

CHAPTER THREE

Frankenstein, Bioethics, And Technological Irreversibility*

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Because our notions of who we are depend crucially on the variable scope and shifting limits of our efficacy in relation to the world, our identities are inextricably tied to our technologies. Theorists of technology from Martin Heidegger to Donna Haraway have argued that the historical contingencies of technology's development and diffusion through society inform our being-in-the-world; the myth of the timeless *cogito* is exploded, as human subjects are situated in a rich historical and material landscape that includes machines and other instruments that mediate our perception of the world and reflexively alter the very nature of ourselves as perceivers. On this view, it is wrong to conceive technologies as neutral tools that prosthetically extend our senses and enhance our abilities while leaving pre-existing identities, aims, and values untouched. Accordingly, human-technological interactions undercut normative and epistemic foundations such as human nature or the self-sufficient subject and problematize the very basis of moral thought and political action. Not surprisingly, even amongst those, like Heidegger and Haraway, who accept the basic anti-essentialistic premise of this line of thought, there is little agreement with regard to its ethical implications. A conservative tradition exemplified by Heidegger fears a technologically induced alienation from a more "authentic" mode of existence, counsels caution in our dealings with technology, but ultimately places its hopes not in human hands but in a cosmic-scale reorientation of Being itself.¹ Haraway, on the other hand, conceives the cyborg as a utopian figure, one laden with progressive political potential, even if, in sharp contrast to the technological optimism of scientific modernity and the so-called

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Enlightenment project, this utopia can only be, as Haraway puts it, of an “ironic” sort; eschewing foundational distinctions between nature and artifacts in favor of “fractured identities,” a cyborg politics aims not towards the establishment of an organic social *telos* but towards a fluid and shifting negotiation of strategic coalitions.² In contrast to Heidegger’s authenticity, the goal of Haraway’s utopia consists in the destruction of utopian goals. Despite deep differences in politico-ethical orientation and outlook, though, there is a common reason for both the fatalistic turn that Heidegger’s nostalgia for pre-modern ways of being takes and the ironic twist of Haraway’s celebration of a decidedly postmodern world: it lies in the central insight that the historical modulations of human subjectivity effected through technologies are essentially irreversible. That is, as historically situated and technologically conditioned beings, there can be no question of our either going back to technologically simpler times or of retaining a stable identity through the course of future technological changes.

I term this implication of technology’s transformative efficacy with regard to human subjectivity *technological irreversibility*. And though, as I have been suggesting, an implicit appreciation of technological irreversibility is at the heart of a wide range of approaches to technology, the phenomenon itself remains incompletely understood. Part of the reason, I contend, is that technological irreversibility is too often couched as a tacit or only partially thematized lemma in overarching arguments designed to deconstruct the impalpable abstractions of humanism or modernity. The specific conditions of subjectivity and its relations to technology—the conditions that make technological irreversibility a reality—thereby receive too little explicit attention in their own right. Moreover, while anti-essentialist theories of technology succeed to varying degrees in exposing the fallaciousness of the assumption that technology is neutral, they are often themselves guilty of neutralizing (or at least underestimating) technology’s broad impact on humanity. In particular, such positions commonly grasp the decentering of the human perspective effected by technological mediations in purely discursive terms—as disruptions of the fundamental categories by which, for example, modernity attempted to establish man as the

measure of all things. Against the tendency to reduce the body to a social-semiotic construct and reality itself to the level of “text,” I maintain that the true ramifications of technological irreversibility can only be grasped once we acknowledge the existence of a radically non-discursive dimension of human-technological interactions. Part of the challenge is thus to locate a point of intersection—what I call an anthropotechnical interface—at an embodied, material level of experience prior to human thought and discourse.

In order, though, to make these claims concrete, I shall focus my arguments not on abstractions like “Technology” as it relates to “Humanity,” but instead situate my analysis at a more local level of technological development and its effects on human beings; I turn for this purpose to scholarly and popular discussions of biotechnology, especially as they are informed by the Frankenstein myth. As I hope to show, much of the controversy that currently rages over emerging genetic technologies is centrally concerned with competing views of human-technological relations and their consequences for moral thought. Biotechnology promises to extend human control over the contingencies of nature, but it also portends destabilizing reconfigurations of individuals and the human species itself. Thus, on the one hand, the new technologies are optimistically conceived as neutral extensions of our autonomous wills; on the other hand, however, fears of a Frankensteinian technology-out-of-control are exacerbated by the fact that the objects of manipulation in biotechnical interventions are nothing less than human beings in their genetic makeup. Opponents thus regularly warn that the physical consequences are unpredictable and possibly irreversible. As a result, it is argued, biotechnologies threaten to unsettle our moral frameworks beyond repair. Thus, in the bioethical context, the connection is explicitly drawn between the material impact of technology on human bodies and the consequences for the categories of human thought. In these discussions, technological irreversibility is quite crucially at stake, but the arguments are formulated largely at a level of a concreteness far removed from the abstractions around which poststructuralist theories of technology revolve. This is not to say that ideological constructs play no role here; indeed, essentialistic notions of the body,

technology, and humanity regularly appear in debates over biotechnology, and thus critical theory takes on a renewed relevance in the bioethical context. Finally, then, contemporary discussions of biotechnology, with their Frankensteinian subtexts, offer a rich arena within which to examine the material conditions of technological irreversibility, to investigate the cultural strategies by which we seek to avoid it, and to explore its consequences for our thinking about ourselves, our technologies, and their points of intersection.

I begin, in section 1, by outlining a theory of the material, embodied basis of technological irreversibility; here I lay out key premises of my argument and offer a justification for my methodology. In section 2, I look at the ways in which the Frankenstein myth informs bioethical discourse and contributes to the establishment of a polarizing framework wherein irreversibility is perceived as a serious ethical problem while its true implications are largely avoided—contained within a space bounded by utopian dreams and dystopian nightmares. However, there are signs that this dominant framework is giving way to what Foucault has called “heterotopian” possibilities, as irreversibility in the context of biotechnology comes to be seen as a challenge to ethical thought itself. Foucault’s notion of heterotopia, which signifies a profound unsettling of the basic categories of human reason, provides the jumping off point for section 3. Here I examine the trope of monstrosity as it has been explored in poststructuralist theory—by Foucault, Derrida, and Haraway—as part of a larger challenge to humanism. Heterotopian monsters, I argue, stand in stark contrast to the dystopian monsters invoked by antagonists of biotechnology and offer a more promising basis upon which to conceive the irreversible effects of novel technologies for moral thought. Section 4 focuses on one of the most challenging examinations to date—at least in the context of mainstream bioethics—of biotechnology’s heterotopian potential: *From Chance to Choice*, by Allen Buchanan, Dan W. Brock, Norman Daniels, and Daniel Wikler. According to these authors, advances in genetic technologies imply fundamental shifts in the relations of nature and technology, radically expanding the realm of human choice and irreversibly altering the categories of moral thought. Section 5 shifts course and examines Mary Shelley’s

Frankenstein, arguing that the novel points to deeper causes of heterotopian conceptual revolutions and fills out a theory of technological irreversibility and the material anthropotechnical interface at its base. Against this background, section 6 argues that the chance/choice dichotomy upon which Buchanan et al. conceive biotechnology's irreversible effects continues to obfuscate the material basis of technological irreversibility. In conclusion, I consider some of the theoretical and practical consequences of technological irreversibility in the context of biotechnology and beyond.

1. *Technesis* and Irreversibility

Humanistic utopias (“non-ironic” ones, to adapt Haraway’s term) require a continuous realm within which human values remain intact over the course of time, so that projected improvements to the lot of mankind may also be appreciated as such by future humans. It is thus essential to the coherence of such projects that technology be conceived as a neutral *supplement* to human aims. Likewise, prospects of a romantic return to Nature, or to more “natural” forms of social existence, are predicated upon the supposition of timeless norms grounded in a human essence impervious to technological change. Whether oriented toward the past or the future, both of these characteristically modern ways of thinking thus rely crucially on the subordination of technology to human thought, on the “putting-into-discourse of technology” that Mark Hansen dubs *technesis*.³ Poststructuralist theory, of course, challenged the coherence of the humanistic framework—and with it the possibility of reversal. Thus, the displacement of one episteme by another, whereby the basic categories of thought are transfigured, requires that nostalgia, as with Heidegger, become fatalistic and that utopia, as with Haraway, become ironic. But in denying the existence of anything “outside the text,” the poststructural paradigm must locate the mechanisms responsible for conceptual revolutions within the realm of discourse itself. Thus, if technology is accorded a transformative potential with regard to human subjectivity, then it is so only in a weak sense: as an instance of the more sweeping phenomenon of discursive movement into which technology has been absorbed.

Poststructuralism thus remains tacitly committed to *technesis* and unable, as a result, to account for the specifically technological transformations of subjectivity whereby human agents are irreversibly situated in their historical contexts.

As I endeavor to show in the context of biotechnology, the transformations in question are indeed registered in moments of discursive upheaval, when the epistemic and normative categories of human thought are open to revision; to this extent, poststructuralism's methodological attention to discourse remains indispensable in identifying technology's impact on human subjectivity. It is imperative, however, that discursive effects are not conflated with their underlying causes. A more radical break with *technesis*—the reduction of technology to discourse—is required if we are to appreciate the phenomenon of technological irreversibility; therefore, a fundamental tenet of the theory I aim to articulate here is that significant, *material* aspects of the technological real exceed our ability to represent them (a condition Hansen describes as “technological exteriority”). If, epistemologically speaking, human thought is confined to the prison-house of discourse, this does not imply that there is nothing beyond the prison walls; but in order to avoid the suspicion that technological materiality, as postulated here, is merely an inert *Ding an sich*, with no possible connection to human subjectivity because of its categorical alteriority to discourse, my theory must be able to identify a point of contact, an anthropotechnical interface, between the discursive and non-discursive realms.

