

The Prosthetic Imagination: Enabling and Disabling the Prosthesis Trope

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This article critically examines the ways in which the trope of prosthesis has been used in recent theory to understand human-technology relationships. Analyzing the trope from a number of angles, including disability, factory labor practices, mass production, and marketing, the author scrutinizes ways in which technologies are simultaneously wounding and enabling in ways for which the prosthesis trope cannot account.

Freud ([1930] 1962) echoed a common teleological fantasy of the promises of prostheses by pronouncing:

With every tool man is perfecting his own organs, whether motor or sensory, or is removing the limits to their functioning. . . . Man has, as it were, become a prosthetic god. When he puts on all his auxiliary organs he is truly magnificent: but those organs have not grown on him and they still give him much trouble at times. (p. 42)

Freud's hesitant caveat surely referred to his own prosthesis, a palate replacing an original that was removed as a result of throat cancer in 1923. His prosthesis, without which he could neither speak nor eat, caused him immense pain. Yet, if he went without it for more than two hours, the tissue circumscribing the chasm between the mouth and nasal cavity would shrink—necessitating yet another agonizing fitting session and prosthesis (Wills 1995).¹ Freud's speculations on godlike magnificence stem, perhaps,

AUTHOR'S NOTE: Many thanks to Steve Flusty; Carla Freccero; Donna Haraway; Samara Marion; Catherine Newman, Jeffrey Schnapp; Sherrie Tucker; Ann Weinstone; the members of the Cluster for Prosthetic Research at the University of California, Santa Cruz, especially Nancy Chen and Steve Kurzman; and to the anonymous readers of *Science, Technology, & Human Values*.



Science, Technology, & Human Values, Vol. 24 No. 1, Winter 1999 31-54
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from his own all too mortal experience with a technology that simultaneously enabled and wounded him. Freud's simultaneous embodiment of faulty technology and extreme optimism about technology's promise illustrates the contradiction that I explore in this article.

First introduced into English in 1553 as a term of rhetoric meaning "attached to" or "setting forth" or, literally, "adding a syllable to the beginning of a word," prosthesis did not come to bear the medical sense of the "replacement of a missing part of the body with an artificial one" until 1704 (Wills 1995, 215). As a trope that has flourished in a recent and varied literature concerned with interrogating human-technology interfaces, "technology as prosthesis" attempts to describe the joining of materials, naturalizations, excorporations, and semiotic transfer that also go far beyond the medical definition of "replacement of a missing part" (Bateson 1971; Brahm and Driscoll 1995; Gray 1995; Grosz 1994; Scarry 1994; Seltzer 1992; Sobchack 1995; Stone 1995; Wiener 1985; Wigley 1991; Virilio 1995).²

There can be no question that one is constituted by interaction with one's physical surroundings. Hegel argued that the object takes the person from abstract to actual, and Marx claimed that one's humanity is contingent on working with the world.³ As a number of recent theorists point out, the use of tools and artifacts requires a degree of incorporation into the body; Elaine Scarry (1994, 97) calls this process the "labor of animation." Yet, surprisingly little work has been done on the everyday social, economic, and semiotic mediations that occur between persons and objects in the technologically infused spaces of life in the United States. Perhaps this is the fascination held out by "prosthesis" as a potential theoretical tool with which to account for the ways in which technologies are always and never constituent of the body. On the other hand, the proliferation of its use has overburdened it; theories themselves can be, after all, both enabling and wounding.

My stakes in the trope of the prosthesis are twofold. First, I believe that the ways in which human bodies are marked, maimed, constituted, conjured, extended, and wounded by both the physical and the auratic properties of commodities is an imperative concern that arises in areas as diverse as tort law, product design, health insurance, and marketing. My second concern is how a promising trope that might in some measure account for the technological extension of bodies can also take into account the variety of bodies and the social construction of abilities. Certain bodies—raced, aged, gendered, classed—are often already dubbed as not fully whole. This article, then, cavorts along three overlapping, richly intertwined (and ultimately inseparable) axes of identity: social (race, gender), physical ability and disability, and another category that considers identity as a correlate to technology.⁴ "Prostheses" are discursive frameworks, as well as material artifacts.

Thus, the concept of prosthesis gives rise to a set of key questions: Which bodies are enabled and which are disabled by specific technologies? How is the “normative” configured? How does the use of the term prosthesis assume a disabled body in need of supplementation? How might the prosthesis produce the disability as a retroactive effect? Where and how is the disability located, and in whose interests are “prostheses” adopted?

With these questions in mind, I critique contemporary theories of prosthesis as promulgated by Mark Seltzer, Mark Wigley, Roseanne Allucquère Stone, and Gregory Bateson. I examine the rhetorical ways in which prosthesis encodes disability and the notion that the prosthesis compensates for some sort of physical disability—although this disability may be in relation only to the realm of the possible rather than a handicap in the way in which it is classically conceived.⁵ In the second part of the article, I revisit consumption and the creation of desire that sustains American-style capitalism in order to recuperate a way of analyzing the body-technology relationship. Collating critical arguments by Catherine Newman and Ann Weinstone, I examine the peculiar way in which the word *prosthesis*, defined as “that which supplies the deficiency,” can signify the fulfillment and creation of a need. Through this wordplay, the term prosthesis can include the creation of deficiency and the antidote to the deficient body and thus capture some of the ironies of technology in the late twentieth century. Finally, I argue that the disavowal and simultaneous objectification of the disabled body is at stake in the use of the term “prosthesis,” and I examine it in relation to other social disabilities.

“The Terror of the Machine”

The difficulty in writing a sustained critique of “prosthesis” as a concept is that so many authors use it as an introductory point—a general premise underpinning their work about the ways in which technoscience and bodies interact. This very generality, however, makes the delineation and interrogation of these assumptions about bodies and technologies both imperative and intriguing.

