains of various plants and grains were often not supported by yields and performance, and many exceptions were made to early patent law on the basis of enforceability and the public interest (Bugos and Kelves 1992, 91).[3] While the autonomy and agency of the human is easily unraveled in this history, even today the patenting of genetically modified plants is predicated on the assumption that nature and culture, or nature and human activity, are, at least initially, independent of each other. Indeed, it is the perception that there is an originary division between nature and culture that informs plant breeding and its cousin genetic engineering and provides the basis for patent claims in agribusiness.

In the same way that Sloterdijk views humans as independent entities that act on a passive and transparent "nature," Monsanto represents the genetic information that scientists manipulate as disembodied and stable. In fact, Monsanto and Sloterdijk's view of genetic information as something that can be isolated and removed intact from the embodied context in which it is found has much in common with the attitude of artificial intelligence (AI) researchers toward knowledge that is the focus of Katherine Hayles's book (1999). Hayles argues that AI researchers operate on the assumption that knowledge is "an entity distinct from the substrates carrying it" akin to "a kind of bodiless fluid that could flow between different substrates without loss of meaning or form" (xi). The consequence of these beliefs is scientific researchers who conceptualize "the universe as composed essentially of information" where "universal informational code underlies the structure of matter, energy, spacetime—indeed, of everything that exists" (11). Not only is the world perceived as reducible to stable and uniform code, but the relationship between materiality and information, or form and content, is conceived of as inconsequential to its operation, effects, and meaning. As Hayles puts it:

> Because we are essentially information, we can do away with the body. Central to this argument is a conceptualization that sees information and materiality as distinct entities. This separation allows the construction of a hierarchy in which information is given the dominant position and materiality runs a distant second. (12)

This view of knowledge appears to inform Sloterdijk's understanding of genetic engineering. In his Harvard talk he heralds "advances" in "cybernetics, as the theory and practice of intelligent machines, and modern biology as the study of system-environment-units," as initiating a new era in conceptions of ontology, breaking down the opposition between spirit or thought and matter (2000, 3). "Intelligent machines," he states, are examples of where "'spirit' or reflection or thought" is "infused in matter and remains there ready to be refound and further cultivated" (3). The notion of "cultivating" information through cybernetics is then equated with improving germ plasma through genetic manipulation and held up as evidence of "how the principle of information is successfully transferred into the sphere of nature" (3). In essence, Sloterdijk conceives of genetic information as something that conditions the body it inhabits, "privileging the abstract as the Real and downplaying the importance of material instantiation" (Hayles 1999, 13).

It is the treatment of genetic material as disembodied information that legitimates the patenting and marketing of genetically modified plants and underpins biotech companies' claims that their genetically modified products are no different and, therefore, no more hazardous to the environment than other crops that have been genetically modified in nature and by plant breeders.[4] In the *New Yorker* article on Monsanto, Michael Specter asks, "Is a plant perfectly natural if its genes are formed in a combination that has been arrived at over generations of breeding but polluted and dangerous if those same genes—the identical little snippets of DNA—are shot into the plant walls with a tungsten coated gene gun?" (2000, 69). Monsanto (and Sloterdijk) would argue yes. In Monsanto's pamphlet *Biotechnology: Solutions for Tomorrow*, we are told:

> For centuries farmers have made improvements to crop plants through selective breeding and hybridization—the controlled pollination of plants. Plant biotechnology is an extension of this traditional plant

> breeding with one very important difference—the plant biotechnology allows for the transfer of a greater variety of genetic information in a more precise, controlled manner. (2000, 9)

In this pamphlet, the notion of genetic information as disembodied is central to the conception of what genetic engineering is and what it can accomplish. Hereditary information is characterized as "stored [rather than embedded] in living cells" and genetic engineering is understood as the "transfer [rather than translation] of genetic information from one organism to another" (4). This reductionist model of genetic engineering is even more apparent in the Monsanto pamphlet's reference to scientists' efforts to read genetic code as the attempt to "decipher the language of life" (4), which is described as "transmitted" between organisms without any mediation being involved. Thus, we have the diagram from Monsanto comparing "traditional plant breeding" and "plant biotechnology," suggesting they are parallel processes, the only difference between them being the degree of control the breeder/biogeneticist is credited with exercising.[5]