Technology's exteriority to discourse thus challenges us to reconsider technology's experiential impact on humanity as bypassing the mediation of discursive figuration and cognition and impinging upon us directly—*bodily*. Beyond (or below) discourse, the body in question here is not the body *qua* bearer of social and cultural identifying marks, nor is it merely the physiological body; while these are far from irrelevant, the primary or most basic site of anthropotechnical interaction is what Merleau-Ponty has called the “lived body” (*corps vécu*): the phenomenally unthematized, material ground of human activity and identity. At this level, the non-discursive interaction between human embodiment and technological materiality is capable of effecting a destabilizing

reconfiguration of the human perceptual apparatus at a pre-personal level, shaking the very foundations upon which psychic and social subjectivities are constructed.⁴

Mary Shelley's *Frankenstein*, the classic tale of technology out of control, is a key literary exploration of the embodied anthropotechnical interface; while technology's effects make themselves known in the discursive realm of ethical chaos, the novel locates their source—not least through the inscription of technology in a monstrous body—squarely in a material realm beyond human deliberation and discourse. As Hansen argues, the novel enacts a powerful critique of *technesis*, registering “the fundamental deterritorialization of the human perspective that, following the text's central fiction of an unnatural creation, results from the advent of widespread technological change.”⁵ Against the background of the industrial revolution, argues Hansen,

Frankenstein stages the failure of language to generate a complete representational reduplication of reality (and thus to transcend it); and unlike contemporary (read: de Manian) efforts to attribute this failure to an intrinsic property of language itself, *Frankenstein* links it directly to the technological changes ensuing with the advent of machine autonomy.⁶

The ahistoricity of the de Manian reading points up a shortcoming of any attack on humanism based on a self-imposed confinement to language: a “posthumanism” predicated exclusively on the self-deconstructive properties of discourse leaves open the possibility of reversal in its disregard for material reality outside the text. That is, though explicitly aimed at deconstructing notions of a timeless essence of human thought or subjectivity, such attacks fail to locate the mechanisms responsible for this deconstruction in a realm *prior to* language and thus fail to definitively close off the dimension in which the impossible dream of reversal is at home. Based on universal properties of discourse, such positions may even be seen themselves as returning, in cyclical fashion, to a subjectivity or presubjective condition more original and less deluded than that of modern humanity.⁷ But, to expand on Hansen's reading, *Frankenstein* undercuts the possibility of

reversal/return at its prediscursive root and locates the conditions and implications of the “demise of man” elsewhere: in the embodied, material phenomenon of technological irreversibility. For in pointing to a type of human-technological interface that bypasses subjectivity—a point of contact, unregistered on conscious, cognitive levels, between technology’s materiality and human embodiment—the text marks out certain “effects” of an anthropotechnical interaction which are incapable of discursive “capture,” and which therefore resist being related back to causes. In a sense to be elucidated later, the phenomenal framework of causality itself is exploded in Frankenstein’s “unnatural creation,” and with it the possibility of reversal to a technologically innocent mode of subjectivity.

Today, of course, *Frankenstein* is more likely to evoke associations with the *biotechnical* revolution currently underway than with the novel’s historical backdrop of the industrial revolution. Due to superficial thematic connections, as well as deeper cultural fears, clichéd images of Frankenstein and his monstrous creation have become staple references in popular discussions of biotechnology. Shelley’s Gothic novel (sometimes through the lens of one of its many cinematic adaptations) is often invoked as a cautionary tale of the dangers of scientific hubris and the unpredictable consequences of “playing God.” Implicit in these often emotional appeals is the claim that *Frankenstein* offers a suitable framework for consideration of real-world bioethical problems—a claim that proponents of genetic research and biotechnical intervention understandably want to deny. But as my discussion is not aimed at settling bioethical debates, I shall skirt the issue of the appropriateness of the novel as a frame for serious consideration of bioethical problems.⁸ Instead, my methodology consists partly in positing the converse thesis: i.e. that bioethical debates offer a fruitful, if apparently anachronistic, framework for coming to grips with crucial issues raised by *Frankenstein*. My primary objective, however, is no more literary critical than it is bioethical. Thus, my juxtaposition of *Frankenstein* and contemporary bioethical discussions aims at uncovering the dynamics by which the exteriority of modern technology to human discourse, in its direct impact on the lived body, can be seen to

irreversibly undermine the relations of nature and artifice so central to normative humanity.

If it is not obvious that *Frankenstein* records an irreversible rupture in “human nature” effected by the machine technologies of the industrial revolution, we might expect more clarity in the context of biotechnology. Indeed, it would seem that all of the necessary ingredients are present in the discourse surrounding biotechnology for an explicit recognition of technological irreversibility and its far-reaching implications for humanity. Never was there a clearer case of a technology aimed directly at the alteration of bodies in their material composition. This fact, implicit in the very nature and purpose of the emerging genetic technologies, would seem to deter us from repeating the error of *technesis*—the discursive reduction or bracketing of technology’s materiality. Moreover, irreversibility has arisen as an explicit theme in controversies over biotechnology. This is the very linchpin of the invocation of the Frankenstein myth in bioethical contexts: that, due to the unpredictability of technical intervention, the consequences of tampering with nature—where nothing less than the nature and future of the human species is at stake—may well be irreversible. This type of argument may be true to the spirit of Shelley’s intended message, but the implications of her narrative are far more radical and ideologically unstable. And, as we shall see, irreversibility is being glimpsed on *both* sides of bioethical debates as a structural condition of our current and emerging relations to technology, as placing us in novel circumstances from which there is no going back. But the true implications of irreversibility—including the material deconstruction of a timeless, autonomous *cogito*—are seldom recognized. Even the strongest statements of biotechnology’s irreversible effects generally swerve eventually towards a neutralization of technology’s radical material otherness through its inscription in discourse. The context of biotechnology, because it seemingly presents the clearest case of non-mediated,⁹ material interaction between technologies and bodies, and because irreversibility and the endangerment of humanity are explicitly connected in the discourse surrounding it, offers a unique opportunity to look at the cultural strategies by which the

irreversible effects of technology are tenaciously avoided through an appeal to *techne*sis.

2. The Monster and the Geneticist

The Frankenstein myth offers a fertile base for biotech opponents to voice a variety of fears and concerns in a single, emotionally captivating allusion. Frankenstein's undertaking was guided by benevolent intentions, but his efforts resulted in a "monster," an inhuman aberration from the natural order of things. In popular discussions, the Frankenstein myth establishes a manichaeian framework of technological utopia versus dystopia, a framework which largely obscures the reality of technological irreversibility. I begin, therefore, by looking at the ways in which the legend structures bioethical discourse, highlighting the points at which irreversibility enters the picture and the manner in which it is neutralized.

The special attraction that *Frankenstein* holds for opponents of biotechnology derives ultimately from the story's monster. This figure casts dystopian shadows across utopian promises, opposing Promethean hopes with the fear of Pandorean punishments. A large part of the monster's power to generate and channel fear lies in its amorphous versatility. It conjures up images of unforeseen physical deformities, chimerical hybrids, and other deviations from nature. The constitution of the human, in particular, is threatened: both as a biological and as an ontological category. For at stake is not just the ability to manipulate the genetic makeup of *Homo sapiens* and thereby reconfigure individuals or the species; "human nature" itself, including the moral category of the "humane," is allegedly endangered by genetic self-dissection and the biotechnical circumvention of nature. Thus, many fear a loss of autonomy as the result of "knowing too much" about the genes responsible for our preferences and personalities. And the ability to modify and select for traits portends the creation of "monsters" in the form of social outcasts. Genetic discrimination by employers and insurers and stigmatization of the disabled imperil human dignity—and not only for those facing exclusion in the brave new world. Also those endowed with power by a new eugenics threaten to become "moral monsters" unequaled by their

Nazi precursors. The specters invoked by an appeal to *Frankenstein* in the context of biotechnology seem, therefore, positively uncontainable: potent monsters render distinctions between good and bad intentions, between acts based on a complete technical knowledge and those grounded in ignorance, and between the subjects and the objects of power quite beside the point.

As such, biotechnology's effects are hardly calculable—either scientifically or socially—and this uncertainty fuels fears of its irrevocability. Discussions of genetically modified (GM) food, or “frankenfood” as it has significantly come to be known, illustrate one important way in which irreversibility enters the picture. Proponents of GM foods invariably ground their arguments in the prospects of ending world hunger with a cornucopia of safe, disease-resistant, and nutritionally enhanced crops. But, opponents argue, because we lack precise knowledge of the effects of unleashing genetically engineered crops into the delicate balance of the ecosystem, and because scientific control conditions are lacking, the outcome of such experimentation remains unpredictable. Moreover, there is a chaos factor which suggests that our incomplete knowledge is in fact a structural condition of our situation, not merely a contingent fact that could, in principle, be overcome. For the global environment is a highly complex system, the properties and behaviors of which emerge in nonlinear fashion from lower-level interactions in unforeseeable ways. Nonlinearity insures that we are not only ignorant of the eventual outcome of systemic modification but that we would also be incapable of effecting a simple reversal for large-scale emergent properties.

Francis Fukuyama, in *Our Posthuman Future*, extends this well-known argument to the realm of “human nature” itself, which he conceives as an emergent set of properties—including reason, language, emotion, and consciousness—irreducible to their precursors in nonhuman animals. He sees these characteristic properties as responsible for “human dignity,” as setting us apart from other animals in composing a “human whole that cannot be reduced to the sum of its parts.”¹⁰ The implication is that, in tampering with any of the necessary “parts,” in trying to enhance

intelligence or alter human emotions, for example, we risk endangering the “whole” of human nature. For Fukuyama, at stake in biotechnical manipulations of the human genome, with its nonlinear relations to phenotypic and, by extension, socio-political expression, are not only physical consequences but our moral framework itself. Though Fukuyama refers to Huxley’s *Brave New World* in articulating the threats he perceives in biotechnology, *Frankenstein* would serve his purposes just as well. For Frankenstein, in constructing a new “whole” from the “parts” of dead bodies, similarly misrecognizes the epistemic limits imposed by nonlinear complexity—the unpredictability of emergent properties. The monster created exceeds his control, following a dynamic specific to itself and incommensurable to human morality. Because of the *Doppelgänger* relation between creator and creature, Frankenstein’s own humanity and morality are compromised in his monstrous act. How much clearer, then, when the subjects and objects of experimentation converge in projects of *self-modification* of the human species, which, following Fukuyama, could make monsters of us all, alienating us from our natures in ways not determinable by rational calculation. What’s more, without an external point of reference, we might even fail to recognize the loss of our “essence”¹¹; if, that is, the emergent effects of self-modification involve an effacement of the moral framework which once defined “our sense of who we are and where we are going,”¹² there would be no epistemic or axiological standpoint from which to perceive or measure the difference. And even assuming the shift from humanity to posthumanity were discernible, upon what basis could we then endeavor to reverse the effects? Again the problem of nonlinear complexity would appear to thwart attempts to calculate the emergent effects of intervention, rendering the change irreversible.