Seltzer introduces the concept of “double logic of prosthesis” in three recent writings on human-machine couplings in the early twentieth century. Drawing on a quote from Henry Ford’s (1923) enormously influential autobiography *My Life and Work*, Seltzer maintains that a double logic operates in cultural understandings of machinery through a simultaneous self-extension and self-cancellation of both the body and human agency. It is well known that Ford developed assembly line production that occasioned the breakdown of work into tiny procedures in accordance with time/motion efficiency.⁶ Not

so well known, perhaps, is the exact correlation of machinic geometry to the physical human resources required by each job. Ford wrote:

Of [7,882 different jobs at the factory,] 949 were classified as heavy work requiring strong able-bodied . . . men, 3,338 required men of ordinary physical development and strength. The remaining 3,595 jobs were disclosed as requiring no physical exertion . . . and could be performed by the slightest weakest sort of men [or] satisfactorily filled by older women or children. [Of these,] 670 could be filled by legless men, 2,637 by one-legged men, two by armless men, 715 by one-armed men and ten by blind men. (p. 108)⁷

Seltzer's full analysis of this passage and of its double logic is as follows:

If from one point of view, such a fantasy projects a violent dismemberment of the natural body and an *emptying of human agency*, from another it projects a transcendence of the natural body and the *extension of human agency through the forms of technology that supplement it*. This double-logic of technology as prosthesis (as self-extension and as self-mutilation or even self-canceling) begins to make visible the interlaced problems of the body and uncertain agency. (Seltzer 1992, 157; 1993a, 99; 1993b, 171)⁸

Although a concern for precisely these relationships between bodily extension and bodily mutilation spurs this article, I want to draw out the naturalizations that Seltzer infers, both in his use of the decontextualized Ford quote and by his own assumptions that make this choice of quote and its assumptions about "disabled bodies" do specific work in the context of his theorization of technology and bodies.

Henry Ford was the archetypal industrial American hero: a "self-made" man who rose to extraordinary wealth through hard work and discipline while simultaneously "bettering" the country.⁹ In the above passage, Ford's rhetoric presents the enabling aspects of machines as prosthetic devices that allow for the "salvage" of women, children, and disabled men who are "just as good workers if rightly placed"—they can be made into real men. Breaking down work processes necessitated the metaphorical dissembling and reconstitution of bodies to align them with their machinic counterparts, but Ford was adamant that this breaking down of bodies was metaphorical only. His factory not only helped people, but did so in the "best way" (Ford 1923, 107).¹⁰ "I have not," he explained, "been able to discover that repetitive labour injures a man in any way. I have been told by parlour experts that repetitive labour is soul—as well as body—destroying, but that has not been the result of our investigations" (p. 105). Although Ford may never have known of a

case in which an “abnormal body” was *produced* by “going through the same set of motions daily for eight hours,” 150 years previously Adam Smith had recounted in his famous pin factory analogy that a laborer working at one of a number of total procedures available in machinic culture “‘generally becomes as stupid and ignorant as it is possible for a human creature to become’ ” (quoted in Buck-Morss 1995, 448).¹¹

Smith declared that the enormous productive potential of the division of labor in an economic system is its massive capacity for quantitative production through the sheer breakdown and multiplication of processes. Forty-eight thousand pins in a day could be mass produced over the twenty or fewer pins produced in a craftperson’s day. Subdivision and repetition multiplies the capacity for production, and Ford’s distillation of body functions maximized the use of total available body parts. In fact, Ford’s machines were not prosthetic in the sense that they “compensated” for or replaced a missing limb. They were merely making optimal use of all existing human limbs. In this sense, the machines were no more or less prosthetic for fully “able-bodied men” (in Ford’s terms) than for “substandard men”: legless or armless men, women, or children. In absolute terms, Ford merely reduced excess, or unused human legs, fingers, ears, and (stereotyped notions of) strength in his factory.

For Smith, a necessary wounding of the worker occurs in mass production that goes unmentioned upon in Ford: the growth of social wealth necessitates the stunting of the individual laborer. But Smith optimistically noted the potential for regeneration through the act of consumption. Buck-Morss (1995), in her brilliant analysis of *The Wealth of Nations*, writes:

In order for the wealth of nations to be affirmed as the goal of social life, it must be a means to the end of the happiness of the individuals of which nations are composed. And so there is a sudden shift in focus. The impoverished producer shows up on the stage again, this time as the well-clad consumer. . . . With the wave of a hand, the victim of the division of labour becomes its beneficiary. (pp. 448-50)

And so the making of the worker, the construction of a “typical” ideal, and the requirements of the standard implode in the parade of consumption. If Fordism’s “major accomplishment is that of transforming its workers into the consumers of the products they make” (Ross 1995, 37), then certainly Smith’s displacement—what Buck-Morss calls his “sleight of hand”—has been integrally woven into ideological formations of mass production in capitalism since the nineteenth century.

Injured workers cum proud consumers needed a product that promised utility, versatility, and identity. The Model T could comply, coinciding with the fantasy of equality and of the typical American, for all Ford motor cars were the same. In *My Life and Work*, Ford (1923) claimed that his customers could have whatever color Model T they wanted—so long as it was black. The ultimate of early century mass-produced items, the Model T was used to saw wood, plow fields, draw water, and haul produce. It thus “embodied an egalitarian social philosophy and merged with the landscape while helping transform the agrarian democracy it seemed to represent” (Nye 1979, 126).¹² In this ideology, mass production gave Americans access to and desire for the trappings that, indeed, make one American. The mass production of the Model T epitomized the great twentieth-century American theme of repetition—repetition of labor, of product, and of identity.

For the less-than “strong, able-bodied man,” however, more is at stake. On one hand, the Ford Motor Company allowed a worker an extremely limited agency vis-à-vis his financial compensation for the operation of a machine. On the other hand, that same mass production of material culture produced a world that was made for a standardized definition of what it was to be an “able-bodied” social being. Although clearly willing to use less than able bodies for production purposes, Ford is silent on the subject of producing cars for the “less than able-bodied” body to drive. In a system of mass production, the well-clad consumer is thus limited with respect to the body that might fit within the standard for which items are produced. The naturalization of the term “prosthesis” needs further development to account for vacillating relations of technologies to different bodies.