The control and specificity associated with this process is used to justify the attribution of intellectual property rights to the scientist doing the research, thus opening the door to investors who can capitalize (literally) on the ownership of this innovation. However, if we reject the division between materiality and information that underpins (commercial) genetic research and humanist discourse, it

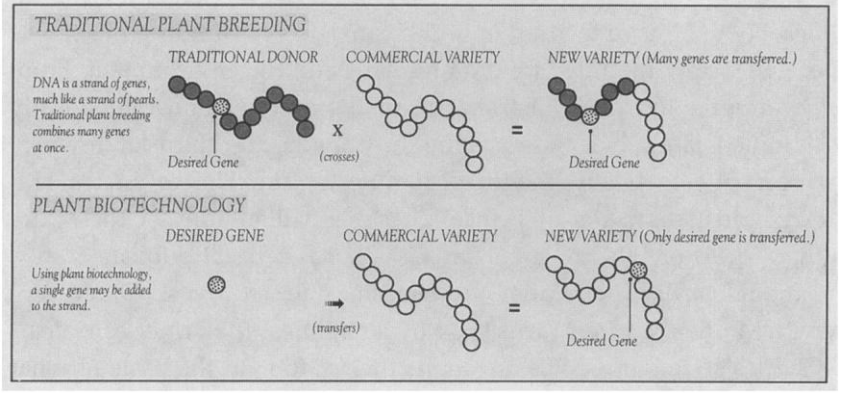

Figure 1. Diagram of traditional plant breeding and plant biotechnology from *Biotechnology: Solutions for Tomorrow's World*. Used by permission of Monsanto Company.

is possible to raise questions about Monsanto's claims that the expression of the gene within its new host is predictable. As Hayles puts it, "for information to exist, it must *always* be instantiated in a medium," and the task of critical posthumanism is to get at "what has been elided, suppressed, and forgotten to make information lose its body" (13). What Monsanto's fairy tale diagram suggests, therefore, is that even if there are scientists struggling to make sense of the relationship between genetic code and its materiality, companies like Monsanto do not want to emphasize this research because the "degree of control" associated with their research and its effects is seriously undermined. As Katherine Hayles comments, "As though we had learned nothing from Derrida about supplementarity, embodiment continues to be discussed as if it were a supplement to be purged from the dominant term of information, an accident of evolution we are now in a position to correct" (1999, 12).

THE DREAM

It is impossible to be unaware of the furor of protest against genetically modified foods that has gripped North America and Europe in and around the recent meetings of the World Trade Organization in Seattle, the International Monetary Fund meetings in Washington, D.C., and the Summit of the Americas in Quebec City. Cartoon images of Frankenstein-like food and feature articles like the *Economist*'s June 19, 1999, cover story, "Who's Afraid of Genetically Modified Foods?" have focused on public anxiety surrounding the effects of genetically modified food on humans and the environment. From Greenpeace to Prince Charles, the public outcry against genetically modified foods has been prolific. In Canada, the third-largest producer of genetically modified food after the United States and Argentina, segments of Prince Charles's Millennium Reith lecture that focus on his musings on GMOs have been published in a national newspaper under the headline "Sacred Trust: Don't Fool with Mother Nature, Warns His Royal Highness the Prince of Wales." Charles's view of GMOs questions their safety on the basis of what he calls the "sacred" status of nature and that "[f]undamentally, an understanding of the sacred helps us to acknowledge that there

are bounds of balance, order and harmony in the natural world" (2000, "Sacred Trust," A13). While Charles represents GMOs as violating natural order, other responses characterize them as perverting nature's identity. Vandana Shiva contrasts "life-enhancing sustainable ecological agriculture" with the effects of "terminator technology," where "sterility rather than fertility is being made the engineered characteristic of seed." Shiva goes as far as blaming genetically modified crops for pushing Indian farmers to suicide "due to indebtedness linked to the poorly-performing new hybrid seeds" (1997, 7). Cases of "genetic pollution," concerns about "superweeds," and lawsuits and counterlawsuits between farmers and agribusinesses like Monsanto fill the news.[6]