References to *Frankenstein* in serious bioethical works are minimal and usually marginal, consisting of prefatory remarks and a clearing-the-ground of dismissals before getting down to business with the hardcore problems of bioethics. Philip Kitcher, for example, in the introductory chapter to his book *The Lives to Come*, contrasts optimistic visions of a future in which “[s]ome of our descendants live longer, all enjoy healthier, more vigorous lives” to pessimistic images of “the darker side of the optimism

about medical progress”¹³: “Dimly, fearfully, thoughtful people glimpse enormous successors to Baron Frankenstein’s laboratory, twenty-first-century hospitals equipped with the ‘decanting rooms’ of *Brave New World*.”¹⁴ The implication is that both extremes fail to confront realistically the genuine problems facing us today. Against this background, Kitcher tries to develop a more humble approach to progress while countering dystopian scenarios with practical solutions to problems associated with prenatal testing, genetic discrimination, and forensic genetics. Halfway through the book, “Baron Frankenstein” makes another brief appearance in connection with the fear that genetic knowledge might be put to use in attempts “to shape people according to some distorted vision of the good.”¹⁵ Kitcher’s rhetorical strategy is the same: his allusion makes a nod in the direction of recognizing the concerns of “thoughtful people,” but the caricature of “Baron Frankenstein” functions as a foil against which he can formulate a supposedly more clear-eyed assessment of serious concerns. Thus, “fear of Frankenstein is easier to dismiss than anxieties about repeating the errors of our eugenic past.”¹⁶ Rejecting utopian dreams and dystopian nightmares alike, Kitcher thus pleads implicitly for a more sober approach obscured by the dominant framework.

Interestingly, though, in the space opened for him by dismissing both extremes, Kitcher invokes a technologically induced irreversibility of a sort quite unlike that feared by biotech opponents. He claims that once we know certain conditions have genetic causes and are capable of intervening technologically to correct these causes, it is henceforth impossible to wash our hands of eugenics. “When we know how to shape future generations, the character of our descendants will reflect our decisions and the values that those decisions embody.”¹⁷ Refraining from biotechnical intervention is not to escape eugenics but tacitly to enforce “a value judgment to the effect that *unplanned* populations are preferable to *planned* populations.”¹⁸ “Molecular knowledge,” therefore, “pitches us into some form of eugenic practice,”¹⁹ and there can be no return to “the garden of genetic innocence.”²⁰ According to Kitcher, though, this does not imply a return to Nazi-style eugenics, which remains a powerful reminder of the injustices against which we must guard. Nor does he see human nature endangered in the way envisioned by Fukuyama. Instead,

Kitcher is optimistic that we can cope with the biotechnical revolution in much the same way we have apparently coped with the Copernican, Darwinian, and Freudian revolutions.²¹ Our self-conceptions as free agents and the value of our emotions and identities, he claims, are not damaged by genetic knowledge, so long as we guard against fallacious belief in genetic determinism.

Ronald Dworkin engages the Frankensteinian subtext of bioethical debates more directly, identifying the fear of “playing God” as the ultimate reason for widespread rejection of genetic research. Dworkin maintains that, in order to understand the significance of this expression, we must look at the “overall structure of our moral and ethical experience,” which

depends, crucially, on a fundamental distinction between what we are responsible for doing or deciding, individually or collectively, and what is given to us, as a background against which we act or decide, but which we are powerless to change.²²

According to Dworkin, human morality depends on this distinction, and thus “any serious shift in that boundary is seriously dislocating”²³ and radically shakes up value systems. Thus, reasons Dworkin, “The terror many of us feel at the thought of genetic engineering is not a fear of what is wrong; it is rather a fear of losing our grip on what is wrong”—a fear

that our settled convictions will, in large numbers, be undermined, that we will be in a kind of moral free-fall, that we will have to think again against a new background and with uncertain results. Playing God is playing with fire.²⁴

But Dworkin does not believe that we can recoil from the “challenge” posed by the new and developing possibilities for genetic manipulation:

Playing God is indeed playing with fire. But that is what we mortals have done since Prometheus, the patron saint

of dangerous discovery. We play with fire and take the consequences, because the alternative is cowardice in the face of the unknown.²⁵

Like Kitcher, Dworkin sees the new technologies as placing us in a position from which there can be no return to an earlier state of innocence. But, in contrast to Kitcher's optimism that human subjectivity can continue unchanged in relation to the moral basis of our decision-making and action, Dworkin's entertainment of the "uncertain results" of our new technical capabilities comes closer to countenancing the scenario so horrifying to Fukuyama. Instead of apocalyptic indications of what must be avoided at all costs, however, Dworkin includes this earth-shattering uncertainty in a larger narrative of scientific and technological progress. Thus, Dworkin's argumentation indicates a shift away from the dominant framework in which the Frankenstein scenario functions as a clearly dystopian possibility and towards what might be called a more "heterotopian" view of humanity's biotechnological future.

3. From Dystopian to Heterotopian Monsters

In the preface to *The Order of Things*, Michel Foucault introduces the term "heterotopia" to explain the persistent "uneasiness"²⁶ he felt upon reading a passage from Borges, in which a "certain Chinese encyclopedia" articulates an impossible taxonomy according to which

animals are divided into: (a) belonging to the Emperor, (b) embalmed, (c) tame, (d) suckling pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) *et cetera*, (m) having just broken the water pitcher, (n) that from a long way off look like flies.²⁷

Foucault identifies a "quality of monstrosity" in Borges's taxonomy, locating it not in the physical disfigurement of creatures enumerated but in the fact that the "common ground on which such meetings are possible has itself been

destroyed.”²⁸ There is no “*common locus*” for classificatory juxtaposition.²⁹ Utopias and dystopias alike are coherent visions of a possible order of things, their coherence depending not on their being “realistic” but on their being united in a homogenous logical space. Heterotopias, on the other hand, dissolve such unities with a “disorder in which the fragments of a large number of possible orders glitter separately in the dimension, without law or geometry.”³⁰ Foucault’s interest in heterotopian monstrosities is based in what he perceives as their potential to disrupt the epistemic-normative construction “man,” the thought of whose disappearance he finds “comforting”³¹ rather than alarming—though surely some “uneasiness” remains in the face of the uncertain outcome of a heterotopian reconfiguration of normative categories. The reason this possibility seems attractive to Foucault is because, as he endeavors to show, “man” is a historically contingent and non-neutral construction masquerading as a natural essence; implicit is a privileging of some identities and modes of being and, concomitantly, the devaluation and exclusion of others.

Jacques Derrida similarly links “monstrosity” to the demise of “man,” which for him is one of a long series of “transcendental signifiers” proposed by Western thought as a foundation, center, origin, or *telos* in an effort to limit the “freeplay” of discourse. The deconstruction of such foundations, accompanied by an affirmation of freeplay,

tries to pass beyond man and humanism, the name man being the name of that being who, throughout the history of metaphysics or of ontotheology—in other words, through the history of all of his history—has dreamed of full presence, the reassuring foundation, the origin and the end of the game.³²

What lies beyond “man” is, however, uncertain. Derrida glimpses “the *conception, the formation, the gestation, the labor*” of “a sort of question,” the dawning “of the face of the as yet unnameable which is proclaiming itself [...] under the species of the non-species, in the formless, mute, infant, and terrifying form of monstrosity.”³³ Derrida’s monstrosity, like Foucault’s, announces itself through its disruption of normative categories; and similar to

Foucault's "uneasiness," Derrida's monstrous "freeplay" involves a certain "anxiety"—"for anxiety is invariably the result of a certain mode of being implicated in the game, of being caught by the game, of being as it were from the very beginning at stake in the game."³⁴ Thus, "man" was devised as a bulwark against this uncertainty, but by calling "man" into question, our very identities are revealed as being what was always already "at stake." If, therefore, the monstrosity "proclaiming itself" in the void opened by "man's" demise is decidedly not utopian, it is also not dystopian. For reasons similar to Foucault's, Derrida tries to expedite the destruction of the old order despite the dizzying uncertainty of a heterotopian future.

By the time feminist critics began rehabilitating Mary Shelley's *Frankenstein* in the 1970s, poststructuralism had established itself as a major force in literary studies and in feminism itself. Though not necessarily influenced directly by the brief appearances of the monstrous in the works of Foucault and Derrida, feminists began to focus on the "monster" of Shelley's novel in ways clearly informed by poststructural concerns. Indeed, the creature poses a unique opportunity to marry the poststructural critique of humanism with the feminist opposition to patriarchy. On the one hand, the monster highlights social processes of exclusion instituted by a patriarchal humanism—the political effects of "phallogocentrism." The monster functions in these readings as a figure for the situation of those persons whose identities are defined by their gendered or racial differences vis-à-vis an ideal norm; it thus offers a starting point for an ideological critique of unjust power structures operative in marginalizing women and minorities.³⁵ On the other hand, the hybrid monster defies normative categorization, resisting classification according to dichotomies of male/female or nature/culture. It thus points to a heterotopian breakdown of oppressive norms and a potential empowerment of the neglected Other.³⁶ The monster had established itself as a powerful image for contesting institutionalized injustice and its discursive deep structures.³⁷

Working within a poststructural feminist framework, Donna Haraway focuses in her *Simians, Cyborgs, and Women* on three "odd boundary creatures [...] which have had a destabilizing place

in the great Western evolutionary, technological, and biological narratives,” three “promising and non-innocent monsters”—simians, women, and most famously cyborgs—which “may be signs of possible worlds” beyond patriarchal and humanistic traditions.³⁸ The cyborg, in the present context, is of particular interest for the way it unites feminist political interests, poststructural philosophical approaches, and a specifically technological form of monstrous hybridity in a single figure. As envisioned by Haraway, the cyborg offers a comprehensive challenge to essentialist ideologies (whether humanist or feminist), it “subvert[s] myriad organic wholes,”³⁹ and it refuses the possibility of a “natural matrix of unity.”⁴⁰ Moreover, the cyborg combines the “artificial” (cybernetic) and the “natural” (organism), thereby deconstructing the nature/culture distinction and emphasizing the contingency and constructedness of identity. It thus points to the possibility of dismantling the supposedly stable transcendental signifiers that compose the standards according to which we are defined in our normality or deviance—the white male heterosexual capitalistic basis for definition perceived at the root of Western culture.