Seltzer’s combination of self-extension and self-mutilation in the double logic of prosthesis is a valuable dialectic in an understanding of technology. Nevertheless, it masks several important aspects of the human-machine interface raised in Ford’s chapter. First, it usually is not the same body that is simultaneously extended and wounded. On the contrary, the Smithian formula notwithstanding, Ford’s profits—his usurpation of surplus labor power—marks his own extension through the use of wage labor. One laborer recalled of his visit to a Ford assembly plant in 1932:

“Every employee seemed to be restricted to a well-defined jerk, twist, spasm, or quiver resulting in a fliver [sic]. I never thought it was possible that human beings could be reduced to such perfect automats [sic]. I looked constantly for the wire or belt concealed about their bodies which kept them in motion with such marvelous clock-like precision. I failed to discover how motive power is transmitted to these people and as it don’t seem reasonable that human beings would willingly consent to being simplified into jerks, I assume that their wives wind them up while asleep.” (quoted in Hounshell 1984, 321)¹³

Second, the contradiction Seltzer points out between enabling and mutilating only makes sense if one believes that it is an amazing thing for a disabled person to work in a factory. If one views Ford's quote above from the perspective that *any* assembly line work is "enabling/mutilating" for a worker, then Seltzer could have used any example of people sweating in a factory. Seltzer's choice of this particular quote marks his use of the "crippled body" as a model of prosthesis, sliding too easily then toward the compensatory version of prosthesis, the "replacement of a missing body part with an artificial one," as a model for "the body" and its interface with technology in general. Particular kinds of psychic and physical wounds were produced in Ford's factory—not necessarily linked to his use of disabled people as laborers—that Seltzer's assumptions do not include.

Third, the physical and psychic wounding wrought by the labor of mass production (self-mutilation), which may be partially compensated for by means of consumption, requires a triangulation of analyses unavailable in a double logic. For example, one of the key ingredients to success in the world shaped by Ford was a stable labor pool. In response to a massive turnover rate, Ford controversially ensured a more stable workforce by introducing what became known as the five-dollar workday—an unrequested doubling of pay in January 1914.¹⁴ This five-dollar wage was guaranteed for only three classes of workers:

- 1) Married men living with and taking good care of their families. ("The man and his home had to come up to certain standards of cleanliness.")
- 2) Single men over twenty-two years of age who are of proved [sic] thrifty habits.
- 3) Young men under twenty-two years of age, and women who are the sole support of some next of kin. (Ford 1923, 127-28)

Ford's prosperity-sharing plan was one in which all married men, thrifty single men over twenty-two, young men, and women with dependents could partake directly, and wives of working men were admonished to keep a clean house. The "worthy" body here—in the moral terms of gender, cleanliness of habit, heterosexual union, thriftiness, family, and age—had more to do with one's ability to partake in social wealth than with able bodiedness as defined by number of limbs. Ford's "sociological department" investigated workers' private lives to determine whether or not they would qualify for the scheme (Sinclair [1937] 1984).

Thus, a consideration of the moral worth of workers' bodies—quite aside from their ability to work—must be central to a thorough understanding of body-machine couplings in the context of enabling and wounding. Furthermore, if the technology at the Ford plant enabled through its terms of

monetary compensation, then a set of behaviors and sexual organs was pivotal to both construction and regulation of gender and gender oppression.

Seltzer's enthusiasm for the term "prosthesis" seems to have led to his use of the particular quote from Ford. However, through my examination of the chapter of *My Life and Work* in which the quote appears, one can see how Seltzer's assumptions about the disabled body as the model for the principles of prosthesis may detract from an otherwise interesting theory of injury, wounding, worthiness, and gender in the early century. Questions of mutilation and enablement *for whom* are confused in the rhetorical slippage from "disabled" to "able to work" that underpins the assumption of "extension of agency" in Seltzer's double logic. As I have argued, Ford's machinery was no more inherently enabling for crippled men than for able-bodied men. If anything, the most "enabled" workers were those who garnered the most compensation through moral coincidence, as I noted with Ford's five-dollar workday and Smith's linkage of the stunted laborer and the regenerative effects of consumption. In one sense, the "prosthesis" can be read as the apparatus of production that produces not only the stunted worker but the means of his reconstitution.

Assembly line production provides one very specific ethos in which to examine the questions of enablement and disablement by technology, and the problems emerging from overgeneralizations of the prosthesis trope. Mark Wigley (1991), in his influential article "Prosthetic Theory: The Disciplining of Architecture," provides a different set of assumptions about the enabling functions of prosthesis, situated more closely in the body and intimate spaces of everyday life.

Wigley (1991) also takes the departure point as the body, although his larger thesis integrates architectural theory into the figurative body of the university: the architectural discipline itself figures a "prosthesis." His article is interesting first of all because it has provided a model for other arguments about prosthesis that similarly rely on metaphors rooted in the (disabled) body, and also because of the specific assumptions about the body that underpin the theory. Wigley writes that the prosthesis is "always structural, *establishing the place* [to which] it appears to be added" (p. 9; emphasis added).

A blurring of identity is produced by all prostheses. They do more than simply extend the body. Rather, they are introduced because the body is in some way "deficient" or "defective," in Freud's terms, or "insufficient," in Le Corbusier's terms. In a strange way, the body depends on the foreign elements that transform it. It is reconstituted and propped up on the "supporting limbs" that extend it. Indeed, it becomes a side effect of its extensions. The prosthesis reconstructs the body, transforming its limits, at once extending and convoluting its borders. The body itself becomes artifice. (Wigley 1991, 8)

The significance of this argument lies in its testimony to the difficulty of delineating the physical and psychic boundary of the body in the circuits produced through bodies and their relationships to material and social structures. I take Wigley's comments to be emblematic of a particular reading of prosthesis within a conventional mind-body dualism that directly follows his own quotation of Lou Andreas Salome's claim that the body is always a prosthesis of consciousness, and Freud's contention that consciousness itself is a prosthetic attachment. In this version of the body and its prosthesis, the body is always already a prosthesis of the mind, the mind of the drives; and the semantic content of mind, body, and prosthesis is evacuated. Indeed, the body undergoes complete erasure as it takes on the nuances of the superbeing, as in Freud's ideal of the "prosthetic god."