What is ironic within the context of this discussion of posthumanism and GMOs is that much of the current activist discourse around GMOs is quite humanist in its conception. In the majority of the

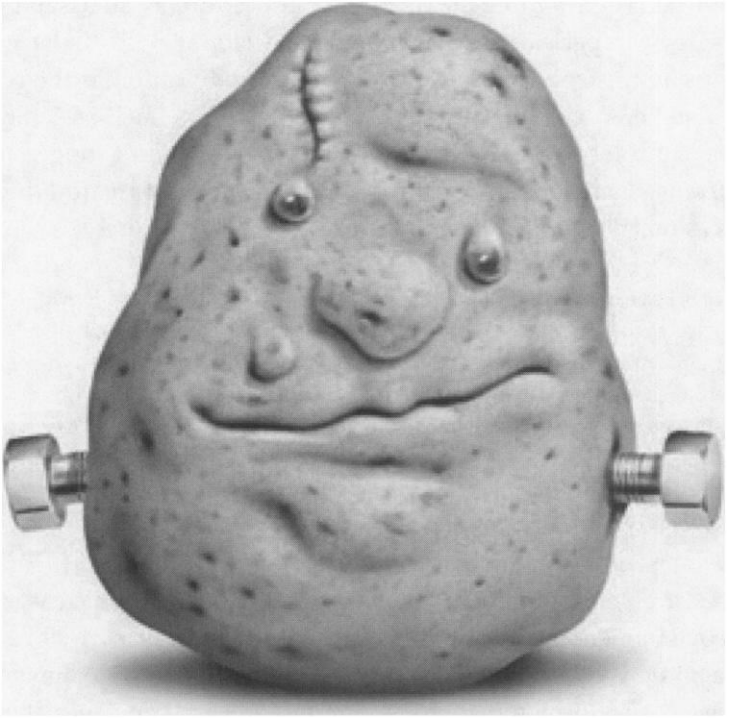

Figure 2. Cover art from the *Economist*, June 19–25, 1999. Image: richardduckett.com.

material I have reviewed, the history of genetic hybridization in situ is ignored or represented as continuous with the "natural processes of evolution." Genetic engineering in the lab, on the other hand, is represented as a violent assault on nature and a form of contamination invading the otherwise pure and untainted boundaries of the body of the liberal subject through the consumption of genetically modified food.[7] It is revealing to compare the reassuring description of the process of genetic modification from the Monsanto literature with the description found in the article "field of Genes" published in the Council for Canadian's magazine, a well-recognized left-wing/nationalist political lobby group in Canada. The reporter, Jennifer Story, writes:

> In order to splice a foreign gene into a host organism it must be blasted in with a "gene gun"—breaking through the species barrier and the mechanisms that organisms have to reject foreign matter. In short, genetic engineering is a biologically violent act, the organism has to be forced to adopt the foreign matter. (Story 1999, 9)

This description figures the laboratory procedure as an assault that transgresses species barriers and the individual will of the gene. Alongside this characterization of genetic modification as the scientific rape/enslavement of genes, you have views such as Vandana Shiva's of transgenetic organisms as freaks of science. Citing genetic and transgenetic engineering as another example of treating organisms as machines, she refers to "animal factories" where

> pigs have to have their tails, teeth and testicles cut off because they fight with each other, and resort to what the industry calls "cannibalism." Eighteen percent of the piglets in the factory farms are choked to death by their mother. Two to five percent are born with congenital defects, such as splayed legs, no anus, or inverted mammary glands. They are prone to disease, such as "banana disease" (so named because stricken pigs arch their back into a banana shape) or Porcine Stress Syndrome. (Shiva, 1999, 32–33)