In “The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others,” Haraway alludes to the Derridean and Foucauldian roots of the heterotopian revaluation of monstrosity and develops further the deconstructive potential of the cyborg. She locates us in “the womb of a pregnant monster,” recalling Derrida’s childbearing imagery, and shuns “the address of some full presence,”⁴¹ indicating her interest in liberating “freeplay” from humanistic and logocentric attempts to limit it. In an effort to undermine categorical distinctions between nature and technology, or more generally between the given and the made, Haraway offers a theory of “relentless artifactualism” aimed at moving us toward “a science fictional, speculative factual, SF place called, simply, elsewhere”⁴²—literally, a hetero-topia. Her theory of “reflexive artifactualism” implies that “nature for us is *made*, as both fiction and fact,”⁴³ which means that nature cannot be appealed to as an absolute foundation for guidance in ethical questions concerning technology. “In the belly of the local/global monster in which I am gestating, often called the postmodern world, global technology appears to *denature* everything.”⁴⁴ But

“[t]echnological decontextualization,” suggests Haraway, “is not a *denaturing* so much as a *particular production* of nature.”⁴⁵ In the heterotopia envisioned by Haraway, nature is not absent but neither is it absolute; it is responsive to rather than categorically different from technology.

When I earlier suggested that Dworkin’s engagement with the Frankensteinian subtext of bioethical debates points in the direction of a heterotopian view of humanity’s relations to biotechnology, what I had in mind was the way his analysis of the expression “playing God” points to a similar deconstruction of the boundaries between nature and technology. His notion that biotechnology might force us to reconceive the “background against which we act or decide”⁴⁶ implies just such a responsiveness of nature to technological development, hinting at the fact that nature is “made” and not “given.” And his emphasis on the “uncertain results”⁴⁷ of such a reconception underlines the unpredictability, the *unthinkability*, from our present standpoint, of a heterotopian reconfiguration of basic categories. My suggestion that Dworkin’s line of thought introduces a heterotopian possibility that eludes the utopian/dystopian framework within which much bioethical debate takes place is not, however, meant to downplay the great distance between mainstream bioethical and poststructuralist discourses. Dworkin himself maintains that his “critical morality” is based on “humanist principles,”⁴⁸ and he is certainly not interested in moving us towards a posthuman “elsewhere.” Likewise, Haraway does not wish to expedite the cyborgian breakdown of humanist categories with the aid of genetic engineering; indeed, she criticizes the Human Genome Project for its “imperializing” enforcement of “human ‘nature.’”⁴⁹ Nor are we likely to find proponents of biotechnology invoking poststructuralist critiques of humanism to advance their causes. Nevertheless, the compound term “biotechnology” combines—both etymologically and practically—the “given” (biology) with the “made” (technology), threatening to deconstruct this essential opposition in much the same way that the cyborg does. And the possibility that this could lead to a *heterotopian* reconfiguration of humanity has indeed begun to be registered in bioethical discourse.

4. Bioethics Beyond the Given and the Made

Allen Buchanan, Dan W. Brock, Norman Daniels, and Daniel Wikler, in their influential book *From Chance to Choice: Genetics and Justice*, explore this possibility in impressive detail. As these authors note, the traditional view of social justice, from Plato onward, defines it as “being about distributing goods among individuals whose identities are given independently of the process of distribution.”⁵⁰ However, this “simple picture,” as they put it, is seriously called into question by “the possibilities for significant and large-scale genetic interventions on human beings com[ing] closer to being actualized,” and this could have far-reaching consequences for “certain basic assumptions about the relationships between justice, human nature, and moral progress” (63).

The traditional view draws a clear line between natural and social inequalities. The justice or injustice of a social order is accordingly to be judged in terms of how it distributes social goods (e.g. money), while inequalities with regard to natural assets (e.g. intelligence, strength) are ruled out of the domain of justice altogether. As Buchanan et al. note, some recent theorists have argued that natural inequalities as well should be compensated for through the redistribution of social goods (63). But the current trajectories of genetic science and biotechnology suggest that a more radical undoing of the once clear dividing line between matters of fortune and those of justice may be on the horizon. Gene-replacement therapy and genetic pharmacology, in particular, offer prospects for the redistribution of *natural* assets (64), prospects that imply a “colonization of the natural by the just” (82) which could radically expand the realm of our moral responsibility while simultaneously undermining the basis upon which we make moral decisions.

One of the implications is that we may have to reconceive “the distinction between the social and the natural as that between what is subject to human control and what is not” (83). As the authors explain,

Nature, or the natural, is often thought to be not only that which is given but also that which must be accepted as beyond human control. In that sense, to say that something is due to nature is to relegate it to the realm of fortune or misfortune, rather than justice or injustice. [...] In contrast, nature subdued—nature mastered by human intelligence and directed to human purposes—is no longer the given, no longer that which must be accepted, and hence no longer the domain of fortune and misfortune. Paradoxically, nature brought within human control is no longer nature. (83)

Thus, “The boundary between the natural and the social, and between the realm of fortune and that of justice, is not static” (83). Therefore, certain diseases—traditionally relegated to categories of “bad luck” or tragedy—may in the future become matters of injustice, conditions for which societies or individuals may be held morally culpable.

This artifactualism, as Haraway calls it, implies a “blurring [of] the distinction between the subjects and objects of justice” (84) which could force us “to reconceive the fundamental problem of distributive justice” (85). For

if it becomes possible to distribute the genetic bases of all “natural” human characteristics, including those that are partly constitutive of the identity of persons, then [the] fundamental assumption—[the] picture of subjects waiting to receive objects through the workings of some distribution mechanism—will no longer be applicable. Yet it is not clear what alternative picture will replace it. (85)

An unsettling and uncharted moral “elsewhere” announces itself as the realm of justice is opened to include not only “justice to persons” but also “justice in the designed creation of persons” (85). The shift from “chance” to “choice” offers therefore no utopian liberation from the cruel indifference of nature, for the choices to be made are hard, and their difficulty is compounded by the loss of a moral foundation upon which to make them. If traditional moral theories have been based on the notion of an

unchanging human nature (as either dictating human morality, limiting what can reasonably be expected of humans, or, minimally, as providing the condition of possibility for moral action and judgment), all such theories—along with the notion of human nature itself—are rendered obsolete by the technical capability to literally alter the genetic constitution of the species with the introduction of non-human genes (87). Without an independent and overriding reason to value the human genome in its present state, decisions to implement or refrain from implementing such technologies are equally unfounded from a (traditional) moral point of view: “Consonance with a fixed human nature cannot be the touchstone for what is just or moral if there is no such thing” (93). Furthermore, the notion of “moral progress” flies out the window as well (94). Instead of a linear progression of history, the biotechnical revolution portends a shift of moral epistemes or paradigms such that there can be no neutral standpoint from which to judge amongst the alternatives.

Like Kitcher and Dworkin, Buchanan and his co-authors thus perceive a technologically induced irreversibility conditioning our interaction with biotechnology: a shift from “chance” in the “natural lottery” to a realm of genetic “choice” from which we cannot recoil. The expansion of the moral realm implies that we are in a sense “doomed to be free” with regard to biotechnological decision-making; it would be a serious case of Sartrean “bad faith” to pretend to return to an inaccessible state of innocence by refusing to choose. Such an abdication of responsibility would make the result no less a matter of choice, no more “natural” than an active decision to implement a technological arsenal. For “nature” itself is reconfigured by the presence of technical capabilities for decision. Indeed, Sartre’s radical claim that “we choose our birth” ominously promises to become literal truth in a biotechnological world.

What distinguishes these authors’ treatment of biotechnology’s irreversible effects for our moral situation is their clear recognition that biotechnology effects a heterotopian effacement of the “common ground” upon which we classify, choose, and subsequently act. But, of course, they are not interested in unleashing the unconstrained force of “freeplay” in the realm of

genetic technologies. Their book is commendable for the honesty with which the authors refuse to frame their treatment of biotechnology's monstrous potential as merely a dystopian "cautionary tale." The strategy of Fukuyama, who wishes to alert us ahead of time to the dangers of tampering with human nature, presupposes a nature whose fixity supplies us with the means to measure the difference and thus the motivation to prevent the change. But for this, according to Buchanan and Co., it is already too late. They therefore adopt a more pragmatic, nonfoundational approach and make an effort to provide practical guidance to inevitable choices in the absence of moral absolutes. Their undertaking is guided by the insight that, assuming morality can continue to play a role at all, biotechnology requires a radical reevaluation of ethical theory and not merely an "application" of it as has traditionally been the case in bioethics.

The authors therefore deconstruct the distinctions traditionally invoked as providing ethical guidance in biotechnological decisions: distinctions between positive and negative interventions, between somatic and germline interventions, and between treatment of disease or disability and enhancement of normal functioning. None of these, it is argued, proves watertight or absolutely morally relevant with regard to obligation or permissibility. Nevertheless, the authors provide a "limited defense" of the treatment/enhancement distinction as a non-absolute guideline capable of raising "moral warning flags," a "primary rationale" for decision-making which, on a case-by-case basis, must be further scrutinized (119-155). Generally, on this view, justice (and specifically equal opportunity) requires the treatment of genetic disease and disability—defined vis-à-vis the standard of "normal species functioning"—while enhancement does not. On the other hand, some enhancements may be permissible while others are clearly not; they are in any case to be handled as inherently more problematic than treatments (156-203).