Wigley's (1991) notion of the defective and insufficient "body" depends on the transformative capacity of supportive limbs that reconstitute the entire collaboration as "artifice." But the unspecified deficiency, the generalized defect or absence, seems to naturalize the general form of the prosthesis and the body alike. If the prosthesis presumes an enhancement to the "natural" body in this account, then bodies and prostheses are already naturalized rather than being understood as socially constructed. In asserting that the interface of body and prosthesis is not a one-way intervention and that boundaries are easily blurred, analyses such as Wigley's are useful. However, Wigley stops short of genuinely considering how interfaces between the body and prosthesis operate in dynamic tension with the body, and he (perhaps unwittingly) takes for granted a politics that considers the body, as a general category, to be a "side effect" of technologies of production. This version of prosthesis naturalizes the enabling facets of technology such that a microscope becomes just more vision, or a printing press just faster, permanent speech. Furthermore, the metaphors of prosthetic extension are presented as if they are equivalent in some way, from typewriters to automobiles, hearing aids to silicone implants, allowing each of us to extend ourselves into the world on the liberal premise of free choice. The disabled body appears here again as a generalized form in need of "propping up." The metaphorical model for this general theory gets lost in "the body" and the "supporting limbs" in a simultaneous apotheosis (the article is illustrated with all sorts of quaintly dated pictures of prostheses, not of amputees) and disavowal (no real discussion of bodies and the multiplicity of "disabilities"). Both the prosthesis and the body are generalized in a form that denies how bodies can and do "take up" technologies of all kinds. However, the specificities demand to be read faithfully. How do body-prosthesis relays transform individual bodies as well as entire social notions about what a properly "functioning" physical body might be?

Not calibrating the differences in disability, ability, and godlike ability leads to the obliteration of issues of bodily expectations; that is, what it means to be a productive and consumptive agent at the turn of twenty-first-century capitalism. I emphatically do not mean that distinct boundaries can or should be drawn and maintained between some naturalized and organic “body” and various forms of prosthetic attachments; rather, I mean to bring into relief the material differences of absences. For example, both artificial legs and automobiles are media of mobility that also can be the cause of multiple sites of wounding (from blistering and cutting in the first, to pollution and road kill in the second). Both require and assume certain political, biological, and semi-otic conditions of possibility that are enabling in certain capacities for certain people and disabling for overlapping sets of bodies and interests. But the differences in social constructions of “needs” remain unaccounted for by Wigley’s (1991) theorization—the material differences of the deficiencies, or defects, that “need” supplementing or correcting are not specified.

Stone (1995) uses the tropes of prosthesis to structure her comments on a Steven Hawking lecture:

Exactly where, I say to myself, is Hawking? Am I any closer to him now than I was outside [watching him on video]? Who is doing the talking up there on stage? In an important sense, Hawking doesn’t stop being Hawking at the edge of his visible body. There is the obvious physical Hawking, vividly outlined by the way our social conditioning teaches us to see a person as a person. But a serious part of Hawking extends into the box in his lap. In mirror image, a serious part of that silicon and plastic assemblage in his lap extends into him as well . . . not to mention the invisible ways, displaced in time and space, in which discourses of medical technology and their physical accretions already permeate him and us. No box, no discourse; in the absence of the prosthetic, Hawking’s intellect becomes a tree falling in the forest with nobody around to hear it. On the other hand, with the box his voice is auditory and simultaneously electric, in a radically different way from that of a person *speaking* into a microphone. Where *does* he stop? Where are his edges? The issues his person and his communication prostheses raise are boundary debates, *borderland/frontera* questions. (p. 5)

In Stone’s essay, Hawking’s box recalls the blind man’s stick in Bateson’s (1971) cybernetics:

If you ask anybody about the localization and boundaries of the self . . . confusions are immediately displayed. [C]onsider a blind man with a stick. Where does the blind man’s self begin? At the tip of the stick? At the handle of the stick? Or at some point halfway up the stick? These questions are nonsense,

because the stick is a pathway along which differences are transmitted under transformation, so that to draw a delimiting line across this pathway is to cut off a part of the systematic circuit which determines the blind man's locomotion. (p. 7)

Boundary questions are nonsense, as Bateson (1971) argues, to the extent that strict boundaries are always blurred in human-machine interfaces. Differences do necessitate transformation: wearing glasses adjusts vision but also changes the comportment of the head and neck and over years changes the contour of the muscular-skeletal infrastructure, and the use of a thirty pound artificial leg strapped over the shoulder in the early century would have changed the weight distribution and physiology of the body.¹⁵ The man is "in" the stick, just as Hawking is "in" the box. In another way, however, the questions are *not* nonsense. One's ability to extend one's agency is always influenced by one's relation to variously construed interfaces. Here, Stone is apposite in emphasizing the importance of delineating those pathways through which material and discursive circuits are predetermined and by whom they continue to be determined. Hawking is "in the box," but the box is part of a social construction of unequally accessible, potentially prosthetic, *and* wounding constellation of technologies.

Questions of human-prosthesis or human-machine interfaces are central to one's active agency in a community embedded in prefigured modes of technological praxis that always already privilege certain body configurations. How, for example, does a stick "compensate" for eyes in negotiating the ways in which cities, spaces, and worlds have been constructed—how do senses relate to one and other, and how are they hierarchized and culturally privileged? Stone (1995) writes that Hawking's prosthesis radically differs from a voice, even an amplified voice. What concerns me here, however, is the importance of the precise difference between his voice (as intention), made audible through his black box, and another speaker's amplified voice. For surely the voice that comes only from the throat is also, in a certain sense, prosthetic—a device (trained, disciplined, accented, and pitched through many screens of personal, educational, and cultural intervention) through which agency is established, communicated, asserted. No voice, no audience, no discourse—likewise, silent falling trees in forests all over the world.