These "stresses and diseases," Shiva states, "are bound to increase with genetic engineering. Already, the pig with human growth hormone has a body weight that is more than its legs can carry" (33). Images of miscegenation, contamination, deformity, and social deviance abound in this literature. Genetic modification is linked with pollution, mothers

who eat their young, obesity, and castration. As Donna Haraway comments: "I cannot help but hear in the biotechnology debates the unintended tones of fear of the alien and suspicion of the mixed" (1997, 218). Concerns around "the breaking of species barriers" that characterize activist and popular discussion of transgenetic organisms recall anxieties around miscegenation within colonial discourse. In this discourse, children of interracial parents were often referred to as "hybrids," implying that they were products of two different species (Young 1995, 9). "It is a mistake in this context," Haraway cautions, "to forget that anxiety over the pollution of lineages lies at the heart of racist discourses in European cultures as well as of linked gender and sexual anxiety" (1997, 217).[8] Susan Squier points out that the current controversy around transgenetic organisms is linked to the racial theories of the seventeenth and eighteenth centuries. "[S]uch theories," she argues, "inevitably mingled race and species because of the preoccupation with issues of origin and hierarchy, often imagined as a 'chain of being' on which the species, and the races, were arranged in hierarchical order" (1998, 364).

After reviewing some of the activist rhetoric around GMOs, there is much evidence to support Haraway's observation that

> [o]pponents of the production, and especially the patenting, of transgenetic organisms appeal to notions such as the natural telos, or self-defining purpose of all life forms. From this perspective, to mix and match genes as if organisms were legitimate raw material for redesign is to violate natural integrity at its vital core. Transferring genes between species violates natural barriers, compromising species integrity. (1997, 217)

It is apparent that scientists themselves are not unaware of the racist assumptions embedded in the public's perception of genetically modified organisms. For example, a recent report in Canada's *Globe and Mail* on scientists engaged in growing genetically modified salmon at PEI's Aqua Bounty Farms notes, "Long before the current furor over genetically altered food, researchers were acutely aware of what consumers might think if they used non-aquatic genes in their efforts to build a better fish" (Cox 2000, A11). In developing salmon who can survive the colder temperatures of East Coast fishing waters and grow at a rate six times faster than unaltered salmon with the injection of what has come to be known as the "antifreeze gene" of

the flounder, one of the researchers, Dr. Fletcher, comments: "It was a deliberate plan to use the fish-to-fish genes" (A11).

As if oblivious to the controversy in the South surrounding the first Green Revolution,[9] Monsanto and other self-proclaimed "life sciences" companies are promising a second Green Revolution; so-called miracle seeds, such as "Golden Rice"—genetically modified to include beta carotene and credited with having the potential to prevent blindness in areas of the world where this occurs as a result of inadequate nutrition—are being heralded as the next gift of science to humanity. If the current popular interest in the potential hazards of genetically modified foods is any indication, it will not take place with as much naive faith in the wisdom of agribusiness and science as the first Green Revolution. Indeed, it seems fair to suggest that the current trend in patenting genetically modified crops, produced from indigenous seed stock communally available for generations in India and only slightly altered in order for companies like Monsanto to be able to claim ownership and the right to regulate its use by farmers, represents what Vandana Shiva calls the "second coming of Columbus" (1997, 2) It also seems clear, as Shiva argues, that "[t]he vacancy of targeted lands has been replaced by the vacancy of targeted life forms and species manipulated by the new biotechnologies" (2) and that "[t]he colonies have now been extended into the interior spaces, the 'genetic codes' of life-forms from microbes and plants to animals, including humans" (3). As this discussion of the way humanist discourse informs scientific and activist discourse suggests, however, it seems necessary to fashion a more posthuman response to help to make sense of the implications these technologies will have for society.