The problem, however, as the authors themselves recognize, is that biotechnology's deconstruction of human nature radically destabilizes what may count as "normal species functioning" and, *a fortiori*, as a disease or disability. Their rejection of the "simple picture" presupposed by theories of distributive justice—that of

basically *equal* subjects to whom objects are distributed justly or unjustly—therefore problematizes the appeal to the treatment/enhancement distinction even as a primary but non-ultimate rationale. As disabilities rights advocates have made clear, not everyone is initially equal in terms of their ability to participate in a given social setting. Moreover, disabilities are largely “socially constructed” (285), not merely deviations from a neutral—because natural—norm. Disabilities are “inherently relational” with regard to social settings (285): an inability to do something not required or valued in a given society is not a disability per se. We glimpse a further realm of choice ignored by traditional theories of justice. The “morality of inclusion” concerns the choice of “dominant cooperative frameworks”—the social “rules of the game,” so to speak—and this, essentially, is the choice of who in society is disabled (258-303). Historically, such “dominant cooperative frameworks” have emerged without regard for human choice, but new technologies provide, in part, the means to change them (291). Especially genetic enhancements on a large scale could result in disabilities for those who, from today’s perspective, are “normally abled” and in exacerbated stigmatization of those presently disabled (296-298). Fairness and exclusion therefore remain persistent problems.

More important in the present context, however, is the fact that Buchanan, Brock, Daniels, and Wikler set their argumentation against the background of perhaps the most serious, if not most radical, statement to date of the heterotopian potential of biotechnology—one informed, through and through, by conditions of technological irreversibility. But, as I shall argue in section 7, even this treatment fails to do complete justice to technological irreversibility. Prior to making this argument, however, I return to Mary Shelley’s *Frankenstein*. As I shall argue presently, Mark Hansen’s reading of the novel brings to light more radical implications of technological irreversibility—in the context of biotechnology and beyond—which are not encompassed by a shift from “chance” to “choice,” and which are only glimpsed in hindsight by poststructural notions of heterotopian revolutions.

5. *Frankenstein* and Technological Irreversibility

Having focused on the Frankensteinian subtext of discussions of biotechnology, I shift now to what Hansen calls “the technological subtext of *Frankenstein*.”⁵¹ As I mentioned earlier, Hansen reads the novel against the technological background of the industrial revolution to reveal an implicit critique of *technesis*, i.e. the discursive reduction of technology’s materiality. Hansen undertakes this reading in an “effort to cross-fertilize the (feminist) critique of romantic prometheanism with an exploration of the technological real embodied in the novel’s central vision of unnatural monstrosity” (579). Feminist readings which identify in Shelley’s novel a critical allegory of “the male romantic ideology of self-expression” (578) are, according to Hansen, on the right track but not radical enough. Most significantly, such readings—which characteristically identify the monster as a metaphor for the marginal, compromised position of women (or Shelley herself) with relation to the male ideology of romanticism—fail to break sharply enough with the representationalism central to the so-called male model. Feminists are right to see Shelley as an able critic of that model, but they have generally failed to appreciate the extent to which her criticism subverts representation or figuration itself; specifically, her “parody” of romanticism, as Hansen terms it, is embodied in a monster characterized by “resistance to literary or figural ‘capture’” (587) and thereby “exposes the profound reduction of technology that forms a further enabling condition [along with a “general retreat from historical reference”] for the advent of romantic ideology” (580). Romantic sublimation—whereby cultural redemption in the face of a perceived material, historical degeneration is sought by means of poetic transcendence—is thus the proximate target of Shelley’s critique. Industrialization and urbanization form the background and the motivation for much of romanticism’s literary production, but by framing them “exclusively as a threat to cultural values” (580) and thus as phenomena to be contained by equally cultural, i.e. literary, means. Frankenstein’s monster, on the other hand, announces a more disturbing level of technology’s experiential impact, a level of “technological exteriority” (582) which resists discursive compensation and circumvents conscious, phenomenal disclosure altogether. Shelley’s text thus “indicts the sublimating

gesture for the naive confidence with which it neutralizes the impact of the industrial revolution as such” (580).

I will not primarily be concerned to defend Hansen’s reading in literary critical terms. Instead, my goal is to make explicit the latent implications of Hansen’s take on the monster for a radical theory of technological irreversibility. Towards this end, I shall explore only a few facets of Hansen’s argument: what he calls “the monstrous *ontology* of technical creation” (583)—that of the fictional monster as well as real-world modern technology; the implications for telic (authorial or technoscientific) aims; and the location of a material anthropotechnical interface. I therefore leave Shelley’s critique of romanticism largely to one side.

The monster, according to Hansen, escapes discursive containment. It cannot be reduced without remainder to a symbol, metaphor, or allegorical trope. But because, by definition, we cannot speak about that which wholly eludes discourse, the literary monster can only *gesture towards* an “outside” of language. If this alterior realm is that of modern technology beyond the reduction of *technesis*, the monster must then be “[u]nderstood as a *displaced* figure for technological exteriority” (582, emphasis added). The problems we have in conceiving of such exteriority, which account for a failure to grasp both the ontology of Frankenstein’s monster and of modern technology itself, are formidable. We tend to think of technology as “applied science,” as the practical application of theoretical knowledge and thus as an extension of scientific discourse. As Hansen argues, however, Shelley’s novel introduces in the body of the monster “a subtle distinction between applied science *and* technology” (581), pointing to a type of “technology *beyond* science” (582). That is, “Shelley’s text discovers [...] a split between a ‘restricted’ form of technology as *techne* (or supplement) and a materially robust form of technology as radical exteriority” (584). As a simple matter of literary interpretation, it would be quite wrong to equate the monster with an embodiment of technology in the “reduced” sense of applied science. For as Hansen emphasizes, “Shelley’s text stresses Frankenstein’s transgression *of* science” (582) in “go[ing] behind the causal laws of Newtonian nature” (582) and returning to the pre-scientific texts of alchemical authors. Frankenstein

makes “a leap beyond knowledge of causes, beyond the empirically-oriented, restricted scope of modern science” (582). Thus,

the monster is not simply the result of scientific law applied, but rather a *technological product* in a quite specific, post-industrial sense: a product of a process whose ‘effects’ are neither predetermined nor constrained by theoretical principles of science. (582)

But we seem to lack a general philosophical framework for locating (not to say conceiving) such material otherness. Idealistic philosophies, of course, rule out such a possibility at the outset. Materialist approaches, on the other hand, have fared little better, especially as they generally privilege physical science as the foundation for their ontologies. In Anglo-American circles, where the idealism-materialism dispute has evolved into the scientific realism-antirealism debate, epistemology takes center stage in settling metaphysical issues, effectively blocking the entry of anything beyond the ken of cognition and discourse.⁵² *Technesis*, in other words, is deeply ingrained in Western culture; Hansen locates “the inaugural moment in [its] reign” (585)—but also the potential to circumvent the reduction of technological exteriority—in Aristotle’s discussion (in *Physics II*) of “the automatic” (*to automaton*) in its relation to “chance” (*tuche*).⁵³ Here Aristotle distinguishes the automatic (sometimes translated “spontaneity”) from “luck” (or “fortune”) according to a relation of broader to narrower category. The latter applies only to human or sentient beings and natural reproduction; it presupposes moral categories whose “projection” onto incidental events allows for their recognition as instances of good or ill fortune. An action undertaken for a given purpose but which results in an unexpected, unintended effect is a case of “luck,” but since “the efficient cause of the lucky event remains internal to the nature of the agent, luck strains natural necessity while still remaining natural” (Hansen 585). The automatic, on the other hand, is a more comprehensive category of chance; it stands in relation to the operation of the physical world without necessary reference to human intention, morality, or thought. The automatic, but not the narrower category of luck, is therefore applicable to non-sentient animals and

inanimate objects, and, crucially, it explains any occurrence of an event “contrary to nature” (*para physin*).

To make sense of Aristotle’s distinction and to demonstrate its relevance for modern technology, we must keep in mind that “nature,” for Aristotle, is defined always in relation to a *telos*. That an oak develops from an acorn is neither lucky nor spontaneous; it is simply a naturally caused effect, for the *telos*—and hence the nature—of the acorn is to develop thus. When, on the other hand, a man who needs money, to take an example from Aristotle, goes to the location where he happens to find it (when in fact his reason for going there is altogether different), Aristotle speaks of luck; for the event is not foreign to the *telos* of the cause—i.e. his going there is the natural effect of his intention to go there. It remains, however, a “chance” event, because his intention comes to fruition in an unintended or incidental effect, i.e. finding the money. Even a “natural monstrosity,” as Hansen points out, must be classed a case of (bad) luck; a physical deformity, for example, is an aberration from the natural *telos* of species-typical development, “but the causes of Nature’s miscarriage are internal to her own processes” (Aristotle, qtd. in Hansen 585). But the automatic, finally, can be *contrary* to nature because it is not related to a *telos* whatsoever—neither that of a purely natural law or physical regularity nor of a conscious intention. This would imply the possibility of an event *without cause*. Aristotle’s enigmatic suggestion to this effect remains vague, however, and he quickly reverses course and subordinates the automatic to the fourfold doctrine of causality, going so far as to invoke a transcendent God-like first cause which would insure that “intelligence and nature” are ultimately behind any and every phenomenon in the universe (*Physics II*: 6).

Nevertheless, Aristotle’s discussion, his brief entertainment of the possibility that an event may be contrary to nature and thus fall outside the framework of efficient, formal, material, and final causes, harbors within it as an aborted potential “a categorical distinction seemingly capable of acknowledging technological exteriority, if only negatively, as what lies *beyond* the explanatory domain of the fourfold doctrine of causality” (585). The creation of Frankenstein’s monster, resulting from the “introduc[tion of] an

unnatural purpose into the use of nature” (583), is not governed by any *telos* that would render it natural. For not only is it contrary to the *telos* of dead organisms to return to life, but not even Frankenstein’s intentionality can reduce this unnatural monstrosity to mere “bad luck.” His intention itself is predicated upon transgressing nature, and, even more significantly, he rejects the causal framework of science in pursuit of his goal. The monster “accordingly stem[s] from a ‘cause’ that is *para physin*” (585) and is thus an embodiment of the automatic in the radical sense introduced and quickly withdrawn (in panic, perhaps?) by Aristotle. Furthermore:

As the product of an application of natural force (electricity) to an unnatural assemblage and for an unnatural purpose, Frankenstein’s creation embodies the autonomy of modern technology in the terms in which it has been defined by theorists of technology from Marx to Michel Serres. (586)

The automation of machines so central to the industrial revolution involves, on this reading, an emancipation of technology from nature, which Marx locates in the “motive mechanism.” When machines are set to work in running other machines, they are freed from their dependence on *human* energy. Serres goes so far as to see in this process—that is, as the essence of the industrial revolution itself—“[a] revolution operating on *matter*” (qtd. in Hansen 586). As Hansen summarizes:

What distinguishes the steam engine from all previous technologies is its energy principle: it performs a stochastic metamorphosis of matter, transforming a natural material, coal, into a force unrelated (by any mechanical calculus) to its *natural* potential. (586)

Modern technologies themselves are thus “unnatural monstrosities,” embodying instances of the automatic in its non-reduced form. Their “stochastic” operations elude causal adumbration and point to a realm of technological exteriority beyond the pale of discourse.