Again, in both Stone (1995) and Bateson (1971), one finds an oddly constructed—or perhaps underconstructed and overobjectified—disabled body standing in for questions about bodies, selves, agency, and technology. I am suggesting here that borderland/*frontera* debates might also consider the social borderlands around Hawking's edges. The blind man's need for locomotion and Hawking's need for communication precede the absorption of a

stick or a silicon and plastic assemblage. Indeed, these absences assert the body's disability—its inability to function within its personal and political regimes of expectations.¹⁶

Seltzer, Wigley, Stone, and Bateson, importantly different, omit meaningful discussions about disabled bodies. Seltzer does so by eliding the important specifics between bodies, as constructed as abled and/or disabled, that could bring into relief some fascinating observations about the self-extension and self-cancellation of machine culture and its requirements of repetition and standardization in the early century. Wigley is significantly more overt in his disavowal of a disabled body in his use of a nostalgic notion of prosthesis in the modeling of the transformative potential of bodies with machines. As does Stone, Wigley understands the deficiency or defect to arise before the prosthetic (in whatever form). I suggest, however, that this is not *necessarily* the case, and in the following I specify the difficulties in those formulations of the problematic of technology as prosthesis.

As a segue into the next section of this article, in which I examine consumptive aspects of “prosthesis,” I look to the example of the automobile air bag to highlight issues of mass production, averages, and technology in relation to the enabling and disabling of bodies. What becomes apparent in this example is the way in which worthiness, or appreciation for the value of the user's body, is built into mass-produced technological systems. The importance of the idea of the built-in social and physical relations and interfaces between particular bodies and particular machines is at stake in questions of prosthesis.

Mass production entails the repetition of one design of a product for the use of many bodies. Mass production of objects for consumption entails the calculation of “averages”—the average height, weight, finger span, and so on of an imagined consumer. Built into that calculation lies the “residual” concern of the consequences of those designs for bodies that do not approximate the calculated average—the historically contingent, yet absolutely material, constitution of an “accident prone” population. Deficiency and disablement in this context result not only from one's body's relationship to purposefully figured average but also from one's relationship to the cultural investment of the material objects in relation to particular interfaces. For example, air bags were installed in automobiles in 1991 as a safety device to cushion drivers in serious accidents. After having been delayed by auto manufacturers for years, air bags have now been credited with saving over 1,700 lives.¹⁷ Inflating at 200 miles per hour from a little cubbyhole in the steering wheel, air bags also cause a number of injuries, including severe cuts caused by the plastic cover flying off the steering wheel, the amputation of hands and arms caught in the way of the inflating bag, broken bones, tearing of the heart and internal

organs, and fatal head injuries (Harper 1997). Although in a recent poll 60 percent of adults believed that air bags save children's lives, air bags have been blamed for the deaths of thirty-eight children and twenty-four women and small drivers in low-speed accidents (Associated Press 1997a). The air bags are designed to "deploy in front of an average adult male's chest" (Associated Press 1996); they are designed to save not the largest percentage of drivers but the largest percentage of male drivers. Consequently, 42 percent of women compared to 24 percent of men received facial injury from the air bags. Whereas 50 percent of drivers under 5' 5" received facial injury, only 18 percent of drivers 5' 11" and over did (Associated Press 1997b).¹⁸

So size, a heavily gendered concept, might be considered a disability in relation to rigid requirements produced by design decisions of mass production. In this case, height factors materially in the calculation of "worthiness" that affects the integrity of bodies and their relation to technology.¹⁹ These design decisions, in a mass-produced environment, determine the ways in which bodies materialize and figure which bodies' borders remain literally stable.

Somewhere among the century-long histories of production, consumption, injury, regulation, and marketing of the car is embedded the stabilization of an effect of the "accident." The accident presumes an unforeseen event, a mishap without cause. Yet, because of the predictability of deaths by car crashes, the air bag has been developed as a safety mechanism in a machine that has become a near necessity in the United States. The air bag complicates the automobile as prosthetic model in several crucial ways. First, it demonstrates one way in which economic interests and design questions create populations that are more at risk of injury and death. Second, it displays that, contrary to common "economic" sense, design decisions are not made to satisfy averages. Air bags are fitted to keep an average male driver without a seatbelt safe, despite the fact that in most states seat belt use is required by law, and that the average male driver is significantly taller than the average driver. Relationships to so-called averages are not only about the material calculations of, say, which height would be ideal to run a particular machine, they are also self-generating questions of the worth of different bodies that make them more or less "fit" social criteria for deserving bodily integrity.

Supplementing Deficiencies

Following Derrida's (1974) "logic of the supplement," Catherine Newman (1997) notes that in sentences about figurative and material prostheses, the prosthesis is sometimes used in an idiom such that it will "supply a

deficiency.” Thus, prosthesis falters between two renditions of meaning; a prosthesis can fill a gap, but it can also diminish the body and create the need for itself. For instance, a chapter title in Ambrose Paré’s *On Monsters and Marvels* reads in translation: “Of the Meanes and Manner to repaire or supply the Naturall or accidental defects or wants in mans body.” This phrase can be read straightforwardly as meaning the compensation for an accidental defect. But it also can be literally read as a pun on the word *supply*—as furnishing the very need for a prosthetic enhancement. Either way, the definitional components of the term prosthesis represent the body as a diminished thing—not complete in itself. In the second part of this article, then, I develop this play on the word “supply” to suggest a way of thinking about the various exchanges of bodies and machines in the socioeconomic marketplace through the metaphor of prosthesis. In this section, I propose a reading of the consumer-commodity relationship rooted in a theorization of the consumer addict, put forth by Ann Weinstone (1996) and based on readings of Karl Marx, Eve Kosofsky Sedgwick, and Jean Baudrillard. Finally, I conclude with a reading of Phillip Howard’s (1994) recent best-seller *The Death of Common-Sense: How Law Is Suffocating America* to further problematize the physical concept of deficiency and compensation that the model of prosthesis assumes and to depict the depth of disdain for disabled bodies and consequently for the importance of taking seriously the issues of disabled people in theory concerned with social justice.