Among the articles raising the alarm about "foreign invaders" penetrating the sanctity of the gene, there are reports on GMO research that adopt an arguably posthuman stance. E. Ann Clark, a professor of Plant Agriculture at the University of Guelph in Canada, for example, avoids miscegenistic rhetoric in her discussion of transpecies GMOs and instead suggests that much of the commercially driven "ag GE" emphasizes narrow research goals and tests products for safety based on assumptions about the autonomy of gene behavior and unverifiable claims concerning the predictability and control attributed to scientific methodology. Clark underscores the imprecision and instability that characterizes genetic engineering and states that

> the process of transgene insertion into a new host genome is anything but precise. Indeed, the point at which a transgene inserts itself within a host genome is virtually random and hence, unrepeatable. It is not yet possible to predict even on which chromosome the transgene(s) will land, let alone where it will insert on a given chromosome. (2000, 5)

She goes on to contend that "[w]ith contemporary understanding of genetics, it seems implausible that anyone could argue that insertion of a transgene would only influence one trait"—as the case is made in the Monsanto material and policy governing the testing of GMOs for wide use and consumption in Canada today (7). In Clark's words: "even industry scientists openly acknowledge the reality of complex, multi-way gene:gene and gene:environment responses to transgene insertion" (7). What is unique about Clark's discussion of GMOs is its emphasis on an embodied understanding of genetic engineering. She emphasizes an approach that is attentive not only to what sort of genetic information can be attributed to a fragment of germ plasm but also to the way in which that information and its expression is mediated by the context and method by which it is inserted and require an attention to the relationship between materiality and epistemology. "In sum," Clark states, "genes do not act in isolation, but rather through interactions with other genes. Evidence has been presented to substantiate the concern that inserting a novel transgene can affect unrelated plant traits, and that some unintended effects have persisted through pre-release testing into commercial production" (9). Clark's discussion draws attention to the embeddedness of meaning, the instability of signification, and the implications this has for the predictability associated with GMO research. In this sense, it could be an invaluable resource for anticolonial, antiracist activist discourse around the issue of the marketing and labeling of GMOs.

Unfortunately, these views are rarely integrated into the positions articulated by activists, incompatible as they are with humanist conceptions of identity that continue to dominate media representations of the GMO controversy on both sides of the debate. Nowhere, for instance, is Haraway's reading of OncoMouse™ (the first patented genetically modified animal), which she describes as an object of simultaneous "[d]esire and fear" (1997, 225) because of the pivotal role it has played in breast cancer research. In the literature about

GMOs they are *either* desired *or* feared with little attention to some of the issues concerning the relationship between genetic information and its materiality and the context in which it is found. They are *either* a humanist dream as in Sloterdijk's view of genetic engineering *or*, ironically, a humanist nightmare, as in much of the activist discourse on GMOs. More often than not, GMOs are represented as *either* both us *or* not us rather than "both us *and* not us" (Haraway 1997, 226). As Neil Badmington has suggested about the role posthuman criticism can play in these debates, "it is not possible to arrive at a moment of certainty, mastery, satisfaction. Meaning keeps moving, and cultural criticism must learn to hear the 'yes' with the 'no,' to read the disfunctioning alongside the functioning, to announce how every 'supposed system' is at once a deposed system" (2001, 12). A critical posthumanist approach to the epistemological and political issues raised by the production and use of GMOs can help restore the multiple and ever-shifting meanings these crops will have for society as debate over their production, use, and safety continues to unfold.

Notes

I would like to thank Bart Simon, Teresa Heffernan, and Andrew Piper for reading and commenting on earlier versions of this paper. My work on critical posthumanism has been influenced and inspired by the presentations of my copanelists at two sessions on "The Politics and Theory of Posthumanism," which I organized with Teresa Heffernan and Bart Simon at the Crossroads in Cultural Studies Conference, University of Birmingham, June 2000.

1. Initially, Sloterdijk's talk was unpublished and unavailable for circulation. A German version has recently been published: *Regeln für den Menschenpark: Ein Antwortschreiben zu Heideggers* (1999).

2. Sloterdijk encouraged this reading of his paper by using the German word *selektionen* in his discussion of the benefits of genetic engineering. As a report on Sloterdijk's talk by the Independent pointed out, "the contemporary German word for selection is *auswahl*." The word *selektionen* was used by Nazi scientists to describe the process where decisions were made about "which inmates were to be sent to the gas chamber and which to be spared on any given day" in the death camps across Europe during the Second World War ("Anger").