This does not imply that there is not “really” (on a physical level) a causal relation at work; nothing is said about whether we live in a deterministic, merely probabilistic, or ultimately chaotic universe. What is implied, on the other hand, is that modern industrial and post-industrial technologies are not merely *applications* of theoretical science, nor do they merely *extend* our intentional wills. For they exceed our capabilities to predict their trajectories on the basis of causal laws, and they gain an autonomy relative to our attempts to reduce them to mere tools in anthropocentrically defined purposes. In a very real sense, such automated technologies are capable of turning the tables on their human makers and employing them as “tools” for the development of their own “unnatural” trajectories. As philosopher of technology Don Ihde argues, the instrumentation employed in scientific inquiry, for example, is emphatically non-neutral with respect to human intentions and perceptions: not only do mediating technologies transform our perceptions of the objects of our inquiry, these transformations reflect back upon ourselves and effect alterations to the constitution of perceiving subjects.⁵⁴ Moreover, technologies can form their own “latent telic *inclinations*”⁵⁵ with profound implications for further scientific research. In the case of the industrial revolution, this process has been well documented: the development of thermodynamics was essentially guided by preoccupation with already developed automated machines. Science, in this case as in many others, *followed* technology’s lead, and not the other way around.⁵⁶

The non-neutral mediation of experience effected by technologies implies a profound explosion of the phenomenal field within which subjects relate to objects and within which causes are related to effects. Phenomenologically speaking, technologies insinuate a recalcitrant interruption into the noetic relation (the relation of a phenomenal “I” to the world), unpredictably reconfiguring the very ground upon which telic intentionality (the “directedness” of perception and subjective involvement with the world) functions. As mediators, technologies promise to extend our perceiving and intending selves, but they in fact introduce what we can only define as an unruly, aleatoric element into our experience of the world. For in the embodied interface of technology’s materiality with our lived bodies, the ground itself of

our subjectivity is reconfigured in a manner defying all attempts at causal explanation. To take up even a simple technology, a hammer for example, is to undergo a transformation of the lived body in its relation to the world; this transformation is not necessarily (nor usually) the object of conscious thought but expresses itself in habitual movements, for example. The hammer extends my body more so than it does my thoughts, but in so doing it shifts the embodied basis of thought itself. My subjective aims, my deliberations, and my self-estimation are different with a hammer in my hand than without one. “I” have subtly become someone else, though the transformation goes unnoticed as the hammer remains wieldy, apparently commensurate with my thought. Industrial and post-industrial technologies, however, as radically incommensurate to human purposes, transform the embodied basis of thought in a more extreme manner. They effectively uproot the phenomenological subject, undermine its foundational autonomy, and initiate a feedback loop with its semi-autonomous objects. The so-called demise of man occurs because the unpredictability of novel technologies is correlated with an *aleatoric element of the technologies themselves*; the consequences of their introduction are unforeseeable because the new relations they bring with them entail an ontological reconfiguration of the human that exceeds the bounds of causal efficacy and ordering. Since new technologies redefine the contours of the world that phenomenally presents itself to my view, thereby altering the subject in its relation to phenomenal objects, the perceiving, acting, and thinking “I” following the introduction of a novel technology is not identical with the “I” prior to this event. This, in turn, implies a radical irreversibility: for embodied creatures in such novel material/technological circumstances, there is literally no going back. A reversal of technology’s course or a return to innocence is *ontologically* unimaginable.

The consequences of technological exteriority thus extend far beyond its impact on the telic aims of the scientific enterprise. The self-identity of the human subject is itself subverted in the emergence of new relations between humans and technologies, which, due to their reflexive nature, undermine subject-centered moral and epistemic theories in favor of a relational network of

knowledge and justice. The rise of technological monstrosity documented by Shelley's *Frankenstein* points, therefore, toward the construction of the cyborg and the necessity of treating an artifactual "nature" as a quasi-agent, a "trickster" in Haraway's term.⁵⁷ However, this is not a result of dynamics inherent to discourse, as poststructuralism would have it, but of direct material interactions between technologies and human embodiment, both situated beyond the reach of discursive or cultural inscription. The "unsettling" shock of discursively defined heterotopian reconfigurations of basic conceptual categories is, so to speak, a mere "echo" of the impact of anthropotechnical interactions immune to phenomenal (and thus discursive) thematization. The poststructuralist deconstruction of the liberal subject, based as it is in discourse's putative self-deconstructive properties, is in some ways merely the flipside of an organicizing romantic sublimation—a celebration of the monstrous disruption of categories so feared by the romantic poets. Despite differences as to whether the perceived revolution should be welcomed or shunned, both approaches reduce the motor force as well as the disorienting effect to the space of language, discourse, and cultural values. They thus register only the tail end of a deeper, material, and truly *irreversible* deconstruction which brings discursive heterotopias in its wake. By highlighting a form of anthropotechnical interface at the material level of embodied relations to technology, Shelley's text thus points us away from the discursively defined monstrosities of poststructuralism and towards a more robustly material form of monstrosity at its root.

We are now in a position to relate these findings back to the discussion of bioethical discourses. Again, I am taking biotechnology as the "extreme case" of a technology capable of directly altering the material constitution of human embodiment—not because the reconfigurations effected by, for example, industrial or digital media technologies are merely metaphorical, but because this potential is so widely and explicitly recognized as the very *goal* of biotechnology. And as the Frankenstein myth and questions of irreversibility inform and even structure many discussions of biotechnology, bioethical debates offer a particularly felicitous object of study for determining the ways in which technological irreversibility is registered, dealt with, and

resisted. If we discover that even here the radical implications of technological exteriority are avoided or blunted, the very explicitness with which the bodily effects of technology are framed in terms of irreversible consequences for humanity makes bioethical discussions a rich index of the stubborn cultural entrenchment of a defensive technetic reduction.

6. Biotechnology Beyond Chance and Choice

As their discussion of the “colonization of the natural by the just” suggests, the authors of *From Chance to Choice* come quite close to postulating a heterotopian revolution of basic moral and epistemic categories effected by new and emerging biotechnologies. The artifactualism implicit in their view registers the threat to the normative human perspective that Foucault, Derrida, and Haraway, among others, find so full of potential. I have criticized, in the meantime, the discursive view of heterotopian monstrosity articulated by poststructuralists as derivative in relation to a more fundamental, material transformation. But the fact that their position approximates the poststructural paradigm does not, in itself, entail a blindness on the part of Buchanan et al. to the underlying *primary* revolution—the material transformation of embodied agents through novel technologies that *entails* the discursive deconstruction of basal categories. The fact that they link the discursive predicament to a properly technological revolution—one aimed directly at the body, at that—suggests that they are in fact well aware of the primacy of technology’s materiality in casting us conceptually adrift. However, their coding of the irreversible consequence of biotechnology as an expansion of the realm of “choice” in the place of “chance” indicates a failure to escape Aristotle’s stifling reduction of the automatic to chance. The authors thus continue the tradition of *technesis* and testify to the stranglehold it has upon us in preventing us from thinking—at least negatively—technology beyond human thought.

Modern science is marked by its rejection of the Aristotelian doctrine of fourfold causality; in the modern period, only efficient causes are regarded as causes properly so called. Biology, in

particular, has been in the forefront of disabusing us of teleological thinking. In the wake of evolutionary theory, philosophers of science are quick to point out the anthropomorphism of attributing telic aims to organisms that are more economically explained by the contingencies of natural selection. The elimination of orderly purpose from the natural universe has gone hand in hand with an increasing secularization of society and a deflation of the so-called argument from design for the existence of God suggested by Aristotle and developed by Aquinas. The repudiation of Aristotle is, to exaggerate just a bit, a cornerstone of our scientific, secular modernity. How strange, then, it must seem to invoke Aristotle in a discussion of biotechnology. The strangeness or inappropriateness, however, is only apparent. For Aristotle is still very much with us in many ways, and he apparently feels quite at home in bioethical debates.

To see that this is the case even in the seemingly radical anti-essentialist framework established by Buchanan and his co-authors, who allow the boundaries between nature and technology to shift to such a degree that even “human nature” is revealed as a contingent artifactual construction, let us look more closely at the claim that biotechnology opens new realms of choice to us where before there was only chance in the form of the “natural lottery.” Recall that this claim implies, according to the authors, the necessity to reconceive our notions of justice from the ground up. Unlike Aristotle, who might reject the legitimacy of biotechnological choice at the outset because it violates the natural *telos* of human nature and reproduction, the authors emphasize that we have no choice but to embrace the challenge posed once the technical capabilities are present. They thus reject the approach of Fukuyama, who describes his own position and strategy as “Aristotelian” due to its reliance on human nature.⁵⁸

But, even in the absence of a foundational human nature, the chance/choice dichotomy is itself caught up in a distinctly Aristotelian framework. The “natural” or “genetic lottery” invoked to explain the background of “chance” upon which we are born, at least prior to the advent of biotechnology, is isomorphic with Aristotle’s category “luck.” Aristotle conceived the latter as a moral category applicable in the realm of human intelligence or

reproduction. As we saw, a natural monstrosity, e.g. a physical deformation, is ascribed by Aristotle to the workings of luck because the causes of the telic aberration from species-typical development are judged to be “internal to [Nature’s] processes.” That Aristotelian luck is the model for the “natural lottery” is clear when we consider that Buchanan and his co-authors invoke a standard of “normal species functioning” as an implicit *telos* against which to judge disease and disability and to demarcate the (non-absolute) boundary between treatment and enhancement. Only upon this basis can the authors treat the extreme case of a genetic disease that results not only in physical deformity but that precludes sentience itself as “misfortune” in the genetic lottery. Clearly, this cannot be a case of bad luck for the “person” involved, because the disease itself prevents the formation of conscious, moral categories by which he or she could make such a value judgment. Instead, the notion of bad luck in the genetic lottery only makes sense, in this case, in relation to the externally projected standards of a third party—standards based on what, teleologically, the being ideally should have become, i.e. a standard of natural development for the species.