Between 1908 and 1927, the Ford Motor Company produced 15 million Model Ts. By the early twenties, Ford’s control over the market was dwindling, and by 1926 it had dropped to 30 percent despite a deliberate schedule of price reductions (Hounshell 1984, 264). What the General Motors Company had established years before, and what Ford was loath to institute, was a framework that emphasized marketing over pure production. Even in the early century, the annual model change, the automobile fashion industry, and planned obsolescence all operated to configure the creation of desire and the instigation of an unquenchable “need” that became the touchstone of flexible mass production. As Charles Kettering of General Motors put it in 1932, the goal was to keep “‘the consumer dissatisfied’” (quoted in Hounshell 1984, 267). Kettering’s reasoning implies the construction of precisely that gap between what is promised through the rhetorical structuring of a commodity and the “thing” itself—in Marx’s (1977, 435) words, the “easily understood” material object. (And I have shown how even the material object has, built within it, certain consequential and ideological assumptions about worthy bodies that are not necessarily easily understood. Thus, the sign, the thing, and the consumer are not distinct but semiotically and materially co-constitutive.)²⁰

In the history of automobile manufacture, an apparatus of marketing strategies has been erected that has entailed the careful creation—and more importantly sustenance—of a steady market of buyers. As in the case of cigarettes, the inherent dangers of the products have been conscientiously disclaimed in the overt sexualization of the products in marketing strategies that entwine the product with the identity and potency of the owner and, ultimately, with a version of freedom itself. Markets are created afresh, for example, by stabilizing spatial environments such that a car is a necessity (compensating for the “deficiency” of not being able to get from place to place without one, or being dependent on poorly funded public transportation).

Locating the commodity as an object caught within a web of desire, addiction, and the promise of transcendence, Weinstone (1996) suggests that the brand of freedom promised by the commodity “may never be fully and satisfactory possessed, only imperfectly exercised in the chase.” As certain theories of the phantom limb describe a yearning for the “whole” body that focuses on the experience of feeling in a missing limb, the freedom proffered by marketing attempts to evoke a certain nostalgia in the consumer in a promise of a “complete” body. Weinstone writes that the “always already in the future of the consumer happily caught in the fluctuation between freedom and addiction, materializes in the surface texture of the PowerBook which itself fluctuates from a frictionless glide to the oddly flesh-textured nap of the surface of the wrist rest.” The sleek, powerful, portable, overinscribed commodity—drenched in the signs of leisure, affluence, hipness, and success—finally self-consciously melds into the very epidermis of the user’s anatomy as a hint, an inkling, of a free, bionic future of integrated body and machine. The illustration she chooses could be replaced with the car or any number of products. In a marketplace economy, freedom is only ever that which can be bought, never what one already has or is.²¹ The organization of human affairs based on the belief of ever-increasing production and consumption can only result in the perpetual creation of need and desire to both produce and consume. The creation of bodies that are considered never whole enough is compensated for by the promise of the prosthetic that assures that, as Weinstone concludes, “the fix the consumer addict chases is not simply the next thing, but the image, the materialized inscription that by its own iteration seems to promise protection from the decay of the ideological freedoms it constructs and represents.”

This “truth” of compulsion has become a self-conscious strategy in various marketing tactics, from potato chips to computers to magazines to cigarettes. In a recent subscription drive, *Wired* magazine quotes one of its readers: “ohgodohgodohgodohgod don’t stop.” *Wired* magazine’s success in tapping the desire of compulsion and the fetish of high tech is precisely an

apotheosis of a prosthetic fantasy that turns on a choice to not choose. Just what cannot be stopped for this reader, except the overt sexual relationship with both the zine and the technology it rehearses? And again, if the uneasy truth of the smoker advocacy campaign rests on the vision that the right to smoke is a human right, then it also rests unspokenly on the right to not be able to choose otherwise—the right to be addicted and maintain affordable access to the addictive substance and to the medical care that the addiction will overwhelmingly statistically require. Sedgwick (1992) writes about the advertising campaign of cigarette manufacturers on smokers' rights:

I see these ads as the warning taunt of a blackmailer, aimed at smokers, at driving ever in and against them the ugly twisting point that in the present discursive constructions of consumer capitalism the powers of our "free will" are always already vitiated by the "truth" of compulsion, while the powers attaching to an acknowledged compulsion are always already vitiated by the "truth" of our free will. (p. 592)

The body, as a site of corporate inscription, is also the material repository through which the lie of the pure voluntariness of consumption is made apparent.

Thus, the promise of prosthetic technologies begs to be read in the context of the economic-discursive apparatuses that do the promising. These institutions, in large part, do the social-material work of constructing normative values of wholeness. The supply of deficiency model of a theory of prosthesis provides one possible, although limited, way to interrogate the flip side of the compensatory model of prostheses in the context of consumer capitalism. With a trope that is fertile enough to question not only where bodies end but in whose interests those boundaries are constituted, one might explore accompanying issues. For example, if the body is dependent on a prosthetic addition, then how does the term "dependent" operate in a system of needs? It may be true, as Wigley (1991) argues, that the implanted "body becomes artifice," but how? And what kind of artifice? There is a difference in political, economic, semiotic, biological, and political register, for example, between dependence on a cochlear prosthesis, a cane, a car, and a cigarette in terms of the apparatuses that create and sustain the needs for these objects as they are psychically invested in body images.

Rights, Desires, and Prosthetic Erasure

I have been arguing that the medically based trope of the prosthesis is insufficient to analyze fully the terms of worthiness, access, injury, and enablement that infuse the questions of body-technology boundaries. Ultimately, the trope turns on the problem of the “wholeness” of the body and thus cannot but invoke the questions of whose bodies are whole and how this wholeness is culturally determined and recognized. Although the passage of the Americans with Disabilities Act has given 35 million Americans unprecedented access to social goods, it has also spawned a backlash against disabled peoples. I, therefore, consider the ways in which the prosthesis trope both depends on and disavows a very particular model of physical impairment in its transition from medical to metaphorical.

In this section of the article, then, I turn to a recent book, *The Death of Common Sense* (1994). On *The New York Times* best-seller list for many weeks, this book sparked the Republican’s Common Sense Legal Reforms Act of 1995 tort reform bill. Its author, Philip K. Howard, out to prove his subtitle *How Law Is Suffocating America*, has strung together a series of powerfully self-righteous anecdotes ridiculing OSHA, civil rights, the Endangered Species Act, and the FDA. Some of his most vituperative attacks are against disabled people’s rights and the application of the Americans with Disabilities Act. A representative episode considers the ethical issues of valuing one group’s desires over another’s in the use of public buses.