3. Bugos and Kelves report: "When introduced in Illinois in 1929, hybrid corn seeds yielded only slightly more ears of corn than naturally open-pollinated varieties. Yet between 1932 and 1936 the percentage of Illinois cornfields planted

with hybrid seed rose from scarcely 1 percent to over 75 percent. Illinois farmers were encouraged to believe that hybrid corn was technically superior to open-pollinated varieties largely because a handful of seed dealers—notably Pioneer Hi-Brid Corn Company, Funk Brothers Seed Compay, the Dekalb Agricultural Association, and Pfiser Hybrid Corn Company—encouraged them to do so, aided by the scientific authority of government agricultural institutions" (1992, 87–88). The fact that it took until 1950 before "the yields of hybrid corn had far exceeded those of open-pollinated corn" (88) recalls Bruno Latour's argument that laboratory conditions are extended to the wider context of society in order to make scientific truth claims function (1983). Bugos and Kelves point out that this substantial increase in production did not come about until a full twenty years later and after "significant investment was made by private breeders" (88).

4. It is interesting to note that there are a few cases where conventional breeding methods have generated products with adverse effects on human health. The recent report by the Royal Society of Canada on GMOs, *Elements of Precaution: Recommendations for Food Biotechnology in Canada*, draws attention to two varieties of potatoes and one variety of celery that were withdrawn from commercial use for this reason (2001, 16).

5. Deborah Lynn Steinberg traces a similar view of genetic science in Steve Jones's Reith lectures, which were broadcast by the BBC in the autumn of 1991. In Jones's lectures, Steinberg argues, "the genetic scientist as reader, decodes, though significantly does not produce [genes], is a recipient rather than mediator of meanings construed as already embedded, already intact in the structure of human (and, by implication, other species') biology" (140). As Steinberg points out, "This positivist investment in the precision of genetic profiling, premised as it is on a denial of interpretive agency on the part of the geneticist, seems utterly to dismiss historical contingency, ambiguity and complexity" (142).

6. Over the last year, Monsanto has successfully argued a case against a farmer from Bruno, Saskatchewan, found guilty of growing Monsanto's patented Roundup Ready canola seeds without paying the proprietary rights. Even after conviction, the farmer, 68-year-old Percy Schmeiser, claims he never planted the seeds and that his 900 acres were contaminated by cross-pollination with his neighbors' farms where the genetically modified crop was being grown (Marushko 2000, B5).

7. This phenomenon is known as "horizontal gene transfer," where the genes of one organism are known to transfer by three mechanisms: conjunction (cell-to-cell mating), transduction (transfer helped by viruses), or transformation (direct uptake of DNA bacteria) (Clark 2000, 9). While earlier research suggested this kind of transfer was impossible because DNA of other organisms is digested too rapidly, this view is now being questioned (9–10). It is interesting to note, however, that this phenomenon is not limited to GMOs but could occur with any conventionally bred crop humans digest, a fact noted by Clark. Clark goes on to caution, however, that "the particular genes involved [in GMOs] are without precedent in human evolution" (10).

8. The disturbingly racist and sexist views of activist and popular discourses give way to homophobia in some objections to genetic engineering. In a recent article on cloning in *Scientific American*, the statement "A very large category of users of human cloning might be lesbian couples" (Green, 82) is foregrounded next to a photo of a woman wearing a T-shirt with the message "I'M THE MOM, AND SO IS SHE" (83). Greater reproductive freedom for lesbian and gay couples is discussed at length in the article as an unanticipated though not necessarily positive outcome of genetic engineering.

9. Activism against genetically modified foods has a long history in places like India where the Green Revolution—the name for the transformation of agricultural practices in Asia in the 1960s and 1970s through the widespread cultivation of rice and corn crops bred to produce higher yields when grown in concert with chemical fertilizer—was accused of exacerbating poverty, increasing the disparity between rich and poor, men and women, and undermining labor rights and reducing biodiversity. This grassroots activism, concentrating on the social and economic effects on the vast underclass in places like India, and as a result largely ignored in the North, differs from the current wave of consumer-based activism that focuses on how GMOs will effect individuals and invade their bodies.

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