Of course, the *telos* implicit in the reasoning of Buchanan and his co-authors is of a less essentialist sort than Aristotle’s. Their notion of “nature,” as we have seen, is pragmatic and revisionist, not static and foundational. Biotechnology allows for or forces revisions of the natural background for human action and decision, but, according to the authors, the *telos* of “normal species functioning” continues to play a role in the ethical evaluation of biotechnical interventions (*vis-à-vis* the treatment/enhancement distinction). Moreover, as they conceive it, the bedrock of “nature” is only challenged by “human control” over it; nature is revealed as contingent only when “mastered by human intelligence and directed to human purposes” (83). This is the crucial move in warranting the conclusion that, with the development of biotechnological capabilities for intervening in the natural lottery, chance irrevocably gives way to choice. As they set up the problem, luck with regard to nature *can only* give way to choice—to *rational choice in the ethical realm of justice*. But by establishing the exclusive alternative between “nature” and “control,” between “chance” and “choice,” the authors effectively

reproduce Aristotle's reduction of the automatic to fourfold causality. The *telos* of nature is opposed exclusively by the *telos* of human intelligence, control, and morality. The possibility that a third, non-teleological or *anti-telic* alternative might exist is simply not considered.

The dichotomizing view is too simplistic. It eschews technological exteriority by fiat, ignoring the intractable dimension of technology's autonomy with relation to thought. As we have seen, it is essential to consider the irreversible effects of technology by way of an exterior *tertium quid* of technology/nature hybridity or "unnatural monstrosity." The embodied anthropotechnical interface required for understanding technology's impact on human experience is located outside the dimension of human thought and deliberation. Shifts in the bedrock of nature do not therefore result automatically in new "choices." To say that biotechnology forces us to make decisions in novel situations is certainly not wrong, for we must continue to choose and act in one way or another. To this extent, the "chance to choice" argument is sound. However, it is also naively euphemistic, for these choices actually involve a monstrous hybridity incommensurable to human reason. There is, as we have seen, an incalculability to human-technological interaction which results from the aleatoric "nature" of modern technology itself. By ignoring the material exteriority of technology to discursivity, the authors of *From Chance to Choice* thus radically understate the scope of (bio)technology's impact and fail to countenance the truth of technological irreversibility.

In a sense, it is unfortunate that the discipline of bioethics is as insulated as it is from poststructuralist and postmodernist philosophies. A serious engagement with poststructuralism and approaches influenced by it might in fact inoculate bioethical reasoning to the shortcomings of *technesis* in dealing with technological exteriority—a mistake germane to both poststructuralism and mainstream bioethics. The dismissal of poststructuralism and deconstruction as mere word-play in much Anglo-American philosophy and, in particular, in the philosophy of science, while often unfounded, based simply on unfamiliarity or on a defensive unwillingness to engage a different style of

thought and expression, is in some cases right on the mark—though perhaps true in a sense different from that intended by those making the charge. There certainly is some justification, for example, in claiming that thinking about technology by stripping it of its materiality and reducing it to a figure for discursive thought is just “playing around with words.” But by dealing with these instances seriously, bioethicists might be forced to confront the paradoxical similarities in their own positions and to think harder about avoiding reductionism.

To name just one area where dialogue might prove fruitful to both sides, bioethicists could do worse, in their search for a third category capable of explaining what lies *beyond* the reductive chance/choice bifurcation, than to begin with a more patient examination of Donna Haraway’s “cyborg.” As I have argued, significant points of contact already exist between the approaches of Buchanan et al. and Haraway, particularly in terms of a heterotopian artifactualism, and these commonalities might be drawn upon to instigate a conversation that avoids the familiar impasses of misrecognition and talking past one another. Initially, what would likely strike bioethicists and mainstream philosophers of science as inexplicable in Haraway’s discussion of the cyborg is the degree to which it is predicated on postmodern “reconceptions of machine and organism as coded texts through which we engage in the play of writing and reading the world.”⁵⁹ Here, we would likely hear, is the case *par excellence* of “playing with words.” The impatient bioethicists would insist—rightly, I believe—that bodies and technologies simply cannot be reduced in this way. They are first of all physical, *material* entities, and only secondarily do they enter into discursive relations. If a postmodern textualism (the denial of anything “outside the text”) cannot recognize this basic fact, so much the worse then for postmodernism. However, if our hypothetical bioethicists can get over their initial indignation, they might learn from Haraway that defining bodies and technologies as “physical, material *entities*” is also reductive. That is, by conceiving them in this way, they are accorded an implicit stability which effaces the transformative potential of technologies—not only their own mutability of purpose but their potential to transfigure embodied humans as well. To call them simply “entities” reduces them to inert objects

of thought and thereby confirms the human subject as an immutable, ahistorical essence.

Obviously, there is some danger that the dialogue could devolve quickly at this point into name calling and mutual cries of “*tu quoque!*” However, such a dénouement is not inevitable. Perhaps the bioethicists would be impressed by the sincerity and sophistication of Haraway’s political engagement. And perhaps Haraway—or some other cyborg feminist—would be impressed by the potential to radicalize “the promise of monsters for inappropriate/d Others” by situating the root “cause” of the cyborg *outside* the realm of language and textuality, in a historical field of concrete, material anthropotechnical interaction. By relativizing Haraway’s categorical pronouncement that “Monsters signify”⁶⁰ to a secondary level of discursive monstrosity while recognizing the existence of radically *non-signifying* monsters on a primary, non-discursive level of materiality, cyborg feminism could avail itself not only of a mechanism for historicization but also of a more durable deconstruction of liberal humanism itself. Assuming that our imagined bioethicists are still around, perhaps they would see the consequences for the chance/choice reduction, which is ultimately a means of extending the dominion and prerogative of human thought even into a world where its physical basis in the body of *Homo sapiens* had been transformed beyond recognition.

But despite the possibilities for cooperation and even convergence I have been imagining, serious problems remain. For one, the liberating political potential envisioned by Haraway for the cyborg myth might be seriously damaged by acknowledging technology’s robust materiality and irreversibility. The radical resistance to calculation in terms of causes and effects introduced by technological materiality precludes, of course, the foreseeability of outcomes. Nor can a dystopian scenario, e.g. fascist politics, be ruled out. Bioethics faces a similar problem. Can moral thought continue following the material deconstruction of humanity and the breakdown of the chance/choice opposition? The question is not rhetorical; I do not wish to imply that there is no way of coping, but any chance that there may be will have to be predicated on a serious attentiveness and responsiveness to the material monstrosity of technological irreversibility.

Martha Nussbaum, in her review of *From Chance to Choice*, has indicated the difficulty of our predicament. Without challenging the thesis that biotechnology confronts us with novel choices in the place of chance, Nussbaum writes that “the very fact of having such a choice seems threatening and in some ways tragic.”⁶¹ This sense of tragedy, which is today pervasive in discussions of biotechnology, is itself an indication that “choice” is an inadequate category for characterizing our situation. Perhaps more than a mere lamentation of the loss of our genetic innocence, the “tragic” aspect of having to make biotechnological decisions could disabuse us of utopian dreams and force us to focus on the *source* of the intractable impossibility of choosing. Perhaps there is hope in recognizing that these choices are impossible—that they are impossible *for us*, for humans unable to think what lies beyond human thought, unable to predict our anthropotechnical future. Our only choice, I submit, is to trace historically the material, technological decentering of the human perspective, which, after all, does not begin with biotechnology. The industrial revolution, as we have seen, already involved an irreversible unsettling of foundational subjectivity through novel anthropotechnical interactions. I do not, however, believe that the entirety of post-industrial political and moral thought has been nothing but a bad joke. If we are to come to grips with our current situation, we must look to historical instances of anthropotechnical upheaval to see how contextual resituation was possible. Perhaps we will discover no orderly patterns or “invariant structures” capable of guiding future deliberation. But certainly we will not get beyond a vague feeling of tragedy without trying.

As I earlier observed, the Frankenstein myth has come to dominate thinking about biotechnology. In many ways, this is due to superficial connections drawn between the new technologies and the narrative events of Mary Shelley’s novel. Equally, the story has come to articulate deep-seated cultural fears in relation to technology. But *Frankenstein* also documents serious, historically specific, material disruptions of human subjectivity effected by modern technologies. In evaluating the polemical uses to which the tale is put today, we shall have to historicize our technological hopes and fears in terms of the technological irreversibilities witnessed by Shelley’s text. And if we find ourselves in the midst

of another technological revolution today, we would do well to return to this record in an attempt to understand ourselves and our technological lifeworlds better. In this way, *Frankenstein* may prove to be a suitable framework, after all, for thinking about biotechnology—though perhaps not amenable to the aims of those likely to invoke it. For the novel’s lesson with regard to technological irreversibility is applicable to the story as well: it resists being subdued by human intentionality and tends to disrupt rather than support the telic purposes towards which it is employed. It is too late to ward off danger with a cautionary tale of the consequences of playing God. But it is equally wrong to think that dismissing such admonitions as irrational can help us (re)establish a situation in which we are unambiguously the masters of our technologies, in which we can employ them as neutral tools without fear of being infected by their autonomous trajectories. The lesson of technological irreversibility is not, however, that we must resign ourselves to technological determinism. Instead, we must look for new ways of embodied being to cope with the material monstrosities of technology, and in this quest *Frankenstein* will continue to play an unpredictable, contradictory, and—in the best sense—*monstrous* role.

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Notes

1. See, for example, Martin Heidegger, *The Question Concerning Technology and Other Essays*, trans. William Lovitt (New York: Harper, 1977), especially the essays “The Question Concerning Technology” (ibid., 3-35) and “The Turning” (ibid., 36-49).

2. See, in particular, “A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century” in Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149-181.

3. Hansen models his notion of *technesis* after Alice Jardine’s *gynesis*, the putting of woman into discourse Jardine sees at work in French feminism and poststructuralism. For a detailed exposition of *technesis*, see chapter 3, “From Metaphor to Embodiment: Resisting *Technesis*,” in Mark Hansen, *Embodying Technesis: Technology Beyond Writing* (Ann Arbor: University of Michigan Press, 2000), 77-101. For the relation to Jardine’s concept, see especially ibid., 86-87.