The extra cost of buses that have a lift for wheelchairs meant that 10% fewer buses were purchased; then service was cut back; then a grandmother in the Bronx had to wait and extra half hour in the cold in a dangerous neighborhood. . . . A friend . . . usually takes the bus up to Third and Manhattan every morning, but now gets off and waits for another bus whenever the first stops for certain wheelchair user [she says]: “He takes almost ten minutes getting on, and ten minutes getting off. I’m late for work every time.” (p. 144)

In a chatty hysteria typical of Republicanism, the old body, the poor body, or the woman’s body comes into play only as the body that suffers as a consequence of another body’s—a disabled body’s—needs or (severely disdained) rights. In this story, the aging female body waits an extra half-hour at the cold bus stop at night because of the wheelchair-bound body’s “desire” to get on the bus. The invidious readerly engagement that this text demands funnels blame toward the disabled person, the person with no geographical or kinship ties—not our “friend” from the neighborhood, not the “grandmother” from

another neighborhood. For Howard, the generalized form of the body's rights is fundamentally manifested in its ability to choose. The woman *could* choose to get off the bus and not wait for the wheelchair-bound person to get on, the wheelchair-bound person *should* choose not to use the bus for fear of putting other people out, and finally the "grandmother" is left with no choice but to wait. The "grandmother," by this logic, is the person with whom the reader sympathizes—and it is for her sake that Americans are asked to limit disabled people's rights to access.

From the prosthesis mind set, attention is turned to the physically disabled body, considering the special bus as its prosthetic. However, the rhetoric of this passage also turns on the reader's cultivated sympathy or pity for the other not "whole" bodies. Raced bodies, aged bodies, gendered bodies are always already not whole enough and require more subtle tools than those that can be squeezed out of the term "prosthesis" in its many incarnations. My goal in this article is not to delimit what, ultimately, might separate "disabled" bodies from socially or contextually "inadequate" bodies, for I believe these questions to be contextually specific and politically strategic. The point here is, rather, that the terms of prosthesis metaphors can too easily elide or defer these questions altogether.

As a final example, consider Audre Lorde's (1980) experiences as a post-mastectomy survivor in 1977. She documents the postsurgical pressures—from surgeons, plastic surgeons, nurses, doctors' office receptionists, and American Cancer Society representatives—to wear a prosthesis. All conveyed the message "you will be just as good as you were before, nobody will know the difference"—as if the one-breasted woman would not herself know that a breast had been removed from her body (Lorde 1980, 42). To Lorde, the intense pressure to undergo breast reconstruction encourages a woman to forgo entirely the experience of loss, leaving her with no room to "weep, rage, internalize, and transcend her own loss. She is left with no space to come to terms with her altered life, not to transform it into another level of dynamic existence" (p. 63).

In Lorde's analysis, the medical use of the prosthesis and the elision of women's loss serve several functions. First, despite the multiple ways of coming to terms with loss in women's messy, noncategorical experiences with breast cancer and mastectomy, the focus on breast reconstruction makes "objective" recovery the primary goal of mastectomy treatment. Subjective recovery is seen as following the objective. Second, the sheer magnitude of the problem of breast cancer and the number of women who suffer from it is erased by reconstruction—even mastectomy survivors cannot identify each other. Unlike war wounds that, Lorde argues, can act as reminders of the war

and celebrate the survivor, the wound that is not marked is the survival that cannot be celebrated, the suffering that cannot be mourned.

Thus, the social, physical, and rhetorical constitution of “whole” bodies is deeply intertwined with a myriad of concerns such as passing; marking, celebrating, or invoking absence; calculating averages; enforcing labor practices; and speculating on human potential for godlike magnificence. No one model could even begin to approach these crucial and fundamental effects and affects of human-technology interfaces. Nevertheless, the examination of the ways in which the trope circulates in current theory turns up uses as fascinating as they are slippery.

Conclusion

Leading advertising copywriter Helen Woodward wrote: “ ‘If you are advertising any product never see the factory in which it was made . . . Don’t watch the people at work . . . Because, you see, when you know the truth about anything, the real inner truth—it is very hard to write the surface fluff which sells the stuff’ ” (quoted in Hounshell 1984, 322). The institution of advertising has been at work in the creation of languages of displacements; indeed, displacement may be the “activity most embedded in ideologies of the free market” (Ross 1995, 22). After all, Haraway (1989, 153) captures this irony in her poignant observation that “[o]ur best machines are made of sunshine; they are all light and clean because they are nothing but signals . . . and these machines are eminently portable, mobile—a matter of immense human pain in Detroit and Singapore.” Sunshine, open and free, recalls all those generic signifiers that are associated with consumption and fully dismembered from the exigencies of both material production and interfacial consumption. Technology as prosthesis, technology as antidote, is always given prominence in these accounts, and the wounding ingredients of technological production remain continually under ontological erasure.

The preceding work has attempted to unsnarl the complexities of the use of prosthesis as a tempting theoretical gadget with which to examine the porous places of bodies and tools. I have endeavored to recuperate some of its ironies and to articulate some of its disavowals. The assumptions of a physically disabled body and the liberal premise of the choice of the perfect body, regardless of identity markers that underwrite the use of the term, overwrite several considerations that I have made explicit. The classification of what counts as a worthy body has patterned human relations with machines since the beginning. This point was demonstrated by the types of physical and

mental wounds that resulted from repetitive labor in the Ford factory, the remuneration of certain laborers over others for the same work based on gender and conformity to heterosexual norms, and the types of injuries suffered by people who do not conform to sets of averages calculated to suit political or economic ends. Replacements are never neat and tidy; they do not simply reiterate the very same body that was before. The prosthesis, in whatever form, establishes oscillating relations of mutual effect, affect, dependence, and extension in the full irony that Freud's imaginings of the prosthetic god and his experience with his prosthetic palate raises. I suggested that prosthesis may be recuperated as a useful, although limited, trope insofar as it can be used to underscore the ironies of supplying deficiencies, in the sense of instigating the needs for the consumption of technologies. Finally, I argue that identity differences and their material consequences are simply incomprehensible through the prosthetic lens.

Notes

1. Wills (1995) quotes Ernst Jones: "The huge prosthesis, a sort of magnified obturator, designed to shut off the mouth from the nasal cavity, was a horror; it was labeled 'the monster'" (p. 92).

2. Although several of these authors may not consider themselves science and technology studies scholars proper, many of them share citational networks with science and technology studies scholars.

3. See Radin (1993) for an important argument on the interconstitutivity of property and personhood. For more on body/artifact relations in law, see Hyde (1997).

4. The idea of a technological identity is not fully explicated here, yet it is my premise that technologies, from cars to silicon implants, allow, affect, and take for granted certain identity positions that, like race or physical disability, are relational. I am suggesting that one's relationships to technologies might also be interpreted as identities in certain situations. The pedestrian, for example, drenched by passing cars as she attempts to cross a street, may be defined by her lack of the technology that would allow her to negotiate the political space of the road. Then again, the "trucker" or the "biker" is (self)defined in relation to her mode of conveyance.

5. Tanenbaum (1986) notes that in 1982, the OTA defined handicap as "socially, environmentally and personally specified limitation"—an able-bodied person can be handicapped by obstacle-ridden environments.

6. A debate smolders around the question of Taylor's influence on Ford, especially since Taylor's (1911) *Principles of Scientific Management* was published just before Ford's significant innovations, which clearly followed many lines of Taylor's suggestions. Nevertheless, Ford claimed that the Ford Motor Company had not relied on Taylorism or any other management system. Differences prevail between Fordism and Taylorism—the most important of which is that where Taylor sought to make labor scientifically efficient, Ford sought to eliminate it altogether with mechanical means. This debate is elucidated in careful detail in Hounshell (1984).

7. Ford (1923) begins the chapter in which this quote appears, "The Terror of the Machine," with the following: "Repetitive labour—the doing of one thing over and over again and always in

the same way—is a terrifying prospect for a certain kind of mind. It is terrifying to me . . . but to other minds, perhaps I might say to the majority of minds, repetitive operations hold no terrors. In fact, to some types of minds, thought is appalling” (p. 103).

8. See also Seltzer (1995, 132) in which the double logic of prosthesis is mentioned without the Ford quote. It is both tantalizing and frustrating that Seltzer never goes on to a more precise analysis of Ford’s quote or of the terms of “prosthesis” and its double logic, and yet uses the passage quoted here as the singular explanation of what he calls the double logic of prosthesis.

9. In 1916, the *Chicago Tribune* accused Ford of being an anarchist. He sued for \$1,000,000 libel, which, due to an attorney’s error, focused on the whole *Tribune* article rather than on the single word *anarchist*. Because the article also called Ford “ignorant,” the *Tribune* put him on the witness stand in order to prove his ignorance. Unable to define *commenced*, *chili con carne*, or *ballyhoo*; stating that the American Revolution had been in 1812; and identifying Benedict Arnold as “a writer, I guess,” his final defense rested in appeal to “ignorant idealism.” Ford won six cents in damages, and more important, the hearts of many Americans (story related in Nye 1979).

10. At final count, Ford had employed “9,563 sub-standard men.” Ford (1923, 107) writes: “It would be quite outside of the spirit of what we are trying to do, to take on a man because they were crippled, pay them a lower wage, and be content with a lower output. That might be directly helping them, but it would not be helping them in the best way.” He contends that the company would never let go of a man because of his physical condition, except in the case of contagious disease.

11. The division of labor in pin manufacture had already been well established by 1772, and the manual process was illustrated in Denis Diderot’s *L’Encyclopedie* (Petroski 1992, 53).

12. Celebrating another all-American product, Andy Warhol extolled: “You know that when you order a Coke you get the same as when Elizabeth Taylor orders a Coke, they are all the same and they are all good” (poster on display at the World Coca-Cola Museum in Atlanta, Georgia).

13. Hounshell takes the quote from the *Tri-City Labour Review* (also quoted in Ewan 1976).

14. Although in his autobiography Ford discusses only the beneficence of his act, the labor turnover rate was, in 1913, a phenomenal 380 percent due to the new machine system. A pay increase was initiated then that set \$2.34 as the minimum daily wage, but labor problems did not cease. After the instigation of the new five-dollar-a-day pay scale, one housewife wrote in 1914 that “[t]he chain system you have is a slave driver! My God! . . . That \$5 a day is a blessing . . . but *oh* they earn it” (quoted in Hounshell 1984, 259).

15. A tip of the pen to Val Leoffler, who pointed this out in relation to my own spectacle-wearing technique.

16. Scott (1969, 121) argues that the blindness system—that is, the network of agencies, organizations, and programs for the blind—creates the experience of being blind: “[B]lind men are not born, they are made.” There are of course limits to this argument. Consider also cases such as worker’s compensation settlements that redress the work injury by paying in accordance with a percentage of disability that a worker suffers. In societal organizations where certain body parts and movements are valued over others, a seemingly minor disability may have major consequences.

17. Ralph Nader’s (1965, ii-vi) research found that the idea of air bags was technologically feasible by the 1940s, and technical papers on the idea were given in 1964-65, by which time they had reached a “very high level” of reliability and could be produced at a cost “no higher than a seat belt.” As with the introduction of seat belts, the industry stalled and stalled, and then finally with increased pressure came out with “their” great idea.

18. The “shortness bias” is also built into seat belt designs.

19. See Pope (1991) for an overview of the scope of disability in the United States, and Wendell (1996) for a thoughtful discussion on setting disability “standards” and definitional problems in general.

20. To distinguish the “easily understood” thing from the fetishized commodity, which is a “very query queer thing, abounding in metaphysical subtleties,” Marx writes, “So far as it is a value in use, there is nothing mysterious about it, whether we consider it from the point of view that by its properties it is capable of satisfying human wants, or from the point that those properties are the product of human labour” (1979, 435).

21. A sociological model is represented by Korten (1995) as a “downward spiral of alienation” through which alienation creates a sense of social and spiritual emptiness—advertisers assure us their product will make us whole; buying their product requires more money; quest for money widens the gap and creates alienation between ourselves, family, and community; and so on.

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