4. The notion of the lived body—the preconceptual and precultural material ground of active human being—is central to Merleau-Ponty’s *Phenomenology of Perception*, and it has increasingly gained currency in recent attempts to explain human-technological interaction. The distinction between the lived body and the bodies of physiology or as invested with socio-cultural significance is approximated in the German concepts *Leib* (as the body I *am*) and *Körper* (as the body I *have*). Philosopher of technology Don Ihde, terming these “body one” and “body two,” investigates the manners in which technologies traverse both of these bodies and thereby reshape our active dealings with the world (see, in particular, Don Ihde, *Bodies in Technology* [Minneapolis: University of Minnesota Press, 2002]). In her attempt to establish the materiality of technologies, N. Katherine Hayles also refers to Merleau-Ponty’s concept of the lived body and contrasts it with Foucault’s passive body, making the distinction between “embodiment” and “the body.” Her focus, like Ihde’s, is largely on the non-cognitive, habitual “incorporation” of technologies, as extensions of our embodiment rather than just of our subjective

thought (Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* [Chicago: University of Chicago Press, 1999], 192-207). Finally, Vivian Sobchack appropriates Merleau-Ponty's phenomenological concept to demonstrate the depth of spectatorial involvement with film, an involvement that goes beyond intellectual considerations to sub-personal levels of tactile engagement (see, in particular, Sobchack, *The Address of the Eye: A Phenomenology of Film Experience* [Princeton: Princeton University Press, 1992] and Sobchack, "What My Fingers Knew: The Cinesthetic Subject, or Vision in the Flesh," in *Carnal Thoughts: Embodiment and Moving Picture Culture* [Berkeley: University of California Press, 2004], 53-84).

5. Mark Hansen, "'Not thus, after all, would life be given': *Technesis*, Technology and the Parody of Romantic Poetics in *Frankenstein*." *Studies in Romanticism* 36 (Winter 1997): 578.

6. *Ibid.*, 578-79.

7. This, it seems to me, is to follow a trajectory central to the work of Heidegger, whose influence on poststructuralism, of course, has been immense. This trajectory, I contend, can be glimpsed in the "Letter on Humanism" (Martin Heidegger, *Über den Humanismus* [Frankfurt: Vittorio Klostermann, 1949]) and, with reference to technology, in Heidegger, *Discourse on Thinking*, trans. John M. Anderson and E. Hans Freund (New York: Harper, 1966). In both works, we see Heidegger trying to move us towards a more spontaneous relation to Being, one less mediated by modern technologies. Heidegger's model for this more "thoughtful" relation to Being is provided, famously, by the pre-Socratic Greeks. And, equally famously, Heidegger hopes to recover their manner of being-in-the-world by way of a careful attentiveness to language, which, after all, is said to be "the house of Being." Heidegger's posthumously published interview with the German magazine *Der Spiegel*, "Nur noch ein Gott kann uns retten" (literally, "only a God can save us"), confirms the suspicion that this is a subtle, ontologized form of romanticism (Heidegger, "Nur noch ein Gott kann uns retten," interview in *Der Spiegel* 23/1976: 193-217). And though Heidegger's romanticism has been problematized in the poststructural tradition itself—notably by

Derrida, who sets his own position apart from what he calls “Heideggerian hope” (Jacques Derrida, “Différance,” in *Margins of Philosophy*, trans. Alan Bass [Chicago: University of Chicago Press, 1982], 27)—the danger remains that basing a deconstruction of humanism on “*différance*” or the like devolves into a mystical return to origins or leap out of time itself.

8. The fact that my investigation makes no pretense of being able to “settle” bioethical controversies does not, however, in any way imply that the considerations I raise are irrelevant to those debates. On the contrary, the theory of technological irreversibility articulated here operates, as I shall argue, a profound *unsettling* of the dominant framework within which the majority of bioethical theory is conducted. As we shall see, this fact has significant practical implications for the future course of bioethics.

9. Obviously, biotechnologies—like all technologies—“mediate” between users’ aims and the objects to which those technologies are set to work. The point, however, is that the contact between the technology and the object (in this case, bodies) is “immediate” in the sense that matter (technology) directly impinges upon matter (embodiment).

10. Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (London: Profile, 2002), 176.

11. *Ibid.*, 101.

12. *Ibid.*, 101.

13. Philip Kitcher, *The Lives to Come: The Genetic Revolution and Human Possibilities* (New York: Touchstone, 1997), 17.

14. *Ibid.*, 18.

15. *Ibid.*, 190.

16. *Ibid.*, 191.

17. *Ibid.*, 197.

18. Ibid., 196-97.
19. Ibid., 197.
20. Ibid., 204.
21. Ibid., 271.
22. Ronald Dworkin, "Playing God: Genes, Clones, and Luck," in *Sovereign Virtue: The Theory and Practice of Equality* (Cambridge, MA: Harvard University Press, 2000), 443.
23. Ibid., 444.
24. Ibid., 446.
25. Ibid., 446.
26. Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage, 1973), xvii.
27. Quoted in *ibid.*, 15.
28. Ibid., xvi.
29. Ibid., xviii.
30. Ibid., xvii.
31. Ibid., xxiii.
32. Jacques Derrida, "Structure, Sign, and Play in the Discourse of the Human Sciences," in *Contexts for Criticism*, 2nd ed., ed. Donald Keese (Mountain View, CA: Mayfield, 1994), 357.
33. Ibid., 357.
34. Ibid., 348.

35. Readings which highlight the *social* aspects of gendered monstrosity develop out of early feminist readings emphasizing the autobiographical aspects of the novel—as dealing specifically with Shelley’s own monstrous position with regard to patriarchal society and literary traditions. See, for example, Ellen Moers, “Female Gothic,” in *Literary Women* (Garden City, NJ: Doubleday, 1976), 91-99, and Sandra Gilbert and Susan Gubar, *The Madwoman in the Attic* (New Haven: Yale University Press, 1979), 213-47.

36. The deconstructive radicalization of feminist readings is taken up, for example, in Barbara Johnson, “My Monster/My Self,” in *A World of Difference* (Baltimore: Johns Hopkins University Press, 1987), 144-54. Barbara Freeman goes further in reading Shelley’s novel philosophically in terms of poststructuralism and even with explicit reference to Derrida’s use of “monstrosity” (Freeman, “*Frankenstein* with Kant: A Theory of Monstrosity, or the Monstrosity of Theory,” *Substance* 52 [1987]: 21-31).

37. It may be guessed by now that I take issue with the type of reading that has dominated feminist criticism of *Frankenstein* for the past several decades. I believe that the monster does indeed serve the purposes of ideological critique, but, as I shall argue later, this is only half of the story. For the monster cannot be reduced to a “mere” symbol, even if it is also that; in addition, though, the monster as human-technological hybrid embodies an anthropotechnical interface that resists discursive representation. The dominant feminist reading, while not wrong, is thus incomplete.

38. Haraway, *Simians, Cyborgs, and Women*, 2.

39. *Ibid.*, 152.

40. *Ibid.*, 157.

41. Donna J. Haraway, “The Promises of Monsters: A Regenerative Politics for Inappropriate/d Others,” in *Cultural Studies*, ed. Lawrence Grossberg, Cary Nelson, and Paula A. Treichler (New York: Routledge, 1992), 295.

42. Ibid., 295.
43. Ibid., 297.
44. Ibid., 297.
45. Ibid., 297.
46. Dworkin, “Playing God,” 443.
47. Ibid., 446.
48. Ibid., 448.
49. Haraway, “The Promises of Monsters,” 296.
50. Allen Buchanan et al., *From Chance to Choice: Genetics and Justice*, (Cambridge: Cambridge University Press, 2000), 63. Subsequent references will be cited in the text.
51. Hansen, “Not thus,” 590. Subsequent references will be cited in the text.
52. Though serious attempts are continually made by realists to win back a realm of unconditioned reality beyond the purview of language, their efforts are severely hindered by the dominance of the Wittgensteinian image of the “fly in the bottle.” Wilfrid Sellars’s important and influential essay on the “Myth of the Given,” which argues that all perception is influenced and conditioned by the “linguistic space” within which we live, along with W.V.O. Quine’s “Two Dogmas of Empiricism” and Thomas Kuhn’s *The Structure of Scientific Revolutions*, to name just a few, demonstrate the formidable odds faced by realists. Against this background, the apparently commonsensical suggestion that the metaphysical question of the existence of an external reality must be settled prior to the epistemological question of our access to that realm becomes positively revolutionary. Michael Devitt, a realist who makes this suggestion, notes with provocative irony that “realism [then] becomes [...] a somewhat boring doctrine,

perhaps even a little vulgar” (Devitt, *Realism and Truth* [Oxford: Basil Blackwell, 1984], 4).

53. Hansen expands upon his reading of Aristotle, which he explicates only briefly in his essay on *Frankenstein*, in Hansen, *Embodying Technesis*, 97-101.

54. See, for example, Don Ihde, *Technics and Praxis: A Philosophy of Technology* (Dordrecht: D. Reidel, 1979) and Ihde, *Technology and the Lifeworld: From Garden to Earth* (Bloomington: Indiana University Press, 1990).

55. Ihde, *Technics and Praxis*, 42.

56. Rachel Laudan sums up the position of many recent historians of science thus: “science owes more to the steam engine than the steam engine owes to science” (Laudan, *The Nature of Technological Knowledge: Are Models of Scientific Change Relevant?* [Dordrecht: D. Reidel, 1984], 10).

57. See chapter 9, “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective,” in Haraway, *Simians, Cyborgs, and Women*, 183-201.

58. Fukuyama, *Our Posthuman Future*, 12.

59. Haraway, *Simians, Cyborgs, and Women*, 152.

60. *Ibid.*, 2.

61. Martha C. Nussbaum, “Brave Good World,” review of *From Chance to Choice: Genetics and Justice*, by Allen Buchanan, Dan W. Brock, Norman Daniels, and Daniel Wikler, *The New Republic Online* 4 Dec. 2000. http://www.tnr.com/120400/nussbaum120400_print.html.

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